CHAPTER 9 – FIRE PROTECTION SYSTEMS - AMENDMENTS

The ninth edition building code became first effective on October 20, 2017 and, with a shortened concurrency period, the new code came into full force and effect on January 1, 2018.

The new, ninth edition code is based on modified versions of the following *2015 International Codes as published by the International Code Council* (ICC).

- The International Building Code (IBC);
- International Residential Code (IRC);
- International Existing Building Code (IEBC);
- International Mechanical Code (IMC);
- International Energy Conservation Code (IECC);
- International Swimming Pool and Spa Code (ISPSC);
- Portions of the International Fire Code (IFC).

Massachusetts amends these code fairly significantly to accommodate for unique issues in the commonwealth. This package of amendments revise the IBC, IEBC, IMC, and IECC.

Please remember that the Massachusetts amendments posted on-line are ***unofficial versions*** and are meant for convenience only. Official versions of the Massachusetts amendments may be purchased from the State House Bookstore @ **Shop the Bookstore** and any of the I-Codes may be purchased from the International Code Council (ICC) @ **iccsafe.org**.

Additionally, the ICC publishes transition documents that identify changes from the 2009 to the 2015 I-Codes for those who may have interest.

- **International Building Code (IBC) Transition**
- **International Residential Code (IRC) Transition.**

780 CMR: MASSACHUSETTS AMENDMENTS TO THE *INTERNATIONAL BUILDING CODE 2015*

CHAPTER 9: FIRE PROTECTION SYSTEMS

901.1 Add four notes as follows:

Note 1: In subsections 904.2, 907.1.1, 909.7, 909.8, 909.9, 909.10, 909.19, the term "fire official" or "building official" is to be substituted with the terms "building official in consultation with the fire official". The fire official may appeal a building official action in accordance with 780 CMR 1.00: *Scope and Administration (Unique to Massachusetts).*

Note 2: In subsection 903.1.1, the term "fire code official" is to be substituted with the term "building official and fire official".

Note 3: In subsections 916.1 through 916.6.3, the term "fire code official" is to be substituted with the term "fire official".

Note 4: Reference to the IFC shall be applied in accordance with 780 CMR subsection 101.4.5.

901.2 Replace the exception as follows:

Exceptions:

1. Any fire protection system or portion thereof not required by 780 CMR shall be permitted to be installed for partial or complete protection, provided that such system meets the requirements of 780 CMR.
2. Where alternative fire protection designs, which vary from any prescriptive requirements of 780 CMR 9.00, are to be utilized, the owner shall engage an independent registered design professional to review said alternative design. The scope of the review shall include, but not be limited to:
   a. Design assumptions, methodologies, and resulting proposed system designs to determine whether or not:
      i. the proposed fire protection systems and any other systems which are affected by the alternative design are consistent with the general objectives and prescriptive provisions of 780 CMR 9.00;
      ii. they all conform to accepted engineering practice.
   b. Preparation of a written report to the building official as to the appropriateness of the proposed design specifically listing any variances from the prescriptive provisions of 780 CMR 9.00 and describing, in detail, the design provisions used to achieve compliance. If the reviewing engineer concurs with the proposed design, the owner shall make application for a variance to the Appeals Board in accordance with 780 CMR 1.00: *Scope and Administration (Unique to Massachusetts).* In addition to all supporting information and materials, the reviewing engineering's report required in accordance with this exception shall be included in the application for variance. A permit shall not be issued until the variance, if required, has been granted, or unless the permit is issued in part in accordance with 780 CMR 1.00.

   When a variance is granted in accordance with this exception for a bulk merchandising retail building as defined in 780 CMR 4.00: *Special Detailed Requirements Based on Use and Occupancy* and when the condition is common to future buildings of the owner, the BBRS, upon request of the owner, may provide that the variance shall be applicable to such future buildings. If such request is made, a quorum of the BBRS shall hear the appeal. Each such application to a future building will be subject to determination as prescribed in 780 CMR 1.00: *Scope and Administration (Unique to Massachusetts)* by the building official in consultation with the fire official that its use is in conformity with the terms of the variance.

901.2.1 Revise subsection as follows:

901.2.1 Document Submittal Process. This process includes the three tiers of the minimum document submittal requirements. This process does not preclude the permit applicant from submitting additional documents; for example shop drawings along with the construction documents at time of permit application.

9.00: continued

Tier One, Construction Documents. Prior to issuance of a permit, construction documents for the fire protection system shall be submitted in accordance with section 107.1.2 and a permit obtained prior to the installation of fire protection systems or modifications, alterations, additions or deletions to an existing fire protection system. The construction documents shall contain sufficient information to completely describe each of the fire protection system(s) for which a permit is to be issued. The construction documents shall include the following:

a. Each system shall be described in a narrative report, which contains:
   i. design methodology for the protection of the occupancy and hazards in accordance with 780 CMR and applicable NFPA standards;
   ii. sequence of operation of all fire protection systems and operations; and
   iii. testing criteria to be used for final system acceptance.

b. Building and site access for fire-fighting or rescue vehicle(s) and personnel or both.

c. Fire hydrant(s) location and water supply information.

d. Type/description and design layout of the automatic sprinkler system(s).

e. Automatic sprinkler system(s) control equipment location.

f. Type/description and design layout of the automatic standpipe system(s).

g. Standpipe system hose valve(s) type and location.

h. Fire department connection type(s) and location.

i. Type/description and design layout of the fire protective signaling system(s).

l. Fire protective signaling system(s) control equipment and remote annunciator.

k. Type/description and design layout of the smoke control or exhaust system(s).

l. Smoke control or exhaust system(s) control equipment location.

m. Building life safety system features (auxiliary functions) required to be integrated as part of the fire protective signaling system(s).

n. Type/description and design layout of the fire extinguishing system(s).

o. Fire extinguishing system(s) control equipment location.

p. Fire protection system(s) equipment room location.

q. Fire protection system(s) equipment identification and operation signs.

r. Fire protection system(s) alarm/supervisory signal transmission method and location.

s. Fire command center location.

t. Type/description and location of any emergency alarm system.

u. Type/description and location of any alternative fire suppression system or protection.

v. Type/description and location of any carbon monoxide protection.

w. Emergency responder radio coverage type/location.

2. **Tier Two, Shop Drawings.** Prior to installation of fire protection systems, shop drawings, where applicable, shall be submitted in accordance with section 107.1.2 and shall contain, but not be limited to; detailed design layout, equipment specifications, system sequence of operation, and analysis to substantiate the design. Shop drawings shall note the name(s), license number(s) and license expiration date(s) of the contractor(s) installing the fire protection systems.

Exception: For shop drawings of Fire Alarm and Detection Systems, *see* section 907.1.2 for applicable requirements.

3. **Tier Three, Record Drawings.** As built plans shall be provided to the owner for all fire protection and life safety systems that are sealed as reviewed and approved by the registered design professional or legally recognized professional performing construction control. Where changes to original shop drawings are minor, a list of as-built changes shall be permitted to be submitted where sealed and reviewed and approved by the registered design professional or legally recognized professional performing construction control in accordance with 780 CMR 1.00: *Scope and Administration (Unique to Massachusetts)*.

9.00: continued

901.3 Revise section as follows:

901.3 Maintenance. All fire protection systems shall be maintained in accordance with applicable provisions of 527 CMR: *Board of Fire Prevention Regulations*. The owner of every building or structure shall be responsible for the care and maintenance of all fire protection systems, including equipment and devices, to ensure the safety and welfare of the occupants. No person shall shut off, disconnect, obstruct, remove or destroy, or cause or permit to be shut off, disconnected, obstructed, removed or destroyed, any part of any sprinkler system, water main, hydrant or other device used for fire protection or carbon monoxide detection and alarm in any building owned, leased or occupied by such person or under his or her control or supervision, without first procuring a written permit so to do from the head of the fire department of the city or town wherein such building is situated in accordance with M.G.L. c. 148, § 27A.

When installations of fire protection systems are interrupted for repairs or other necessary reasons, the owner shall immediately advise the local fire department and shall diligently prosecute the restoration of the protection.

901.5 Revise section as follows:

901.5 Acceptance Tests. Fire protection systems shall be tested in accordance with the requirements of 780 CMR and NFPA standards and approved testing criteria and operational sequence as submitted in section 901.2.1(1)(a). When required, the tests shall be conducted in the presence of the building official and fire official or their designee. The building official may authorize the fire official as designee. The fire official may authorize the building official as designee.

901.5.1 Add subsection as follows:

901.5.1 Certificate of Occupancy. Prior to the issuance of a certificate of occupancy and prior to witness of acceptance testing the following documents shall be submitted to the building and fire officials, or designees:

1. Certification from the registered design professional, or other legally recognized professional, responsible for the construction documents in accordance with section 107.6, stating that the fire protection systems have been installed in accordance with applicable codes and standards, in accordance with the approved construction documents and that the record drawings indicate any deviations, if any.
2. Confirmation by the owner that they have received the as-built record drawings.
3. Material, test, performance, and completion certificates, properly executed by the installing contractor in accordance with the applicable NFPA standards.

Note: In *lieu* of witnessing a satisfactory functional test, the building official and fire official or designees, may accept a final performance test report from a registered design professional, or other legally recognized professional, as an acceptance test. Said report shall certify that complete and satisfactory functional tests of all fire protection systems, in accordance with the applicable codes and standards, and that the approved testing criteria and operational sequence, have been witnessed.

901.6.2 Revise section as follows:

901.6.2 Fire Alarm Systems. Fire alarm systems required by the provisions of section 907.2 of 780 CMR shall be monitored by an approved supervising station in accordance with section 907.6.6.

Exceptions:

1. Single- and multiple-station smoke alarms required by section 907.2.11.
2. Smoke detectors in Group I-3 occupancies.
3. Supervisory service is not required for automatic sprinkler systems in one- and two-family dwellings.
4. Smoke detectors in patient sleeping rooms in occupancies in Group I-2.

901.7 Revise section as follows:

901.7 Fire Areas. For the purpose of 780 CMR 9.00, the term fire area shall be defined as: "The aggregate area of a building, regardless of subdivisions by fire barriers, fire walls, or horizontal assemblies."

9.00: continued

901.9 through 901.9.1. Add sections as follows:

901.9 Signs. All signs required to identify fire protection equipment, equipment rooms and equipment locations shall be constructed of durable materials, be permanently installed and be readily visible. Letters and numbers shall contrast with the sign background, shall be at least two inches in height and shall have an appropriate width-to-height ratio to permit the sign to be read easily from a distance of ten feet. The sign and location shall be approved by the local fire department.

901.9.1 Sprinkler Control Valve Room Signs. Where sprinkler control valves are located in a separate room or building, a sign shall be provided on the entrance door. The lettering shall be at least 2½ inches (63.5 mm) in height and shall otherwise conform to section 901.7 and shall read "Sprinkler Control Valves."

903.2. Delete sections 903.2 through 903.2.10.1, and replace with the following:

[F] 903.2 Where required. Approved automatic sprinkler systems, in all new and some existing buildings and structures, shall be provided in accordance with items 1 and 2:

1. In accordance with the following enhanced sprinkler provisions, as required by the respectively-referenced statute:
   a. The following statutes are enforced by the head of the fire department, and shall be appealed through the automatic sprinkler appeals board:
      i. **M.G.L. c. 148, § 26A½**: certain high-rise buildings constructed prior to January 1, 1975;
      ii. **M.G.L. c. 148, § 26G**: certain non-residential structures that exceed 7,500 square feet;
      iii. **M.G.L. c. 148, § 26G½**: bars, nightclubs, dance halls, and discotheques with a capacity of 100 or more persons; and
      iv. **M.G.L. c. 148, § 26H** (if adopted through local option): lodging or boarding houses with six or more persons boarding or lodging.
   b. The following statute is enforced by the head of the fire department, and shall be appealed through the Building Code Appeals Board:
      M.G.L. c. 148, § 26A: certain high-rise buildings.
   c. The following statute is enforced by the head of the fire department, and shall be appealed through a court of competent jurisdiction:
      M.G.L. c. 148, § 26I (if adopted through local option): certain multiple dwelling units.
   d. **M.G.L. c. 272, §§ 86 through 86D**. certain stables, as required by law. This provision is enforced by the head of the fire department, or his or her designee, and shall be appealed through a court of competent jurisdiction.
2. As required by Table 903.2.

   Exceptions: Automatic sprinkler systems shall not be required in the following rooms or areas where such rooms or areas are protected with an approved automatic smoke detection system and notification in accordance with section 907 that will respond to visible or invisible particles of combustion.
      1. Spaces or areas in telecommunications buildings used exclusively 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 and notification system in accordance with section 907.2 and are separated from the remainder of the building by not less than one-hour fire barriers constructed in accordance with section 707 or not less than two-hour horizontal assemblies constructed in accordance with section 712, or both.

9.00: continued

2. Machine rooms of traction/drum hydraulic elevators, elevator hoistways, or elevator pits. Such elevator machine rooms, hoistways, or pits shall be constructed to meet the fire-resistance rating specified in Table 601 and otherwise as required by the applicable sections of 780 CMR 7.00: *Fire and Smoke Protection Features*. Where Table 601 requires a higher fire-resistance rating for elevator machine rooms, hoistways, or pits, such rating shall be provided unless such ratings are governed by other sections of 780 CMR. For elevator installation within atriums, also *see* 780 CMR 4.00: *Special Detailed Requirements Based on Use and Occupancy* for additional fire-resistance rating guidance. Where the elevator machine room is determined to be a true penthouse roof structure, also refer to section 1509.0 for additional fire-resistance rating requirements.

3. Non-combustible and limited combustible concealed spaces and plenums that contain electrical, data, communications and other cables that are of the types and in the configurations permitted in such spaces by 527 CMR: *The Board of Fire Prevention Regulations*.

4. Transformer vaults where all the following conditions are satisfied:
   a. The cable within the vault is flame retardant or limited combustible.
   b. The dielectric fluid is a limited combustible fluid.
   c. The vault is enclosed in three hour fire resistance rated construction.
   d. The vault is at grade or no more than one level below grade. Access to the vault is directly from the exterior or *via* a dedicated two hour passageway.
   e The vault is protected with automatic smoke detection connected to the building fire alarm system which notifies the fire department upon activation.
   f. The room is limited to the sole use of the transformer equipment and is limited in size to accommodate said equipment only. Storage is prohibited in the vault enclosure.
   g. The vault is provided with spill containment.
   h. An emergency fire plan has been developed with and approved by the fire department.
   i. Continuous ventilation is provided for the vault enclosure in accordance with the ventilation requirements of NFPA 30.
   j. The ventilation equipment is dedicated to serve the vault only.
   k. Standby emergency power, in addition to the normal power source, is provided for the ventilation equipment.
   l. The vault is no larger in area than 2,400 sq. ft.

5. Transformer vaults where an alternative suppression system is provided for the vault in accordance with section 904 and section 903.2 exception 4. conditions i., j., and k., are met.

Note: Also *see* subsections 903.3.1.1.1, 903.3.1.2.1, and 903.3.1.2.2

TABLE 903.2 OCCUPANCY AUTOMATIC SPRINKLER REQUIREMENTS			
Building having occupancy	Provide automatic fire sprinkler system throughout building if one of the following conditions will exist (*See* Note a)		
	Fire Area	Building occupant load	Occupancy location
A-1	>0 ft²	> 0	Any level
A-2 [Nightclub]	>5,000 ft²	≥ 50	Any floor other than the level of exit discharge for A-2 Use
A-2 [all others]	>5,000 ft²	≥ 100	Any floor other than the level of exit discharge for A-2 Use
A-3	>5,000 ft²	≥ 300	Any floor other than the level of exit discharge for A-3 Use
A-4	>7,500 ft²	≥ 300	Any floor other than the level of exit discharge for A-5 Use
A-5	*See* Note b		
Assembly occupancies on roofs	*See* Note c		
Multiple fire areas of Group A-1, A-2, A-3, or A-4	*See* Note d		

TABLE 903.2 OCCUPANCY AUTOMATIC SPRINKLER REQUIREMENTS			
Building having occupancy	Provide automatic fire sprinkler system throughout building if one of the following conditions will exist (*See* Note a)		
B [Ambulatory Health Care]	*See* Note e		
B	>12,000 ft²	---	---
E [below level of exit discharge]	*See* Note f		
E [all others]	>12,000 ft²	---	---
F-1 [Woodworking Operations]	*See* Note g		
F-1 [all others]	>12,000 ft²	---	More than three stories above grade plane
F-1 [all types]	>24,000 ft²	---	Combined area of all Group F-1 fire areas on all floors, including mezzanines.
H [Pyroxylin Plastics]	*See* Note h		
H-5	*See* Note i		
H [all others]	>0 ft²	> 0	Any level
I[a]	>0 ft²	> 0	Any level
M [bulk merchandising]	>0 ft²	> 0	Any level
M [upholstered furniture display/sale]	>0 ft²	> 0	Any level
M [storage of merchandise in high-piled or rack storage arrays]	*See* Note j		
M [all others]	>12,000 ft²	---	More than three stories above grade plane
M [all types]	>24,000 ft²	---	Combined area of all Group M fire areas on all floors, including mezzanines.
R[a]	>0 ft²	> 0	Any level
S-1 [upholstered furniture or mattresses/storage]	>2,500 ft²	--	More than three stories above grade plane
S-1 [with commercial motor vehicles]	>5,000 ft²	---	More than three stories above grade plane
S-1 [with repair garage, building two or more stories above grade]	>10,000 ft²	---	1. In basement; or 2. More than three stories above grade plane
S-1 [with repair garage, building one story above grade]	>12,000 ft²	---	In basement
S-1 [with commercial motor vehicles]	>5,000 ft²	---	1. In basement; or 2. More than three stories above grade plane
S-1 [with tire storage]	*See* Note k		
S-1 [all others]	>12,000 ft²	---	More than three stories above grade plane
S-1 [all types]	>24,000 ft²	---	Combined area of all Group M fire areas on all floors, including mezzanines.
S-2	*See* Notes l & m		

Note a:

1. For Use Group R and I-1 buildings with an aggregate building area of 12,000 ft² or more, and mixed use buildings containing R-Uses, the sprinkler system shall be designed and installed throughout the structure in accordance with NFPA 13.
2. Buildings of entire R-Use, other than R-1 Occupancies and R-2 Dormitories, having no more than three dwelling units and also less than a 12,000 ft² Fire Area shall be permitted to have an automatic fire suppression system installed in accordance with section 903.3.1.3; provided that every automatic sprinkler system shall have at least one automatic water supply or a stored water supply source in accordance with NFPA 13D where the minimum quantity of stored water shall equal the water demand rate times 20 minutes.
3. An automatic sprinkler system installed in accordance with section 903.3.1.3 shall be permitted in Group R-3 occupancies.

9.00: continued

4. An automatic sprinkler system installed in accordance with section 903.3.1.3 shall be permitted in Group R-4 Condition 1 occupancies.

5. An automatic sprinkler system installed in accordance with section 903.3.1.2 shall be permitted in Group R-4 Condition 2 occupancies. Attics shall be protected as follows:

a.. Attics used for living purposes, storage or fuel-fired equipment shall be protected with an automatic sprinkler system installed in accordance with section 903.3.1.2.

b. Attics not used for living purposes, storage or fuel-fired equipment shall comply with one of the following requirements:

i. It shall be protected throughout by a heat detector system arranged to activate the building fire alarm system in accordance with section 907.2.10.

ii. It shall be constructed of non-combustible materials.

iii. It shall be constructed of fire-retardant-treated wood framing complying with section 2303.2.

iv. The automatic sprinkler system shall be extended to provide protection throughout the attic space.

6. An automatic sprinkler system installed in accordance with section 903.3.1.3 shall be permitted in care facilities with five or fewer individuals in a single-family dwelling.

7. Townhouses are required to be protected by automatic sprinkler systems.

Note b: Group A-5, An automatic sprinkler system shall be provided in concession stands, retail areas, press boxes, and other accessory use areas in excess of 1,000 ft^2 (93m^2).

Note c: Assembly occupancies on roofs. Where an occupied roof has an Assembly Occupancy with an occupancy load exceeding:

1. 100 for Group A-2; and
2. 300 for all other Group A occupancies,

all floors between the occupied roof and the level of exit discharge shall be equipped with an automatic sprinkler system in accordance with sections 903.3.1.1 or 903.3.1.2, when applicable.

Exception: Open parking garages in Type I or Type II construction.

Note d: Multiple fire areas. An automatic sprinkler system shall be provided where multiple fire areas of Group A-1, A-2, A-3 or A-4 occupancies share exit or exit access components and the combined occupant load of these fire areas is 300 or more.

Note e: 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 one of the following conditions exists at any time:

1. Four or more care recipients are incapable of self-preservation.
2. 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.

In buildings where ambulatory care is provided, on levels other than the level of exit discharge, an automatic sprinkler system shall be installed throughout the entire floor where such care is provided, as well as all floors below and all floors between the level of ambulatory care and the nearest level of exit discharge, including the level of exit discharge.

Note f: Group E. An automatic sprinkler system shall be provided as follows:

1. Throughout all Group E fire areas greater than 12,000 ft^2 in area.
2. Throughout every portion of educational buildings below the lowest level of exit discharge serving that portion of the building.

Note g: Group F-1 (Woodworking Operations). An automatic sprinkler system shall be installed throughout buildings that contain woodworking operation(s) in excess of 2,500 ft^2(232 m^2) in area that generate(s) finely divided combustible waste or use(s) finely divided combustible materials.

Note h: 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.

Note i: Group H-5. An automatic sprinkler system shall be installed throughout buildings containing Group H-5 occupancies. The design of the sprinkler system shall be not less than that required by 780 CMR for the occupancy hazard classifications in accordance with Table 903.2.1. 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.

9.00: continued

Note j: High-piled storage. An automatic sprinkler system shall be provided in accordance with the IFC, and applicable provisions of 527 CMR: *The Board of Fire Prevention Regulations*, in all buildings of Group M where storage of merchandise is in high-piled or rack storage arrays.

Note k: Bulk storage of tires. An automatic sprinkler system shall be provided throughout buildings and structures where the area for the storage of tires exceeds 20,000 ft^3(566 m^3), in accordance with section 903.3.1.1.

Note l Group S-2. An automatic sprinkler system shall be provided for Group S-2 occupancies as follow:

1. Throughout buildings classified as Group S-2 Enclosed Parking.
2. Throughout Group S-2 Enclosed Parking located beneath other groups.

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

Note m: Commercial Parking Garages. An automatic sprinkler system shall be provided throughout buildings having storage of commercial motor vehicles where the aggregate area used for parking exceeds 5,000 ft^2 (464m^2).

903.3.1.1.1 Add the following note:

Note 7. Also *see* section 903.2 Exceptions

903.3.1.2.1 and 903.3.1.2.2 Add the following note:

Note: Also *see* section 903.2 Exceptions

903.3.1.3 Revise subsection as follows:

903.3.1.3 NFPA 13D Sprinkler Systems. Automatic sprinkler systems installed in one- and two-family dwellings, townhouses, Group R-3, Group R-4 Condition 1, buildings containing only R-Uses of three units or less shall be permitted to be installed throughout in accordance with NFPA 13D.

903.3.5.2 Revise subsection as follows:

903.3.5.2 Combination Services. A single combination water supply shall be permitted provided that the domestic and/or commercial demand is added to the sprinkler demand as required by NFPA 13, NFPA 13D or NFPA 13R as applicable.

903.4.1 Revise subsection as follows:

903.4.1 Monitoring. Alarm, supervisory and trouble signals shall be distinctly different and shall be automatically transmitted to one of the following NFPA 72 locations. The owner has the choice of which single option to employ.

1. UL listed or FM approved central supervising station, or
2. Approved proprietary supervising station or approved remote supervising station, or
3. Alarm signals to an approved Auxiliary Fire Alarm System in accordance with NFPA 72, with supervisory signals supervised by method a or b identified above, or at a constantly attended location approved by the local fire department, having personnel on duty trained to recognize the type of signal received and to take prescribed action. This shall be permitted to be a location different from that at which alarm signals are received.

903.4.2 Revise subsection as follows:

903.4.2 Alarms. An approved audible device, located on the exterior of the building in an approved location, shall be connected to each automatic sprinkler system. Such sprinkler waterflow 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. Activation of the sprinkler waterflow alarm devices shall activate a fire alarm system installed throughout the building in accordance with section 907.

Exception: Buildings sprinklered throughout in accordance with 903.3.1.3.

9.00: continued

903.4.4 Add subsection as follows:

903.4.4 Re-transmission of Alarm Signals. In all cases, alarm signals received by those operating approved remote/proprietary station fire alarm system supervising stations shall re-transmit alarm signals within 90 seconds of receipt to the fire department having jurisdiction.

903.5 Add the following note:

Note: *See* section 901.3.

904.5.1 Add subsection as follows:

904.5.1 Discharge Test. All systems shall be tested by a discharge of expellant gas through the piping and nozzles with observations being made of the flow of expellant gas through all nozzles as well as observing for leakage and continuity of piping with free unobstructed flow.

904.6.1 Add subsection as follows:

904.6.1 Discharge Test. All systems shall be tested by a discharge of expellant gas through the piping and nozzles with observations being made of the flow of expellant gas through all nozzles as well as observing for leakage and continuity of piping with free unobstructed flow.

904.14 Add section as follows:

904.14 Water Spray Fixed Systems. Water spray fixed systems shall be installed, maintained, periodically inspected and tested in accordance with NFPA 15 and the listings contained therein.

904.15 Add section as follows:

904.15 Aerosol Systems. Aerosol systems shall be installed, maintained, periodically inspected and tested in accordance with NFPA 2010 and the listings contained therein.

905.3.9 Add subsection as follows:

905.3.9 High-piled Combustible Storage. A Class I automatic wet or manual standpipe system shall be provided in all exit passageways of areas containing high-piled combustible storage.

905.10 Revise section as follows:

905.10 During Construction. Standpipes systems required during construction and demolition operations shall be provided in accordance with section 3311 and NFPA 241.

907.2.8.3.1 Add subsection as follows:

907.2.8.3.1 Annunciation. In buildings that are not equipped throughout with an automatic sprinkler system installed in accordance with section 903.3.1.1 or section 903.3.1.2, the smoke detectors in guestrooms shall be connected to the buildings fire alarm systems for the purpose of notifying the guestroom occupants and shall be annunciated by guestroom at a constantly attended location from which the fire alarm system is capable of being manually activated.

907.2.9.1 Exception 2 Revise to read as follows:

1. Manual fire alarm boxes are not required where the building is equipped throughout with an automatic sprinkler system installed in accordance with sections 903.3.1.1, 903.3.1.2, or 903.3.1.3 and the occupant notification appliances will automatically activate throughout the notification zones upon a sprinkler water flow.

9.00: continued

907.2.11 Revise subsection as follows:

907.2.11 Single- and Multiple-station Smoke Alarms. Listed single- and multiple-station photoelectric type smoke alarms shall be installed in accordance with the provisions of 780 CMR and the household fire warning equipment provisions of NFPA 72, as applicable. Section 907.2.8 shall not preclude the installation of a fully addressable fire alarm system where system detectors and alarm notification devices can perform the functions as required in section 907.2.11.

907.2.15 Add exception as follows:

Exception: Buildings sprinklered throughout with an automatic sprinkler system.

907.5.2.2.6 Add subsection as follows:

907.5.2.2.6 Evacuation. Where the head of the fire department or his or her designee determines that partial or selective evacuation is not desired but rather total evacuation is required, then a distinctive signal in *lieu* of a voice alarm is permitted.

907.5.2.3 Add a second sentence as follows:

Also refer to 521 CMR: *Architectural Access Board* for visible alarm requirements in buildings, or portions thereof, open to the public.

907.6.6 Revise subsection as follows:

907.6.6 Monitoring. Fire alarm systems required by 780 CMR 9.00 shall be monitored by an approved supervising station in accordance with NFPA 72 and section 901.6.

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

1. Single- and multiple-station smoke alarms required by section 907.2.11.
2. Smoke detectors in Group I-3 occupancies.
3. Automatic sprinkler systems in one- and two-family dwellings.
4. Smoke detectors in patient sleeping rooms in occupancies in Group I-2.

909.2 Revise section as follows:

909.2 General Design Requirements. Buildings, structures or parts thereof required by 780 CMR to have a smoke control system or systems shall have such systems designed in accordance with the applicable requirements of section 909 and the generally accepted and well-established principles of engineering relevant to the design. The construction documents shall include sufficient information and detail to adequately describe the elements of the design necessary for the proper implementation of the smoke control systems. These documents shall be accompanied by sufficient information and analysis to demonstrate compliance with these provisions.

An independent third party review is required for smoke control system designs incorporating performance analysis under section 909 (design fire analysis, rational analysis, timed egress analysis), or the smoke control methods of sections 909.6, 909.7, or 909.8 or other alternative design method selected by the registered design professional. The independent third party reviewer shall prepare a written report documenting the review and submit it to the registered design professional and the building and fire officials. If all parties concur that the analyses are appropriate, the design may be approved pursuant to section 104.11.

909.6 Revise section as follows:

909.6 Pressurization Method. When approved by the fire official, 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.

909.15 Revise section as follows:

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 official and shall be kept on site adjacent to the fire alarm panel in a format and manner approved by the fire chief.

9.00: continued

909.16 Add exception as follow:

Exception: Existing buildings with an existing dedicated function smoke control panel.

909.18.8.3.1 Add subsection as follows:

909.18.8.3.1 Report Filing. A copy of the final report shall be filed with the fire code official and building official and an identical copy shall be maintained in an approved location at the building.

909.20.6.1.1 Add subsection as follows:

909.20.6.1.1 Intake Duct Detection. An intake duct smoke detector shall be installed just downstream of the fresh air fan. Activation of this detector shall annunciate at the control panel and shall shut down the fan for that particular smoke proof enclosure.

909.20.6.3 Revise section as follows:

909.20.6.3 Acceptance and Testing. Before the mechanical equipment is approved, the system shall be tested in the presence of the building official and fire official or their designee, to confirm that the system is operating in compliance with these requirements. The building official may authorize the fire official as designee. The fire official may authorize the building official as designee.

909.22 through 909.22.5 Add section and subsections as follows:

909.22 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 sections 909.22.1 through 909.22.5.

909.22.1 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.

909.22.2 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 servicing personnel, and notification of any unsatisfactory condition and the corrective action taken, including parts replaced.

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

909.22.4 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.

909.22.5 Nondedicated Smoke Control Systems. Dedicated smoke control systems shall be operated for each control sequence annually. The system shall also be tested under standby power conditions.

912.7 Add section as follows:

912.7 Connections. Fire department connections shall be such that attachment to any one water sprinkler connection will serve all sprinklers, and attachment to any one standpipe connection will serve all standpipes within the building.

913.6 Add section as follows:

913.6 Second Power Source. All electric driven fire pumps shall be provided with emergency power from an on-site emergency generator system, set when the fire pump is installed, as protection for a building or structure with any one of the following characteristics:

1. High-rise building.
2. Use Group H.
3. Use Group I having surgery or treatment areas.

9.00: continued

915.2 Revise section as follows:

915.2 Locations. Where required by section 915.1.1, carbon monoxide detection shall be installed in the locations specified in sections 915.2.1 through 915.2.3 or in accordance with the technical potions listed in applicable sections of 527 CMR, as well as all applicable provisions of 527 CMR: *The Board of Fire Prevention Regulations* and 248 CMR: *The Board of State Examiners of Plumbers and Gasfitters*.

915.3.1 Add subsection as follows:

915.3.1 Interconnection. Where more than one listed carbon monoxide alarm or combination smoke/carbon monoxide detector is required to be installed within a dwelling unit, or E- or I-use area, they shall be interconnected in such a manner that the activation of the carbon monoxide alarm or combination smoke/carbon monoxide detector shall activate the carbon monoxide audible notification devices throughout the individual dwelling unit, or affected area, by detector or separate notification device.

SECTION 916 EMERGENCY RESPONDER RADIO COVERAGE

916.1 Revise section as follows:

916.1 General. Emergency responder radio coverage shall be provided in all new buildings in accordance with sections 916.2 through 916.6.3 and NFPA 72, section 24.5: *Two-way, In-building Emergency Communications Systems*.

Exception: Existing buildings which contain fire fighter communication systems.

916.2 through 916.6.3 Add sections and subsections as follows:

916.2 Emergency Responder Radio Coverage in New Buildings. All new buildings shall have approved radio coverage for emergency responders within the building based upon the existing coverage levels of the public safety communication systems of the jurisdiction at the exterior of the building. This section shall not require improvement of the existing public safety communication systems.

Exceptions:

1. Where approved by the building official and the fire code official, a wired communication system in accordance with section 907.2.13.2 shall be permitted to be installed or maintained instead of an approved radio coverage system.
2. Where it is determined by the fire code official that the radio coverage system is not needed.
3. In facilities where emergency responder radio coverage is required and such systems, components or equipment required could have a negative impact on the normal operations of that facility, the fire code official shall have the authority to accept an automatically activated emergency responder radio coverage system.

916.3 Permit Required. A construction permit for the installation of or modification to emergency responder radio coverage systems and related equipment is required as specified in section 105.1. Maintenance performed in accordance with 780 CMR is not considered a modification and does not require a permit.

916.4 Technical Requirements. Systems, components and equipment required to provide the emergency responder radio coverage system shall comply with sections 916.4.1 through 916.4.2.5.

916.4.1 Radio Signal Strength. The building shall be considered to have acceptable emergency responder radio coverage when signal strength measurements in 95% of all areas on each floor of the building meet the signal strength requirements in sections 916.4.1.1 and 916.4.1.2.

916.4.1.1 Minimum Signal Strength into the Building. A minimum signal strength of -95 dBm shall be receivable within the building.

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916.4.1.2 Minimum Signal Strength out of the Building. A minimum signal strength of -95 dBm shall be received by the agency's radio system when transmitted from within the building.

916.4.2 System Design. The emergency responder radio coverage system shall be designed in accordance with sections 916.4.2.1 through 916.4.2.5.

916.4.2.1 Amplification Systems Allowed. Buildings and structures that cannot support the required level of radio coverage shall be equipped with a radiating cable system, a distributed antenna system with Federal Communications Commission (FCC)-certified signal boosters, or other system approved by the fire code official in order to achieve the required adequate radio coverage.

916.4.2.2 Technical Criteria. The fire code official shall maintain a document providing the specific technical information and requirements for the emergency responder radio coverage system. This document shall contain, but not be limited to, the various frequencies required, the location of radio sites, effective radiated power of radio sites, and other supporting technical information.

916.4.2.3 Standby Power. Emergency responder radio coverage systems shall be provided with standby power in accordance with section 2702. The standby power supply shall be capable of operating the emergency responder radio coverage system for a duration of not less than 24 hours.

916.4.2.4 Signal Booster Requirements. If used, signal boosters shall meet the following requirements:

1. All signal booster components shall be contained in a National Electrical Manufacturer's Association (NEMA) 4-type waterproof cabinet.
2. Battery systems used for the emergency power source shall be contained in a NEMA 4-type waterproof cabinet.
3. The signal booster system and battery system shall be electrically supervised and monitored by a supervisory service, or when approved by the fire code official shall sound an audible signal at a constantly attended location.
4. Equipment shall have FCC certification prior to installation.

916.4.2.5 Additional Frequencies and Change of Frequencies. The emergency responder radio coverage system shall be capable of modification or expansion in the event frequency changes are required by the FCC or additional frequencies are made available by the FCC.

916.5 Installation Requirements. The installation of the public safety radio coverage system shall be in accordance with sections 916.5.1 through 916.5.4.

916.5.1 Approval Prior to Installation. Amplification systems capable of operating on frequencies licensed to any public safety agency by the FCC shall not be installed without prior coordination and approval of the fire code official.

916.5.2 Minimum Qualifications of Personnel. The minimum qualifications of the system designer and lead installation personnel shall include both of the following:

1. A valid FCC-issued general radio operator's license.
2. Certification of in-building system training issued by a nationally recognized organization, school or a certificate issued by the manufacturer of the equipment being installed.

These qualifications shall not be required where demonstration of adequate skills and experience satisfactory to the fire code official is provided.

916.5.3 Acceptance Test Procedure. Where an emergency responder radio coverage system is required, and upon completion of installation, the building owner shall have the radio system tested to verify that two-way coverage on each floor of the building is not less than 90%. The test procedure shall be conducted as follows:

1. Each floor of the building shall be divided into a grid of 20 approximately equal test areas.
2. The test shall be conducted using a calibrated portable radio of the latest brand and model used by the agency talking through the agency's radio communications system.

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3. Failure of not more than two nonadjacent test areas shall not result in failure of the test.
4. In the event that three of the test areas fail the test, in order to be more statistically accurate, the floor shall be permitted to be divided into 40 equal test areas. Failure of not more than four nonadjacent test areas shall not result in failure of the test. If the system fails the 40-area test, the system shall be altered to meet the 90% coverage requirement.
5. A test location approximately in the center of each test area shall be selected for the test, with the radio enabled to verify two-way communications to and from the outside of the building through the public agency's radio communications system. Once the test location has been selected, that location shall represent the entire test area. Failure in the selected test location shall be considered failure of that test area. Additional test locations shall not be permitted.
6. The gain values of all amplifiers shall be measured and the test measurement results shall be kept on file with the building owner so that the measurements can be verified during annual tests. In the event that the measurement results become lost, the building owner shall be required to rerun the acceptance test to reestablish the gain values.
7. As part of the installation, a spectrum analyzer or other suitable test equipment shall be utilized to ensure spurious oscillations are not being generated by the subject signal booster. This test shall be conducted at the time of installation and subsequent annual inspections.

916.5.4 FCC Compliance. The emergency responder radio coverage system installation and components shall also comply with all applicable federal regulations including, but not limited to, FCC 47 CFR Part 90.219.

916.6 Maintenance. The emergency responder radio coverage system shall be maintained operational at all times in accordance with sections 916.6.1 through 916.6.3.

916.6.1 Testing and Proof of Compliance. The emergency responder radio coverage system shall be inspected and tested annually or where structural changes occur including additions or remodels that could materially change the original field performance tests.

Testing shall consist of the following:

1. In-building coverage test as described in section 916.5.3.
2. Signal boosters shall be tested to verify that the gain is the same as it was upon initial installation and acceptance.
3. Backup batteries and power supplies shall be tested under load of a period of one hour to verify that they will properly operate during an actual power outage. If within the one-hour test period the battery exhibits symptoms of failure, the test shall be extended for additional one-hour periods until the integrity of the battery can be determined.
4. Other active components shall be checked to verify operation within the manufacturer's specifications.
5. At the conclusion of the testing, a report, which shall verify compliance with section 916.5.3, shall be submitted to the fire code official.

916.6.2 Additional Frequencies. The building owner shall modify or expand the emergency responder radio coverage system at his or her expense in the event frequency changes are required by the FCC or additional frequencies are made available by the FCC. Prior approval of a public safety radio coverage system on previous frequencies does not exempt this section.

916.6.3 Field Testing. Agency personnel shall have the right to enter onto the property at any reasonable time to conduct field testing to verify the required level of radio coverage.

917 PRIVATE UNDERGROUND FIRE MAINS AND YARD HYDRANTS

917.1 Add section as follows:

917.1 Private Underground Fire Mains and Yard Hydrants. Fire hydrants and underground fire mains installed on private property shall be located and installed as approved by the head of the fire department. Hydrants shall conform to the standards of the administrative authority of the jurisdiction and the fire department. Hydrants shall not be installed on a water main less than six inches in diameter. Standards of construction shall be in accordance with NFPA 24.