

**14.15 Secondary Means of Emergency Escape and Rescue.**

~~14.15.1 Secondary means of Emergency escape and rescue openings shall comply with the Building Code, shall comply with NFPA~~

~~14.15.2 Where approved, on secondary means of the emergency escape and rescue openings, security bars, grates, grilles, or similar devices shall be equipped with approved release mechanisms that are releasable from the inside without the use of a tool, a key, special knowledge, or force greater than that which it takes for normal operation of the door or window.~~

### Chapter 15 Fire Department Service Delivery Concurrency Evaluation

~~Chapter 15 has been deleted in its entirety.~~

### Chapter 16 Safeguarding Construction, Alteration, and Demolition Operations

**16.1 General Requirements.**

16.1.1 Structures undergoing construction, alteration, or demolition operations, including those in underground locations, shall comply with NFPA 241, *Standard for Safeguarding Construction, Alteration, and Demolition Operations*, and this chapter.

16.1.1.1 Permits. Permits, where required, shall comply with Section 1.12.

~~16.1.2 A fire protection plan shall be established where required by the AHJ and submitted in accordance with the Building Code.~~

16.1.3\* In buildings under construction, adequate escape facilities shall be maintained at all times for the use of construction workers. Escape facilities shall consist of doors, walkways, stairs, ramps, fire escapes, ladders, or other approved means or devices arranged in accordance with the general principles of Chapter 14 and NFPA 101, *Life Safety Code*, insofar as they can reasonably be applied to buildings under construction. [101: 4.6.10.2]

16.1.4 Fire department access roads provided in accordance with 18.2.3 shall be provided at the start of a project and shall be maintained throughout construction.

16.1.5 Permanent fire department access road markings shall not be required until the building is complete or occupied for use.

**16.2 Processes and Hazards.****16.2.1 Temporary Heating Equipment.**

16.2.1.1\* Temporary heating equipment shall be listed. [241: 5.2.1]

16.2.1.2 Temporary heating equipment shall be installed in accordance with its listing, including clearance to combustible material, equipment, or construction. [241: 5.2.2]

16.2.1.3 Temporary heating equipment shall be installed, used, and maintained in accordance with the manufacturer's instructions, except as otherwise provided in 16.2.1.4. [241: 5.2.3]

~~16.2.1.4 Where instructions, as addressed in 16.2.1.3, are not available, temporary heating equipment shall be used in accordance with recognized safe practices. [241: 5.2.4]~~

16.2.1.5 Temporary heating equipment shall be situated so that it is secured. [241: 5.2.5]

16.2.1.6 Only personnel familiar with the operation of the temporary heating equipment shall be allowed to operate such devices. [241: 5.2.6]

16.2.1.7\* Temporary heating equipment, where utilized, shall be monitored for safe operation and maintained by properly trained personnel. [241: 5.2.7]

16.2.1.8 Temporary heating equipment and devices noted to be damaged or considered to be a potential safety hazard shall not be used. [241: 5.2.8]

16.2.1.9 Temporary heating equipment using exposed radiant heating wires shall not be used. [241: 5.2.9]

16.2.1.10 Temporary electrical heating equipment shall be equipped with tip-over protection and overheat cutoffs. [241: 5.2.10]

16.2.1.11 Chimney or vent connectors, where required from direct-fired heaters, shall be maintained at least 18 in. (460 mm) from combustibles and shall be installed in accordance with NFPA 211, *Standard for Chimneys, Fireplaces, Vents, and Solid Fuel-Burning Appliances*. [241: 5.2.11]

16.2.1.12 Oil-fired heaters shall comply in design and installation features with Section 11.5. [241: 5.2.12]

16.2.1.13 Fuel supplies for liquefied petroleum gas-fired heaters shall comply with NFPA 54, *National Fuel Gas Code*, and Chapter 69. [241: 5.2.13]

16.2.1.14\* Refueling operations shall be conducted in an approved manner. [241: 5.2.14]

16.2.1.15 Heaters used in the vicinity of tarpaulins, canvas, or similar coverings shall be located a safe distance from coverings and other combustible materials. The coverings shall be securely fastened to prevent ignition of the covering or upsetting of the heater due to wind action on the covering or other material.

16.2.1.16 Tests for the presence of carbon monoxide shall be made by a qualified person within one hour after the start of each work shift and at least every three hours thereafter. If concentrations of carbon monoxide reach 30 parts per million (ppm) by volume, tests shall be made more frequently to determine if there is a continuing increase of carbon monoxide concentration. Records of all tests, including the date, time, results obtained, and person making tests, shall be maintained for a seven day period.

16.2.1.17 Each time a salamander is placed in operation it shall be checked to ensure that it is functioning properly and its operation shall be checked periodically thereafter. When concentrations of carbon monoxide attain quantities greater than 50 parts per million (ppm) to air volume at employee breathing levels, the salamander shall be extinguished unless additional natural or mechanical ventilation is provided to reduce the carbon monoxide content to permissible limits.

16.2.1.18 No employee shall be permitted to enter the heated area until notification of such entry is given to another person located outside. Periodic checks of at least one every 15 minutes shall be made to ensure the safety of employees entering the heated area.

16.2.1.19 Fresh air shall be supplied in sufficient quantities to maintain the safety of employees. Where natural means of fresh air supply is inadequate (less than 16% oxygen by volume) mechanical ventilation shall be provided. Particular attention shall be given to confined spaces and pockets where heat and fumes may accumulate and employees may be present.

percent at the end of the emergency lighting duration. [101: 7.10.4]

**14.14.5 Illumination of Signs.**

**14.14.5.1 General.** Every sign required by 14.14.1.2, 14.14.1.5, or 14.14.8.1, other than where operations or processes require low lighting levels, the *Building Code* shall be suitably illuminated by a reliable light source. Externally and internally illuminated signs shall be legible in both the normal and emergency lighting mode. [101: 7.10.5.1]

**14.14.5.2\* Continuous Illumination.**

**14.14.5.2.1** Every sign required to be illuminated by 14.14.6.3, 14.14.7, and 14.14.8.1 shall be continuously illuminated as required under the provisions of Section 14.12, unless otherwise provided in 14.14.5.2.2. [101: 7.10.5.2.1]

**14.14.5.2.2\*** Illumination for signs shall be permitted to flash on and off upon activation of the fire alarm system. [101: 7.10.5.2.2]

**14.14.6 Externally Illuminated Signs.**

**14.14.6.1\* Size of Signs.**

**14.14.6.1.1** Externally illuminated signs required by 14.14.1 and 14.14.2, other than approved existing signs, unless otherwise provided in 14.14.6.1.2, shall read EXIT or shall use other appropriate wording in plainly legible letters sized as follows:

- (1) For new signs, the letters shall be not less than 6 in. (150 mm) high, with the principal strokes of letters not less than 3/4 in. (19 mm) wide.
- (2) For existing signs, the required wording shall be permitted to be in plainly legible letters not less than 4 in. (100 mm) high.
- (3) The word EXIT shall be in letters of a width not less than 2 in. (51 mm), except the letter I, and the minimum spacing between letters shall be not less than 3/8 in. (9.5 mm).
- (4) Sign legend elements larger than the minimum established in 14.14.6.1.1(1) through 14.14.6.1.1(3) shall use letter widths, strokes, and spacing in proportion to their height. [101: 7.10.6.1.1]

**14.14.6.1.2** The requirements of 14.14.6.1.1 shall not apply to marking required by 14.14.1.3 and 14.14.1.7. [101: 7.10.6.1.2]

**14.14.6.2\* Size and Location of Directional Indicator.**

**14.14.6.2.1** Directional indicators, unless otherwise provided in 14.14.6.2.2, shall comply with the following:

- (1) The directional indicator shall be located outside of the EXIT legend, not less than 3/8 in. (9.5 mm) from any letter.
- (2) The directional indicator shall be of a chevron type, as shown in Figure 14.14.6.2.1.
- (3) The directional indicator shall be identifiable as a directional indicator at a distance of 40 ft (12 m).
- (4) A directional indicator larger than the minimum established for compliance with 14.14.6.2.1(3) shall be proportionately increased in height, width, and stroke.
- (5) The directional indicator shall be located at the end of the sign for the direction indicated. [101: 7.10.6.2.1]

**14.14.6.2.2** The requirements of 14.14.6.2.1 shall not apply to approved existing signs. [101: 7.10.6.2.2]



**FIGURE 14.14.6.2.1 Chevron-Type Indicator.** [101: Figure 7.10.6.2.1]

**14.14.6.3\* Level of Illumination.** Externally illuminated signs shall be illuminated by not less than 5 ft-candles (54 lux) at the illuminated surface and shall have a contrast ratio of not less than 0.5. [101: 7.10.6.3]

**14.14.7 Internally Illuminated Signs.**

**14.14.7.1 Listing.** Internally illuminated signs shall be listed in accordance with ANSI/UL 924, *Standard for Emergency Lighting and Power Equipment*, unless they meet one of the following criteria:

- (1) They are approved existing signs.
- (2) They are existing signs having the required wording in legible letters not less than 4 in. (100 mm) high.
- (3) They are signs that are in accordance with 14.14.1.3 and 14.14.1.6. [101: 7.10.7.1]

**14.14.7.2\* Photoluminescent Signs.** The face of a photoluminescent sign shall be continually illuminated while the building is occupied. The illumination levels on the face of the photoluminescent sign shall be in accordance with its listing. The charging illumination shall be a reliable light source as determined by the AHJ. The charging light source shall be of a type specified in the product markings. [101: 7.10.7.2]

**14.14.8 Special Signs.**

**14.14.8.1 Sign Illumination.**

**14.14.8.1.1\*** Where required by other provisions of this Code, special signs shall be illuminated in accordance with 14.14.5, 14.14.6.3, and 14.14.7. [101: 7.10.8.1.1]

**14.14.8.1.2** Where emergency lighting facilities are required by the applicable provisions of Chapters 11 through 43 of NFPA 101, the required illumination of special signs shall additionally be provided under emergency lighting conditions. [101: 7.10.8.1.2]

**14.14.8.2 Characters.** Special signs, where required by other provisions of this Code, shall comply with the visual character requirements of ICC/ANSI A117.1, *American National Standard for Accessible and Usable Buildings and Facilities*. [101: 7.10.8.2]

**14.14.8.3\* No Exit.**

**14.14.8.3.1** Any door, passage, or stairway that is neither an exit nor a way of exit access and that is located or arranged so that it is likely to be mistaken for an exit shall be identified by a sign that reads as follows: NO EXIT as required by the *Building Code*. [101: 7.10.8.3.1]

**14.14.8.3.2** The NO EXIT sign shall have the word NO in letters 2 in. (51 mm) high, with a stroke width of 3/8 in. (9.5 mm), and the word EXIT in letters 1 in. (25 mm) high, with the word EXIT below the word NO, unless such sign is an approved existing sign. [101: 7.10.8.3.2]

**16.2.2 Waste Disposal.**

**16.2.2.1\*** Accumulations of combustible waste material, dust, and debris shall be removed from the structure and its immediate vicinity at the end of each work shift or more frequently as necessary for safe operations. [241: 5.4.1]

**16.2.2.2** Rubbish shall not be burned on the premises without first obtaining a permit from the AHJ. (See Section 10.10.) [241: 5.4.2]

**16.2.2.3** Materials susceptible to spontaneous ignition, such as oily rags, shall be stored in a listed disposal container. [241: 5.4.3]

**16.2.2.4** Trash chutes, where provided, shall comply with 16.2.2.4.1 through 16.2.2.4.6. [241: 5.4.4]

**16.2.2.4.1\*** A trash chute safety plan shall be submitted to and approved by the AHJ. [241: 5.4.4.1]

**16.2.2.4.2** Trash chutes used on the exterior of a building shall be of noncombustible construction, or protected in accordance with 16.2.2.4.3 through 16.2.2.4.6 if of combustible construction. [241: 5.4.4.2]

**16.2.2.4.3\*** The interior of combustible trash chutes shall be provided with not less than one temporary automatic sprinkler within a recess near the top of the chute. [241: 5.4.4.3]

**16.2.2.4.4** The temporary sprinkler required by 16.2.2.4.3 shall be protected by the recess as well as a listed sprinkler guard. [241: 5.4.4.4]

**16.2.2.4.5** The temporary sprinkler required by 16.2.2.4.3 shall be connected to any available water supply with a listed fire hose, or a flexible, commercial rubber hose, with a diameter of not less than ¼ in. (19 mm) and a listed flexible connector. [241: 5.4.4.5]

**16.2.2.4.6** The temporary sprinkler required by 16.2.2.4.3 shall be protected against freezing where required by the AHJ. [241: 5.4.4.6]

**16.2.3 Flammable and Combustible Liquids and Flammable Gases.****16.2.3.1 Storage.**

**16.2.3.1.1** Storage of flammable and combustible liquids shall be in accordance with Chapter 66, unless otherwise modified by 16.2.3. [241: 5.5.1.1]

M **16.2.3.1.2\*** Only a one day supply of heater fuel shall be stored  
A inside a building in the vicinity of the temporary heating  
M equipment. Storage of Class I and Class II liquids shall not exceed  
A 60 gal (227 L) within 50 ft (15 m) of the structure. [241: 5.5.1.2]

**16.2.3.1.3** Storage areas shall be kept free of weeds, debris, and combustible materials not necessary to the storage. [241: 5.5.1.3]

**16.2.3.1.4** Open flames and smoking shall not be permitted in flammable and combustible liquids storage areas. [241: 5.5.1.4]

**16.2.3.1.5** Such storage areas shall be appropriately posted as "No Smoking" areas. [241: 5.5.1.5]

**16.2.3.1.6** Storage areas shall be appropriately posted with markings in accordance with NFPA 704, *Standard System for the Identification of the Hazards of Materials for Emergency Response*. [241: 5.5.1.6]

**16.2.3.2 Handling of Flammable and Combustible Liquids at Point of Final Use.**

**16.2.3.2.1** Handling of flammable and combustible liquids shall

be in accordance with Chapter 66, except as modified by 16.2.3.2.2 through 16.2.3.2.4. [241: 5.5.2.1]

**16.2.3.2.2** Class I and Class II liquids shall be kept in approved safety containers. [241: 5.5.2.2]

**16.2.3.2.3** Means shall be provided to dispose of leakage and spills promptly and safely. [241: 5.5.2.3]

**16.2.3.2.4\*** Class I liquids shall be dispensed only where there are no open flames or other sources of ignition within the possible path of vapor travel. [241: 5.5.2.4]

**16.2.3.3 Storage and Handling of Combustible and Flammable Gases.**

**16.2.3.3.1** Storage and handling of combustible and flammable gases shall be in accordance with NFPA 54, *National Fuel Gas Code*, and Chapter 69. [241: 5.5.3.1]

**16.2.3.3.2** Open flames and smoking shall not be permitted in flammable gas storage areas. [241: 5.5.3.2]

**16.3 Fire Protection.****16.3.1 Fire Safety Program.**

**16.3.1.1** An overall construction or demolition fire safety program shall be developed.

**16.3.1.2** All of the following items shall be addressed in the fire safety program:

- (1) Good housekeeping
- (2) On-site security
- (3) Fire protection systems
  - (a) For construction operations, installation of new fire protection systems as construction progresses
  - (b) For demolition operations, preservation of existing fire protection systems during demolition
- (4) Organization and training of an on-site fire brigade
- (5) Development of a prefire plan with the local fire department
- (6) Rapid communication
- (7) Consideration of special hazards resulting from previous occupancies
- (8) Protection of existing structures and equipment from exposure fires resulting from construction, alteration, and demolition operations

[241: 7.1]

**16.3.2 Owner's Responsibility for Fire Protection.**

**16.3.2.1\*** The owner shall designate a person who shall be responsible for the fire prevention program and who shall ensure that it is carried out to completion. [241: 7.2.1]

**16.3.2.1.1** The fire prevention program manager shall have the authority to enforce the provisions of NFPA 241 and other applicable fire protection standards. [241: 7.2.1.1]

**16.3.2.1.2** The fire prevention program manager shall have knowledge of the applicable fire protection standards, available fire protection systems, and fire inspection procedures. [241: 7.2.1.2]

**16.3.2.1.3** Inspection records shall be available for review by the AHJ. [241: 7.2.1.3]

**16.3.2.2** Where guard service is provided, the fire prevention program manager shall be responsible for the guard service. [241: 7.2.2]

**16.3.2.3\* Prefire Plans.**

**16.3.2.3.1** Where there is public fire protection or a private fire brigade, the manager shall be responsible for the development of prefire plans in conjunction with the fire agencies. [241: 7.2.3.1]

**16.3.2.3.2** Prefire plans shall be updated as necessary. [241: 7.2.3.2]

**16.3.2.3.3** The prefire plan shall include provisions for on-site visits by the fire agency. [241: 7.2.3.3]

**16.3.2.4 Program Manager Responsibilities.**

**16.3.2.4.1** The manager shall be responsible for ensuring that proper training in the use of protection equipment has been provided. [241: 7.2.4.1]

**16.3.2.4.2** The manager shall be responsible for the presence of adequate numbers and types of fire protection devices and appliances and for their proper maintenance. [241: 7.2.4.2]

**16.3.2.4.3** The manager shall be responsible for supervising the permit system for hot work operations. (See Section 5.1 of NFPA 241.) [241: 7.2.4.3]

**16.3.2.4.4** A weekly self-inspection program shall be implemented, with records maintained and made available. [241: 7.2.4.4]

**16.3.2.4.5\*** Impairments to the fire protection systems or fire alarm, detection, or communications systems shall be authorized only by the fire prevention program manager. [241: 7.2.4.5]

**16.3.2.4.6** Temporary protective coverings used on fire protection devices during renovations, such as painting, shall be removed promptly when work has been completed in the area. [241: 7.2.4.6]

**16.3.2.5 Site Security.**

**16.3.2.5.1\*** Guard service shall be provided where required by the AHJ. [241: 7.2.5.1]

**16.3.2.5.2\*** Where guard service is provided, the guard(s) shall be trained in all of the following:

- (1) Notification procedures that include calling the fire department and management personnel
  - (2) Function and operation of fire protection equipment
  - (3) Familiarization with fire hazards
  - (4) Use of construction elevators, where provided
- [241: 7.2.5.2]

**16.3.2.5.3** Guards shall be informed of any special status of emergency equipment or hazards. [241: 7.2.5.3]

**16.3.2.5.4\*** Security fences shall be provided where required by the AHJ. [241: 7.2.5.4]

**16.3.2.5.5\*** Entrances (e.g., doors and windows) to the structure under construction, alteration, or demolition shall be secured where required by the AHJ. [241: 7.2.5.5]

**16.3.3\* Fire Alarm Reporting.**

**16.3.3.1** There shall be a readily available public fire alarm box near the premises, telephone service to the responding fire department, or equivalent facilities. [241: 7.4.1]

**16.3.3.2** Instructions shall be issued for the immediate notification of the fire department in the case of a fire. Where telephone service is employed, the local fire department number and site address shall be conspicuously posted near each telephone. [241: 7.4.2]

**16.3.4 Access for Fire Fighting.**

**16.3.4.1** A suitable location at the site shall be designated as a command post and provided with plans, emergency information, keys, communications, and equipment, as needed. [241: 7.5.1]

**16.3.4.2** The person in charge of fire protection shall respond to the location command post whenever fire occurs. [241: 7.5.2]

**16.3.4.3** Where access to or within a structure or an area is unduly difficult because of secured openings or where immediate access is necessary for life-saving or fire-fighting purposes, the AHJ shall be permitted to require a key box to be installed in an accessible location. [241: 7.5.3]

**16.3.4.4** The key box shall be an approved type and shall contain keys to gain access as required by the AHJ. (See Section 18.2.) [241: 7.5.4]

**16.3.4.5 Stairs.**

**16.3.4.5.1** In all buildings over one story in height, at least one stairway shall be provided that is in usable condition at all times and that meets the requirements of NFPA 101. [241: 7.5.6.1]

**16.3.4.5.2** This stairway shall be extended upward as each floor is installed in new construction and maintained for each floor still remaining during demolition. [241: 7.5.6.2]

**16.3.4.5.3** The stairway shall be lighted. [241: 7.5.6.3]

**16.3.4.5.4** During construction, the stairway shall be enclosed where the building exterior walls are in place. [241: 7.5.6.4]

**16.3.4.5.5** All exit stairs shall be provided with stair identification signs to include the floor level, stair designation, and exit path direction as required to provide for safe egress. [241: 7.5.6.5]

**16.3.5 Standpipes.** In all new buildings in which standpipes are required or where standpipes exist in buildings being altered or demolished, such standpipes shall be maintained in conformity with the progress of building construction in such a manner that they are always ready for use. [241: 7.6]

**16.3.6\* First-Aid Fire-Fighting Equipment.**

**16.3.6.1\*** The suitability, distribution, and maintenance of extinguishers shall be in accordance with Section 13.6. [241: 7.7.1]

**16.3.6.2** Wherever a toolhouse, storeroom, or other shanty is located in or adjacent to the building under construction or demolition, or where a room or space within that building is used for storage, a dressing room, or a workshop, at least one approved extinguisher shall be provided and maintained in an accessible location, unless otherwise permitted by 16.3.6.3. [241: 7.7.2]

**16.3.6.3** The requirement of 16.3.6.2 shall be permitted to be waived where the structure does not exceed 150 ft<sup>2</sup> (14 m<sup>2</sup>) in floor area or is equipped with automatic sprinklers or other approved protection. [241: 7.7.3]

**16.3.6.4** At least one approved fire extinguisher also shall be provided in plain sight on each floor at each usable stairway as soon as combustible material accumulates. [241: 7.7.4]

**16.3.6.5** Suitable fire extinguishers shall be provided on self-propelled equipment. [241: 7.7.5]

**16.3.6.6\*** Free access to permanent, temporary, or portable first-aid fire equipment shall be maintained at all times. [241: 7.7.6]

**16.4 Safeguarding Construction and Alteration Operations.****16.4.1\* Scaffolding, Shoring, and Forms.**

**16.4.1.1** Accumulations of unnecessary combustible forms or form lumber shall be prohibited. [241: 8.2.1]

**16.4.1.2** Combustible forms or form lumber shall be brought into the structure only when needed. [241: 8.2.2]

**16.4.1.3** Combustible forms or form lumber shall be removed from the structure as soon as stripping is complete. [241: 8.2.3]

**16.4.1.4** Those portions of the structure where combustible forms are present shall not be used for the storage of other combustible building materials. [241: 8.2.4]

**16.4.1.5\*** During forming and stripping operations, portable fire extinguishers or charged hose lines shall be provided to protect the additional combustible loading adequately. [241: 8.2.5]

#### **16.4.2 Temporary Separation Walls.**

**16.4.2.1** Protection shall be provided to separate an occupied portion of the structure from a portion of the structure undergoing alteration, construction, or demolition operations when such operations are considered as having a higher level of hazard than the occupied portion of the building. [241: 8.6.2.1]

**16.4.2.2** Walls shall have at least a 1-hour fire resistance rating. [241: 8.6.2.2]

**16.4.2.3** Opening protectives shall have at least a 45-minute fire protection rating. [241: 8.6.2.3]

**16.4.2.4\*** Nonrated walls and opening protectives shall be permitted when an approved automatic sprinkler system is installed. [241: 8.6.2.4]

#### **16.4.3 Fire Protection During Construction.**

##### **16.4.3.1 Water Supply.**

**16.4.3.1.1\*** A water supply for fire protection, either temporary or permanent, shall be made available as soon as combustible material accumulates. [241: 8.7.2.1]

**16.4.3.1.2** There shall be no delay in the installation of fire protection equipment. (See A.16.4.1.5.) [241: 8.7.2.2]

**16.4.3.1.3\*** Where underground water mains and hydrants are to be provided, they shall be installed, completed, and in service prior to commencing construction work on any structure. [241: 8.7.2.3]

##### **16.4.3.2 Sprinkler Protection.**

**16.4.3.2.1\*** If automatic sprinkler protection is to be provided, the installation shall be placed in service as soon as practicable. [241: 8.7.3.1]

**16.4.3.2.2** The details of installation shall be in accordance with NFPA 13. [241: 8.7.3.2]

**16.4.3.2.3** Where sprinklers are required for safety to life, the building shall not be occupied until the sprinkler installation has been entirely completed and tested so that the protection is not susceptible to frequent impairment caused by testing and correction, unless otherwise permitted by 16.4.3.2.4. [241: 8.7.3.3]

**16.4.3.2.4** The provision of 16.4.3.2.3 shall not prohibit occupancy of the lower floors of a building, even where the upper floors are in various stages of construction or protection, provided that both of the following conditions are satisfied:

- (1) The sprinkler protection of the lower occupied floors has been completed and tested in accordance with 16.4.3.2.3.
- (2) The sprinkler protection of the upper floors is supplied by entirely separate systems and separate control valves so that

the absence or incompleteness of protection in no way impairs the sprinkler protection of the occupied lower floors.

[241: 8.7.3.4]

**16.4.3.2.5** The operation of sprinkler control valves shall be permitted only by properly authorized personnel and shall be accompanied by the notification of duly designated parties. [241: 8.7.3.5]

**16.4.3.2.6** Where the sprinkler protection is regularly turned off and on to facilitate connection of newly completed segments, the sprinkler control valves shall be checked at the end of each work shift to ascertain that protection is in service. [241: 8.7.3.6]

##### **16.4.3.3 Standpipes.**

###### **16.4.3.3.1 General.**

**16.4.3.3.1.1\*** The pipe size, hose valves, hose, water supply, and other details for new construction shall be in accordance with Section 13.2. [241: 8.7.4.1.1]

**16.4.3.3.1.2** On permanent Type II and Type III standpipes, hose and nozzles shall be provided and made ready for use as soon as the water supply is available to the standpipe, unless otherwise permitted by 16.4.3.3.1.3. [241: 8.7.4.1.2]

**16.4.3.3.1.3\*** In combined systems where occupant hose is not required, temporary hose and nozzles shall be provided during construction. [241: 8.7.4.1.3]

**16.4.3.3.2 Standpipe Installations in Buildings Under Construction.** Where required by the AHJ, in buildings under construction, a standpipe system, either temporary or permanent in nature, shall be installed in accordance with 16.4.3.3.2.1 through 16.4.3.3.2.10. [241: 8.7.4.2]

**16.4.3.3.2.1** The standpipes shall be provided with conspicuously marked and readily accessible fire department connections on the outside of the building at the street level and shall have at least one standard hose outlet at each floor. [241: 8.7.4.2.1]

**16.4.3.3.2.2** The pipe sizes, hose valves, hose, water supply, and other details for new construction shall be in accordance with NFPA 241. [241: 8.7.4.2.2]

**16.4.3.3.2.3** The standpipes shall be securely supported and restrained at each alternate floor. [241: 8.7.4.2.3]

**16.4.3.3.2.4\*** At least one approved hose valve for attaching fire department hose shall be provided at each intermediate landing or floor level in the exit stairway, as determined by the AHJ. [241: 8.7.4.2.4]

**16.4.3.3.2.5** Valves shall be kept closed at all times and guarded against mechanical injury. [241: 8.7.4.2.5]

**16.4.3.3.2.6** Hose valves shall have NH standard external threads for the valve size specified in accordance with NFPA 1963, *Standard for Fire Hose Connections*, unless modified by 16.4.3.3.2.7. [241: 8.7.4.2.6]

**16.4.3.3.2.7** Where local fire department connections do not conform to NFPA 1963, the AHJ shall designate the connection to be used. [241: 8.7.4.2.7]

**16.4.3.3.2.8\*** The standpipes shall be extended up with each floor and shall be securely capped at the top. [241: 8.7.4.2.8]

**16.4.3.3.2.9** Top hose outlets shall be not more than one floor below the highest forms, staging, and similar combustibles at all times. [241: 8.7.4.2.9]

**16.4.3.3.2.10** Temporary standpipes shall remain in service until the permanent standpipe installation is complete. [241: 8.7.4.2.10]

**16.4.4 Alteration of Buildings.**

**16.4.4.1** Where the building is protected by fire protection systems, such systems shall be maintained operational at all times during alteration.

**16.4.4.2** Where alteration requires modification of a portion of the fire protection system, the remainder of the system shall be kept in service and the fire department shall be notified.

**16.4.4.3** When it is necessary to shut down the system, the AHJ shall have the authority to require alternate measures of protection until the system is returned to service.

**16.4.4.4** The fire department shall be notified when the system is shut down and when the system is returned to service.

**16.4.4.5** All required exit components shall be maintained in accordance with this *Code* as deemed necessary by the AHJ.

**16.4.4.6** Fire-resistive assemblies and construction shall be maintained.

**16.5 Fire Safety During Demolition.**

**16.5.1** If a building intended to be demolished contains a sprinkler system, such system shall not be rendered inoperative without approval of the AHJ.

**16.5.2** Demolition operations involving the use of cutting and welding shall be done in accordance with Chapter 41.

**16.5.3** Combustible waste material shall not be burned at the demolition site unless approved by the AHJ. Combustible materials shall be removed from the site as often as necessary to minimize the hazards therefrom. (See 16.2.2 and Section 10.10.)

**16.5.4** Where in the opinion of the AHJ the demolition site is of a hazardous nature, qualified personnel shall serve as an on-site fire watch.

**16.6 Torch-Applied Roofing Systems.**

**16.6.1 Permits.** Permits, where required, shall comply with Section 1.12.

**16.6.2** Torch-applied roofing systems shall be installed in accordance with Chapter 9 of NFPA 241, *Standard for Safeguarding Construction, Alteration, and Demolition Operations*.

**16.7 Tar Kettles.****16.7.1 General.**

**16.7.1.1** The provisions of Section 16.7 shall apply to any type of equipment including, but not limited to, chassis-mounted equipment used for preheating or heating tar, asphalt, pitch, or similar substances for roofs, floors, pipes, or similar objects.

**16.7.1.2 Permits.** Permits, where required, shall comply with Section 1.12.

**16.7.1.3** Operating kettles shall not be located inside of or on the roof of any building.

**16.7.1.4 Tar Kettle Location.** The kettle shall be operated in a controlled area. The area shall be identified by the use of traffic cones, barriers, and other suitable means as approved by the AHJ.

**16.7.1.5 Kettle Supervision.**

**16.7.1.5.1** An operating kettle shall be attended by a minimum of one employee who is knowledgeable of the operations and hazards.

**16.7.1.5.2** The employee shall be within 25 ft (7.6 m) of the kettle and shall have the kettle within sight.

**16.7.1.6 Fire Extinguishers.**

**16.7.1.6.1** Two approved 4-A: 40-B: C fire extinguishers shall be provided and maintained within 25 ft (7.6 m) of the operating kettle.

**16.7.1.6.2\*** A minimum of one approved 4-A: 40-B: C fire extinguisher shall be provided and maintained on the roof in close proximity to the roofing operations while the roofing material is being applied.

**16.7.1.6.3** Fire extinguishers shall be mounted in an accessible and visible or identified location.

**16.7.1.7 Exits.**

**16.7.1.7.1** Roofing kettles shall not block exits, means of egress, gates, roadways, or entrances.

**16.7.1.7.2** Kettles shall not be closer than 10 ft (3 m) from exits or means of egress.

**16.7.2 Fuel System.**

**16.7.2.1** Fuel containers shall be constructed and approved for the use for which they were designed.

**16.7.2.2** Liquefied petroleum gas (LP-Gas) containers, hose, regulators, and burners shall conform to the requirements in Chapter 69.

**16.7.2.3** LP-Gas cylinders shall be secured to prevent accidental tipover.

**16.7.2.4** Regulators shall be required on any cylinders.

**16.7.2.5** Where, in the opinion of the AHJ, physical damage to the container is a danger, protection shall be provided to prevent such physical damage.

**16.7.2.6** LP-Gas containers for roofing kettles shall not be used in any building.

**16.7.3 Maintenance.**

**16.7.3.1** Roofing kettles and all integral working parts shall be in good working condition and shall be maintained free of excessive residue.

**16.7.3.2** All piping used for pumping heated material to the roof shall be installed in a manner to prevent loss of heated material.

**16.7.3.3** Flexible steel piping shall not be used on the vertical extension of piping systems.

**16.7.3.4** Flexible steel piping shall be limited to those connections that are immediately adjacent to the pump kettle or discharge outlet.

**16.7.3.5** No single length of flexible piping shall exceed 6 ft (1.8 m) in length, and all piping shall be able to withstand a pressure of at least four times the working pressure of the pump.

**16.7.3.6 Roofing Kettle Doors.**

**16.7.3.6.1** All roofing kettles shall have doors permanently attached.

**16.7.3.6.2** Roofing kettle doors shall be installed in a workmanlike manner and shall be provided with handles that allow them to be opened without the operator having to stand in front of same.

**16.7.3.6.3** All kettles shall have an approved, working visible temperature gauge that indicates the temperature of the material being heated.



### Chapter 18 Fire Department Access and Water Supply

**18.1 General.** Fire department access and water supplies shall comply with this chapter.

#### 18.1.1 Application.

**18.1.1.1** This chapter shall apply to public and privately owned fire apparatus access roads.

**18.1.1.2** This chapter shall apply to public and privately owned fire hydrant systems.

**18.1.1.3** Existing and new one- and two-family detached dwellings and their accessory structures such as garages, carports, and sheds shall be exempt from the provisions of 18.2.3.

**18.1.1.4** The fire apparatus access road plans must include an analysis and evaluation of fire apparatus maneuvers throughout the access roads created by swept path analysis and turn simulation software.

**18.1.1.5** The fire apparatus access plans shall bear the seal and signature of the responsible registered professional engineer.

**18.1.1.6** Nothing in this Section shall reduce the requirements established by cities or towns under MGL 40A and planning and zoning by-laws.

**18.1.2 Permits.** Permits, where required, shall comply with Section 1.12.

#### 18.1.3 Plans.

**18.1.3.1 Fire Apparatus Access.** Plans, where required, for fire apparatus access roads shall be submitted to the fire department for review and approval prior to construction.

**18.1.3.2 Fire Hydrant Systems.** Plans and specifications for fire hydrant systems shall be submitted to the fire department for review and approval prior to construction.

#### 18.2 Fire Department Access.

**18.2.1** Fire department access and fire department access roads shall be provided and maintained in accordance with Section 18.2.

#### 18.2.2\* Access to Structures or Areas.

**18.2.2.1 Access Box(es).** The AHJ shall have the authority to require an access box(es) to be installed in an accessible location where access to or within a structure or area is difficult because of security. The access box(es) shall be of an approved type listed in accordance with UL 1037.

**18.2.2.1.1** Approval of access roads shall be subject to the AHJ and capable of supporting the imposed loads of fire apparatus and shall be provided with an all-weather driving surface and shall be maintained as provided.

**18.2.2.2 Access to Gated Subdivisions or Developments.** The AHJ shall have the authority to require fire department access be provided to gated subdivisions or developments through the use of an approved device or system.

**18.2.2.3 Access Maintenance.** The owner or occupant of a structure or area, with required fire department access as specified in 18.2.2.1 or 18.2.2.2, shall notify the AHJ when the access is modified, in a manner that could prevent fire department access.

#### 18.2.3 Fire Department Access Roads.

##### 18.2.3.1 Required Access.

**18.2.3.1.1** Approved fire department access roads shall be

provided for every facility, building, or portion of a building hereafter constructed or relocated.

**18.2.3.1.2** Fire department access roads shall consist of roadways, fire lanes, parking lot lanes, or a combination thereof.

**18.2.3.1.3\*** The provisions of 18.2.3.1 through 18.2.3.2.2.1 shall be permitted to be modified by the AHJ where any of the following conditions exists:

- (1) ~~One and two family dwellings protected by an approved automatic sprinkler system in accordance with Section 13.1~~
- (2) ~~Existing one and two family dwellings~~
- (3) ~~Private garages having an area not exceeding 400 ft<sup>2</sup>~~
- (4) ~~Carports having an area not exceeding 400 ft<sup>2</sup>~~
- (5) Agricultural buildings having an area not exceeding 400 ft<sup>2</sup>
- (6) Sheds and other Other detached buildings having an area not exceeding 400 ft<sup>2</sup>

**18.2.3.1.4** When fire department access roads cannot be installed due to location on property, topography, waterways, nonnegotiable grades, or other similar conditions, the AHJ shall be authorized to require additional fire protection features.

**18.2.3.1.4** When fire department access roads cannot be installed due to location on property, topography, waterways, nonnegotiable grades, or other similar conditions, the AHJ shall be authorized to require additional fire protection features, permitted to accept alternatives proposed by the owner of the building to allow additional fire protection features, up to and including the installation of an approved fire sprinkler system installed in accordance with the Building Code, cistern(s), additional fire hydrant(s), or similar devices or systems.

##### 18.2.3.2 Access to Buildings and Facilities.

**18.2.3.2.1** A fire department access road shall extend to within 50 ft (15 m) of at least one exterior door that can be opened from the outside and that provides access to the interior of the building.

**18.2.3.2.1.1** Where a ~~one or two family dwelling, or~~ townhouse as defined in the Building Code, is protected with an approved automatic sprinkler system that is installed in accordance with NFPA 13D or NFPA 13R, as applicable, the distance in 18.2.3.2.1 shall be permitted to be increased to 150 ft (46 m).

**18.2.3.2.2** Fire department access roads shall be provided such that any portion of the facility or any portion of an exterior wall of the first story of the building is located not more than 150 ft (46 m) from fire department access roads as measured by an approved route around the exterior of the building or facility.

**18.2.3.2.2.1** When buildings are protected throughout with an approved automatic sprinkler system that is installed in accordance with NFPA 13, ~~NFPA 13D, or NFPA 13R,~~ the distance in 18.2.3.2.2 shall be permitted to be increased to 450 ft (137 m).~~250 feet.~~

**18.2.3.3 Multiple Access Roads.** More than one fire department access road shall be provided when it is determined by the AHJ that access by a single road could be impaired by vehicle congestion, condition of terrain, climatic conditions, or other factors that could limit access.

##### 18.2.3.4 Specifications.

##### 18.2.3.4.1 Dimensions.

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