

2021 Virginia Construction Code

CHAPTER 9 FIRE PROTECTION AND LIFE SAFETY SYSTEMS

SECTION 903 AUTOMATIC SPRINKLER SYSTEMS

[F] 903.1 General.

Automatic sprinkler systems shall comply with this section.

[F] 903.1.1 Alternative protection.

Alternative *automatic fire-extinguishing systems* complying with [Section 904](#) shall be permitted instead of automatic sprinkler system protection where recognized by the applicable standard and *approved* by the fire code official.

[F] 903.2 Where required.

Approved *automatic sprinkler systems* in new buildings and structures shall be provided in the locations described in [Sections 903.2.1](#) through [903.2.12](#).

Exception: Spaces or areas in telecommunications buildings used exclusively for telecommunications equipment, associated electrical power distribution equipment, batteries and standby engines, provided that those spaces or areas are equipped throughout with an *automatic smoke detection system* in accordance with [Section 907.2](#) and are separated from the remainder of the building by not less than 1-hour *fire barriers* constructed in accordance with [Section 707](#) or not less than 2-hour *horizontal assemblies* constructed in accordance with [Section 711](#), or both.

[F] 903.2.1 Group A.

An *automatic sprinkler system* shall be provided throughout buildings and portions thereof used as Group A occupancies as provided in this section.

[F] 903.2.1.1 Group A-1.

An *automatic sprinkler system* shall be provided throughout stories containing Group A-1 occupancies and throughout all stories from the Group A-1 occupancy to and including the *levels of exit discharge* serving that occupancy where one of the following conditions exists:

1. The *fire area* exceeds 12,000 square feet (1115 m²).
2. The *fire area* has an *occupant load* of 300 or more.
3. The *fire area* is located on a floor other than a *level of exit discharge* serving such occupancies.
4. The *fire area* contains a multitheater complex.

[F] 903.2.1.2 Group A-2.

An *automatic sprinkler system* shall be provided throughout stories containing Group A-2 occupancies and throughout all stories from the Group A-2 occupancy to and including the *levels of exit discharge* serving that occupancy where one of the following conditions exists:

1. The *fire area* exceeds 5,000 square feet (464 m²).
2. The *fire area* has an *occupant load* of 100 or more *innight clubs* or 300 or more in other Group A-2 occupancies.
3. The *fire area* is located on a floor other than a *level of exit discharge* serving such occupancies.

[F] 903.2.1.3 Group A-3.

An *automatic sprinkler system* shall be provided throughout stories containing Group A-3 occupancies and throughout all stories from the Group A-3 occupancy to and including the *levels of exit discharge* serving that occupancy where one of the following conditions exists:

1. The *fire area* exceeds 12,000 square feet (1115 m²).
2. In Group A-3 occupancies other than places of religious worship, the *fire area* has an *occupant load* of 300 or more.
3. The *fire area* is located on a floor other than a *level of exit discharge* serving such occupancies.

[F] 903.2.1.4 Group A-4.

An *automatic sprinkler system* shall be provided throughout stories containing Group A-4 occupancies and throughout all stories from the Group A-4 occupancy to and including the *levels of exit discharge* serving that occupancy where one of the following conditions exists:

1. The *fire area* exceeds 12,000 square feet (1115 m²).
2. The *fire area* has an *occupant load* of 300 or more.
3. The *fire area* is located on a floor other than a *level of exit discharge* serving such occupancies.

[F] 903.2.1.5 Group A-5.

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An *automatic sprinkler system* shall be provided for all enclosed Group A-5 accessory use areas in excess of 1,000 square feet (93 m²).

[F] 903.2.1.5.1 Spaces under grandstands or bleachers.

Enclosed spaces under *grandstands* or *bleachers* shall be equipped with an *automatic sprinkler system* in accordance with [Section 903.3.1.1](#) where either of the following exist:

1. The enclosed area is 1,000 square feet (93 m²) or less and is not constructed in accordance with [Section 1030.1.1.1](#).
2. The enclosed area exceeds 1,000 square feet (93 m²).

[F] 903.2.1.6 Assembly occupancies on roofs.

Where an occupied roof has an assembly occupancy with an *occupant load* exceeding 100 for Group A-2 and 300 for 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 [Section 903.3.1.1](#) or [903.3.1.2](#).

Exception: *Open parking garages* of Type I or Type II construction.

903.2.1.7 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.

[F] 903.2.2 Ambulatory care facilities.

An *automatic sprinkler system* shall be installed throughout the entire floor containing an *ambulatory care facility* where either of the following conditions exist at any time:

1. Four or more care recipients are *incapable of self-preservation*.
2. One or more care recipients that are *incapable of self-preservation* are located at other than the *level of exit discharge* serving such a facility.

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 as well as all floors below where such care is provided, and all floors between the level of ambulatory care and the nearest *level of exit discharge*, the *level of exit discharge*, and all floors below the level of *exit discharge*.

Exception: Floors classified as an *open parking garage* are not required to be sprinklered.

[F] 903.2.3 Group E.

An *automatic sprinkler system* shall be provided for Group E occupancies as follows:

1. [Throughout all Group E fire areas greater than 20,000 square feet \(1858 m²\) in area.](#)
2. The Group E *fire area* is located on a floor other than a *level of exit discharge* serving such occupancies.

Exception: In buildings where every classroom has not fewer than one exterior *exit* door at ground level, an *automatic sprinkler system* is not required in any area below the lowest *level of exit discharge* serving that area..

[F] 903.2.4 Group F-1.

An *automatic sprinkler system* shall be provided throughout all buildings containing a Group F-1 occupancy where one of the following conditions exists:

1. A Group F-1 *fire area* exceeds 12,000 square feet (1115 m²).
2. A Group F-1 *fire area* is located more than three stories above *grade plane*.
3. The combined area of all Group F-1 *fire areas* on all floors, including any *mezzanines*, exceeds 24,000 square feet (2230 m²).

[F] 903.2.4.1 Woodworking operations.

An *automatic sprinkler system* shall be provided throughout all Group F-1 occupancy *fire areas* that contain woodworking operations in excess of 2,500 square feet (232 m²) in area that generate finely divided combustible waste or use finely divided combustible materials.

[F] 903.2.4.2 Group F-1 distilled spirits.

An *automatic sprinkler system* shall be provided throughout a Group F-1 *fire area* used for the manufacture of distilled spirits.

[F] 903.2.4.3 Group F-1 upholstered furniture or mattresses.

An *automatic sprinkler system* shall be provided throughout a Group F-1 *fire area* that exceeds 2,500 square feet (232 m²) used for the manufacture of upholstered furniture or mattresses.

[F] 903.2.5 Group H.

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Automatic sprinkler systems shall be provided in high-hazard occupancies as required in [Sections 903.2.5.1 through 903.2.5.3](#).

[F] 903.2.5.1 General.

An *automatic sprinkler system* shall be installed in Group H occupancies.

[F] 903.2.5.2 Group H-5 occupancies.

An *automatic sprinkler system* shall be installed throughout buildings containing Group H-5 occupancies. The design of the sprinkler system shall be not less than that required by this code for the occupancy hazard classifications in accordance with [Table 903.2.5.2](#).

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.

**[F] TABLE 903.2.5.2
GROUP H-5 SPRINKLER DESIGN CRITERIA**

| LOCATION | OCCUPANCY HAZARD CLASSIFICATION |
|----------------------------------|---------------------------------|
| Fabrication areas | Ordinary Hazard Group 2 |
| Service corridors | Ordinary Hazard Group 2 |
| Storage rooms without dispensing | Ordinary Hazard Group 2 |
| Storage rooms with dispensing | Extra Hazard Group 2 |
| Corridors | Ordinary Hazard Group 2 |

[F] 903.2.5.3 Pyroxylin plastics.

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

[F] 903.2.6 Group I.

An *automatic sprinkler system* shall be provided throughout buildings with a Group I *fire area*.

Exceptions:

1. An *automatic sprinkler system* installed in accordance with [Section 903.3.1.2](#) shall be permitted in Group I-1, Condition 1 facilities.
2. An *automatic sprinkler system* is not required where Group I-4 day care facilities are at the *level of exit discharge* and where every room where care is provided has not fewer than one exterior exit door.
3. In buildings where Group I-4 day care is provided on levels other than the *level of exit discharge*, an *automatic sprinkler system* in accordance with [Section 903.3.1.1](#) shall be installed on the entire floor where care is provided, all floors between the level of care and the *level of exit discharge*, and all floors below the *level of exit discharge* other than areas classified as an open parking garage.
4. An *automatic sprinkler system* shall not be required for open-sided or chainlink-sided buildings and overhangs over exercise yards 200 square feet (18.58 m²) or less in Group I-3 facilities, provided such buildings and overhangs are of noncombustible construction.

[F] 903.2.7 Group M.

An *automatic sprinkler system* shall be provided throughout buildings containing a Group M occupancy where one of the following conditions exists:

1. A Group M *fire area* exceeds 12,000 square feet (1115 m²).
2. A Group M *fire area* is located more than three stories above *grade plane*.
3. The combined area of all Group M *fire areas* on all floors, including any *mezzanines*, exceeds 24,000 square feet (2230 m²).

[F] 903.2.7.1 High-piled storage.

An *automatic sprinkler system* shall be provided in accordance with the [International Fire Code](#) in all buildings of Group M where storage of merchandise is in high-piled or rack storage arrays.

[F] 903.2.7.2 Group M upholstered furniture or mattresses.

(Section deleted.)

903.2.8 Group R.

An *automatic sprinkler system* installed in accordance with [Section 903.3](#) shall be provided throughout all buildings with a Group R *fire area*, except for Group R-2 occupancies listed in the exceptions to this section when the necessary water pressure or volume, or both, for the system is not available:

Exceptions:

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1. Group R-2 occupancies that do not exceed two stories, including basements that are not considered as a story above grade, and with a maximum of 16 dwelling units per fire area. Each dwelling unit shall have at least one door opening to an exterior exit access that leads directly to the exits required to serve that dwelling unit.
2. Group R-2 occupancies where all dwelling units are not more than two stories above the lowest level of exit discharge and not more than one story below the highest level of exit discharge of exits serving the dwelling unit and a 2-hour fire barrier is provided between each pair of dwelling units. Each bedroom of a dormitory or boarding house shall be considered a dwelling unit under this exception.

[F] 903.2.8.1 Group R-3.

An *automatic sprinkler system* installed in accordance with [Section 903.3.1.3](#) shall be permitted in Group R-3 occupancies.

[F] 903.2.8.2 Group R-4, Condition 1.

An *automatic sprinkler system* installed in accordance with [Section 903.3.1.3](#) shall be permitted in Group R-4, Condition 1 occupancies.

[F] 903.2.8.3 Group R-4, Condition 2.

An *automatic sprinkler system* installed in accordance with [Section 903.3.1.2](#) shall be permitted in Group R-4, Condition 2 occupancies.

[F] 903.2.8.4 Care facilities.

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.

[F] 903.2.9 Group S-1.

An *automatic sprinkler system* shall be provided throughout all buildings containing a Group S-1 occupancy where one of the following conditions exists:

1. A Group S-1 *fire area* exceeds 12,000 square feet (1115 m²).
2. A Group S-1 *fire area* is located more than three stories above *grade plane*.
3. The combined area of all Group S-1 *fire areas* on all floors, including any *mezzanines*, exceeds 24,000 square feet (2230 m²).
4. A Group S-1 *fire area* used for the storage of commercial motor vehicles where the *fire area* exceeds 5,000 square feet (464 m²).

[F] 903.2.9.1 Repair garages.

An *automatic sprinkler system* shall be provided throughout all buildings used as *repair garages* in accordance with [Section 406](#), as shown:

1. Buildings having two or more *stories above grade plane*, including basements, with a *fire area* containing a *repair garage* exceeding 10,000 square feet (929 m²).
2. Buildings not more than one *story above grade plane*, with a *fire area* containing a *repair garage* exceeding 12,000 square feet (1115 m²).
3. Buildings with *repair garages* servicing vehicles parked in basements.
4. A Group S-1 *fire area* used for the repair of commercial motor vehicles where the *fire area* exceeds 5,000 square feet (464 m²).

[F] 903.2.9.2 Bulk storage of tires.

Buildings and structures where the area for the storage of tires exceeds 20,000 cubic feet (566 m³) shall be equipped throughout with an *automatic sprinkler system* in accordance with [Section 903.3.1.1](#).

[F] 903.2.9.3 Group S-1 Distilled spirits or wine.

An *automatic sprinkler system* shall be provided throughout a Group S-1 *fire area* used for the bulk storage of distilled spirits or wine.

[F] 903.2.9.4 Group S-1 upholstered furniture and mattresses.

An *automatic sprinkler system* shall be provided throughout a Group S-1 *fire area* where the area used for the storage of upholstered furniture or mattresses exceeds 2,500 square feet (232 m²).

Exception: Self-service storage facilities not greater than one story above grade plane where all storage spaces can be accessed directly from the exterior.

[F] 903.2.10 Group S-2 parking garages.

An *automatic sprinkler system* shall be provided throughout buildings classified as parking garages where *any* of the following conditions exists:

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1. Where the fire area of the enclosed parking garage [in accordance with Section 406.6](#) exceeds 12,000 square feet (1115 m²).
2. Where the enclosed parking garage [in accordance with Section 406.6](#) is located beneath other groups.

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

3. Where the fire area of the open parking garage [in accordance with Section 406.5](#) exceeds 48,000 square feet (4460 m²).

[F] 903.2.10.1 Commercial parking garages.

An *automatic sprinkler system* shall be provided throughout buildings used for storage of commercial motor vehicles where the fire area exceeds 5,000 square feet (464 m²).

[F] 903.2.10.2 Mechanical-access enclosed parking garages.

An *approved automatic sprinkler system* shall be provided throughout buildings used for the storage of motor vehicles in a mechanical-access enclosed parking garage. The portion of the building that contains the mechanical-access enclosed parking garage shall be protected with a specially engineered *automatic sprinkler system*.

[F] 903.2.11 Specific building areas and hazards.

In all occupancies other than Group U, an *automatic sprinkler system* shall be installed for building design or hazards in the locations set forth in [Sections 903.2.11.1 through 903.2.11.6](#).

[F] 903.2.11.1 Stories without openings.

An *automatic sprinkler system* shall be installed throughout all stories, including basements, of all buildings where the floor area exceeds 1,500 square feet (139.4 m²) and where the story does not comply with the following criteria for exterior wall openings:

1. Openings below grade that lead directly to ground level by an exterior *stairway* complying with [Section 1011](#) or an outside *ramp* complying with [Section 1012](#). Openings shall be located in each 50 linear feet (15 240 mm), or fraction thereof, of exterior wall in the story on not fewer than one side. The required openings shall be distributed such that the lineal distance between adjacent openings does not exceed 50 feet (15 240 mm).
2. Openings entirely above the adjoining ground level totaling not less than 20 square feet (1.86 m²) in each 50 linear feet (15 240 mm), or fraction thereof, of exterior wall in the story on not fewer than one side. The required openings shall be distributed such that the lineal distance between adjacent openings does not exceed 50 feet (15 240 mm). The height of the bottom of the clear opening shall not exceed 44 inches (1118 mm) measured from the floor.

[F] 903.2.11.1.1 Opening dimensions and access.

Openings shall have a minimum dimension of not less than 30 inches (762 mm). Access to such openings shall be provided for the fire department from the exterior and shall not be obstructed in a manner such that fire fighting or rescue cannot be accomplished from the exterior.

[F] 903.2.11.1.2 Openings on one side only.

Where openings in a story are provided on only one side and the opposite wall of such story is more than 75 feet (22 860 mm) from such openings, the story shall be equipped throughout with an *approved automatic sprinkler system*, or openings shall be provided on not fewer than two sides of the story.

[F] 903.2.11.1.3 Basements.

Where any portion of a *basement* is located more than 75 feet (22 860 mm) from openings required by [Section 903.2.11.1](#), or where walls, partitions or other obstructions are installed that restrict the application of water from hose streams, the *basement* shall be equipped throughout with an *approved automatic sprinkler system*.

[F] 903.2.11.2 Rubbish and linen chutes.

An *automatic sprinkler system* shall be installed at the top of rubbish and linen chutes and in their terminal rooms. Chutes shall have additional sprinkler heads installed at alternate floors and at the lowest intake. Where a rubbish chute extends through a building more than one floor below the lowest intake, the extension shall have sprinklers installed that are recessed from the drop area of the chute and protected from freezing in accordance with [Section 903.3.1.1](#). Such sprinklers shall be installed at alternate floors, beginning with the second level below the last intake and ending with the floor above the discharge. Access to sprinklers in chutes shall be provided for servicing.

[F] 903.2.11.3 Buildings 55 feet or more in height.

An *automatic sprinkler system* shall be installed throughout buildings that have one or more stories with an *occupant load* of 30 or more located 55 feet (16 764 mm) or more above the lowest level of fire department vehicle access, measured to the finished floor.

Exception: Occupancies in Group F-2.

[F] 903.2.11.4 Data processing equipment cabinets.

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[F] 903.2.11.4 Ducts conveying hazardous exhausts.

Where required by the *International Mechanical Code*, automatic sprinklers shall be provided in ducts conveying hazardous exhaust or flammable or combustible materials.

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

[F] 903.2.11.5 Commercial cooking operations.

An *automatic sprinkler system* shall be installed in commercial kitchen exhaust hood and duct systems where an *automatic sprinkler system* is used to comply with [Section 904](#).

[F] 903.2.11.6 Other required fire protection systems.

In addition to the requirements of [Section 903.2](#), the provisions indicated in [Table 903.2.11.6](#) require the installation of a fire [protection](#) system for certain buildings and areas.

**[F] TABLE 903.2.11.6
ADDITIONAL REQUIRED PROTECTION SYSTEMS**

| SECTION | SUBJECT |
|--|--|
| 402.5 , 402.6.2 | Covered and open mall buildings |
| 403.3 | High-rise buildings |
| 404.3 | Atriums |
| 405.3 | Underground structures |
| 407.7 | Group I-2 |
| 410.6 | Stages |
| 411.3 | Special amusement buildings |
| 412.2.4 | Airport traffic control towers |
| 412.3.6 , 412.3.6.1 , 412.5.6 | Aircraft hangars |
| 415.11.11 | Group H-5 HPM exhaust ducts |
| 416.5 | Flammable finishes |
| 417.4 | Drying rooms |
| 424.3 | Play structures |
| 428 | Buildings containing <i>laboratory suites</i> |
| 507 | Unlimited area buildings |
| 508.5.7 | Live/work units |
| 509.4 | Incidental uses |
| 1030.6.2.3 | Smoke-protected assembly seating |
| IFC | Sprinkler system requirements as set forth in Section 903.2.11.6 of the <i>International Fire Code</i> |

[[F] 903.2.12 During construction.

Automatic sprinkler systems required during construction, alteration and demolition operations shall be provided in accordance with [Chapter 33](#) of the *International Fire Code*.

[F] 903.3 Installation requirements.

Automatic sprinkler systems shall be designed and installed in accordance with [Sections 903.3.1](#) through [903.3.8](#).

[F] 903.3.1 Standards.

Sprinkler systems shall be designed and installed in accordance with [Section 903.3.1.1](#) unless otherwise permitted by [Sections 903.3.1.2](#) and [903.3.1.3](#) and other chapters of this code, as applicable.

[F] 903.3.1.1 NFPA 13 sprinkler systems.

Where the provisions of this code require that a building or portion thereof be equipped throughout with an *automatic sprinkler system* in accordance with this section, sprinklers shall be installed throughout in accordance with [NFPA 13](#) except as provided in [Sections 903.3.1.1.1](#) and [903.3.1.1.2](#).

[F] 903.3.1.1.1 Exempt locations.

Automatic sprinklers shall not be required in the following rooms or areas where such rooms or areas are protected with an *approved* automatic fire detection system in accordance with [Section 907.2](#) that will respond to visible or invisible particles of combustion. Sprinklers shall not be omitted from a room merely because it is damp, of fire-resistance-rated construction or contains electrical equipment.

1. A room where the application of water, or flame and water, constitutes a serious life or fire hazard.
2. A room or space where sprinklers are considered undesirable because of the nature of the contents, where

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approved by the fire code official.

3. Generator and transformer rooms separated from the remainder of the building by walls and floor/ceiling or roof/ceiling assemblies having a *fire-resistance rating* of not less than 2 hours.
4. Rooms or areas that are of noncombustible construction with wholly noncombustible contents.
5. Fire service access elevator machine rooms and machinery spaces.
6. Machine rooms, machinery spaces, control rooms and control spaces associated with occupant evacuation elevators designed in accordance with [Section 3008](#).

[F] 903.3.1.1.2 Bathrooms.

In Group R occupancies sprinklers shall not be required in bathrooms that do not exceed 55 square feet (5 m²) in area and are located within individual *dwelling units* or *sleeping units*, provided that walls and ceilings, including the walls and ceilings behind a shower enclosure or tub, are of noncombustible or limited-combustible materials with a 15-minute thermal barrier rating.

[F] 903.3.1.2 NFPA 13R sprinkler systems.

Automatic sprinkler systems in Group R occupancies shall be permitted to be installed throughout in accordance with [NFPA 13R](#) where the Group R occupancy meets all of the following conditions:

1. Four stories or fewer above *grade plane*.
2. The floor level of the highest story is 30 feet (9144 mm) or less above the lowest level of fire department vehicle access.
3. The floor level of the lowest story is 30 feet (9144 mm) or less below the lowest level of fire department vehicle access.

The number of stories of Group R occupancies constructed in accordance with [Sections 510.2](#) and [510.4](#) shall be measured from [grade plane](#).

[F] 903.3.1.2.1 Balconies and decks.

Sprinkler protection shall be provided for exterior balconies, decks and ground floor patios of *dwelling units* and *sleeping units* where either of the following conditions exists:

1. The building is of Type V construction, provided that there is a roof or deck above.
2. Exterior balconies, decks and ground floor patios of dwelling units and sleeping units are constructed in accordance with [Section 705.2.3.1](#), Exception 3.

Sidewall sprinklers that are used to protect such areas shall be permitted to be located such that their deflectors are within 1 inch (25 mm) to 6 inches (152 mm) below the structural members and a maximum distance of 14 inches (356 mm) below the deck of the exterior balconies and decks that are constructed of open wood joist construction.

[F] 903.3.1.2.2 Corridors and balconies in the means of egress.

Sprinkler protection shall be provided in *corridors* and for balconies in the means of egress where any of the following conditions apply:

1. Corridors with combustible floor or walls.
2. Corridors with an interior change of direction exceeding 45 degrees (0.79 rad).
3. Corridors that are less than 50 percent open to the outside atmosphere at the ends.
4. Open-ended corridors and associated exterior stairways and ramps as specified in [Section 1027.6](#), Exception 3.
5. Egress balconies not complying with [Sections 1021.2](#) and [1021.3](#).

[F] 903.3.1.2.3 Attics.

Attic protection shall be provided as follows:

1. Attics that are used or intended for living purposes or storage shall be protected by an *automatic sprinkler system*.
2. Where fuel-fired equipment is installed in an unsprinklered attic, not fewer than one quick-response intermediate temperature sprinkler shall be installed above the equipment.
3. Where located in a building of Type III, Type IV or Type V construction designed in accordance with [Section 510.2](#) or [510.4](#), attics not required by Item 1 to have sprinklers shall comply with one of the following if the roof assembly is located more than 55 feet (16 764 mm) above the lowest level of fire department vehicle access [needed to meet the provisions in Section 503](#).
 - 3.1. Provide *automatic sprinkler system* protection.
 - 3.2. Construct the attic using noncombustible materials.
 - 3.3. Construct the attic using *fire-retardant-treated wood* complying with [Section 2303.2](#).
 - 3.4. Fill the attic with noncombustible insulation.

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The height of the roof assembly shall be determined by measuring the distance from the lowest required fire vehicle access road surface adjacent to the building to the eave of the highest pitched roof, the intersection of the highest roof to the exterior wall, or the top of the highest parapet, whichever yields the greatest distance. For the purpose of this measurement, required fire vehicle access roads shall include only those roads that are necessary for compliance with [Section 503](#) of the *International Fire Code*:

4. Group R-4, Condition 2 occupancy *attics* not required by Item 1 to have sprinklers shall comply with one of the following:

- 4.1. Provide *automatic sprinkler system* protection.
- 4.2. Provide a heat detection system throughout the *attic* that is arranged to activate the building fire alarm system.
- 4.3. Construct the *attic* using noncombustible materials.
- 4.4. Construct the *attic* using *fire-retardant-treated wood* complying with [Section 2303.2](#).
- 4.5. Fill the *attic* with noncombustible insulation.

5. Sprinkler protection shall be provided for *attics in buildings* of Type III, IV or V construction in Group R-2 occupancies that are designed or developed and marketed to senior citizens 55 years of age or older and in Group I-1 occupancies in accordance with [Section 7.2 of NFPA 13R](#).

[F] 903.3.1.3 NFPA 13D sprinkler systems.

Automatic sprinkler systems installed in one- and two-family *dwelling*s; Group R-3; Group R-4, Condition 1; and *townhouses* shall be permitted to be installed throughout in accordance with [NFPA 13D](#).

[F] 903.3.2 Quick-response and residential sprinklers.

Where *automatic sprinkler systems* are required by this code, quick-response or residential automatic sprinklers shall be installed in all of the following areas in accordance with [Section 903.3.1](#) and their listings:

1. Throughout all spaces within a *smoke compartment* containing care recipient *sleeping units* in Group I-2 in accordance with this code.
2. Throughout all spaces within a *smoke compartment* containing gas fireplace appliances and decorative gas appliances in Group I-2.
3. Throughout all spaces within a *smoke compartment* containing treatment rooms in *ambulatory care facilities*.
4. *Dwelling units* and *sleeping units* in Group I-1 and R occupancies.
5. Light-hazard occupancies as defined in [NFPA 13](#).

[F] 903.3.3 Obstructed locations.

Automatic sprinklers shall be installed with regard to obstructions that will delay activation or obstruct the water distribution pattern and shall be in accordance with the applicable *automatic sprinkler system* standard that is being used. Automatic sprinklers shall be installed in or under covered kiosks, displays, booths, concession stands, or equipment that exceeds 4 feet (1219 mm) in width. Not less than a 3-foot (914 mm) clearance shall be maintained between automatic sprinklers and the top of piles of *combustible fibers*.

Exception: Kitchen equipment under exhaust hoods protected with a fire-extinguishing system in accordance with [Section 904](#).

[F] 903.3.4 Actuation.

Automatic sprinkler systems shall be automatically actuated unless specifically provided for in this code.

[F] 903.3.5 Water supplies.

Water supplies for *automatic sprinkler systems* shall comply with this section and the standards referenced in [Section 903.3.1](#). The potable water supply shall be protected against backflow in accordance with the requirements of this section and the *International Plumbing Code*. For connections to public waterworks systems, the water supply test used for design of fire protection systems shall be adjusted to account for seasonal and daily pressure fluctuations based on information from the water supply authority and as approved by the fire code official.

[F] 903.3.5.1 Domestic services.

Where the domestic service provides the water supply for the *automatic sprinkler system*, the supply shall be in accordance with this section.

903.3.5.1.1 Limited area sprinkler systems.

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

1. Valves shall not be installed between the domestic water riser control valve and the sprinklers.

Exception: An approved indicating control valve supervised in the open position in accordance with [Section 903.4](#).

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2. The domestic service shall be capable of supplying the simultaneous domestic demand and the sprinkler demand required to be hydraulically calculated by [NFPA 13](#), [NFPA 13R](#), or [NFPA 13D](#).

903.3.5.1.2 Residential combination services.

A single combination water supply shall be allowed provided that the domestic demand is added to the sprinkler demand as required by [NFPA 13R](#).

[F] 903.3.6 Hose threads.

Fire hose threads and fittings used in connection with *automatic sprinkler systems* shall be as prescribed by the fire code official.

[F] 903.3.7 Fire department connections.

Fire department connections for *automatic sprinkler systems* shall be installed in accordance with [Section 912](#).

[F] 903.3.8 Limited area sprinkler systems.

(Section deleted.)

903.3.8.1 Number of sprinklers.

(Section deleted.)

903.3.8.2 Occupancy hazard classification.

(Section deleted.)

903.3.8.3 Piping arrangement.

(Section deleted.)

903.3.8.4 Supervision.

(Section deleted.)

903.3.8.5 Calculations.

(Section deleted.)

[F] 903.4 Sprinkler system supervision and alarms.

Valves controlling the water supply for *automatic sprinkler systems*, pumps, tanks, water levels and temperatures, critical air pressures and waterflow switches on all sprinkler systems shall be electrically supervised by a *listed* fire alarm control unit.

Exceptions:

1. *Automatic sprinkler systems* protecting one- and two-family *dwelling*s.
2. Limited area sprinkler systems in accordance with [Section 903.3.8](#).
3. *Automatic sprinkler systems* installed in accordance with [NFPA 13R](#) where a common supply main is used to supply both domestic water and the *automatic sprinkler system*, and a separate shutoff valve for the *automatic sprinkler system* is not provided.
4. Jockey pump control valves that are sealed or locked in the open position.
5. Control valves to commercial kitchen hoods, paint spray booths or dip tanks that are sealed or locked in the open position.
6. Valves controlling the fuel supply to fire pump engines that are sealed or locked in the open position.
7. Trim valves to pressure switches in dry, preaction and deluge sprinkler systems that are sealed or locked in the open position.
8. [Underground key or hub gate valves in roadway boxes](#).

[F] 903.4.1 Monitoring.

Alarm, supervisory and trouble signals shall be distinctly different and shall be automatically transmitted to an *approved* supervising station or, where *approved* by the fire code official, shall sound an audible signal at a *constantly attended location*.

Exception: Backflow prevention device test valves located in limited area sprinkler system supply piping shall be locked in the open position. In occupancies required to be equipped with a fire alarm system, the backflow preventer valves shall be electrically supervised by a tamper switch installed in accordance with [NFPA 72](#) and separately annunciated.

903.4.2 Alarms.

Approved audible devices shall be connected to every automatic sprinkler system. Such sprinkler water-flow alarm devices shall be activated by water flow equivalent to the flow of a single sprinkler of the smallest orifice size installed in the system. Alarm devices shall be provided on the exterior of the building in an approved location. Where a fire alarm system is installed, actuation of the automatic sprinkler system shall actuate the *building* fire alarm system. Group R-2

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occupancies that contain 16 or more dwelling units or sleeping units, any dwelling unit or sleeping unit two or more stories above the lowest level of exit discharge, or any dwelling unit or sleeping unit more than one story below the highest level of exit discharge of exits serving the dwelling unit or sleeping unit shall provide a manual fire alarm box at an approved location to activate the suppression system alarm.

[F] 903.4.3 Floor control valves.

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

[F] 903.5 Testing and maintenance.

Automatic sprinkler systems shall be tested and maintained in accordance with the *International Fire Code*.