

Design Intent Corrections List for Automatic Sprinkler Systems

This list is to be used in conjunction with the attached General Correction List. Note that this correction list is not all inclusive. See additional items on the General Correction List.

Items listed require amended construction documents such as revised plans, supplemental instructions, addenda, field orders, or change orders before plans approval will be issued. Answers in letter form may be provided to explain the changes to the construction documents. All drawing revisions should be clouded with a corresponding revision number tag.

This review does not authorize construction to begin. Starting construction before plans approval may result in a Stop Work Order. Rule 0780-02-07-.09

Sprinkler systems and sprinkler system components are reviewed for compliance with the following State of Tennessee adopted codes:

- National Fire Protection Association (NFPA) 13, 13R, and 13D, 2010 edition
- National Fire Protection Association (NFPA) 24, 2010 edition
- International Building Code (IBC), 2012 edition

Submittal Requirements

1. Construction documents shall be of sufficient clarity to indicate the location, nature and extent of the work proposed and show in detail that it will conform to the provisions of the referenced code.

IBC 107.2.1

Automatic Sprinkler System Shop Drawings, based on an Approved Engineered Design Intent, shall provide details from the *point of service*. Point of service is defined as the point immediately after the tap of the service main where water is used exclusively for fire protection purposes. Rule 0780-02-07-.01(g)

All documents shall be sealed (with signature and date) by a Tennessee registrant. Rule 0780-02-03-.03, 0780-02-03-.03(b), Rule 0120-02-.08(3)

2. Engineer sealed fire sprinkler shop drawings will not be accepted as an engineer's design intent unless accompanied with a signed and sealed letter stating that the licensed "Responsible Managing Employee" who prepared the drawings is either:
 - (a) A Tennessee registrant in accordance with the Architects and Engineers Licensing Law Rules, or
 - (b) Under the responsible charge of the Tennessee registrant who is a staff employee of the sprinkler company.

In such a case, the drawings may be accepted as both the design intent and sprinkler shop drawing submittal.

Architectural Requirements

1. On the cover sheet of the plans, identify the specific sprinkler standard to be used in the design drawings and scope of building protection: e.g., *Equipped Throughout, Partial, Incidental Area*. IBC 107.2.1, IBC 903.3.1

2. The Sprinkler Design Intent drawings shall be indexed on the Cover Sheet of the plan set. IBC 107.2.1

3. All fire sprinkler related allowances/reductions in code requirements (for building height and area) which are applied in the design must be identified in the Code Analysis section by the specific exception's code reference number.
IBC 107.2.1

Note: In almost all cases, allowances/reductions may only be taken when the building is protected throughout by an automatic NFPA 13 system. IBC 903.3.1.1

4. Automatic sprinkler system riser rooms shall be designed with adequate space for all equipment necessary for the installation, as defined by the manufacturer, with sufficient working room around the stationary equipment. Clearances around equipment to elements of permanent construction, including other installed equipment and appliances, shall be sufficient to allow inspection, service, repair or replacement without removing such elements of permanent construction or disabling the function of a required fire-resistance-rated assembly. Automatic sprinkler system riser rooms shall be provided with a door(s) and unobstructed passageway large enough to allow removal of the largest piece of equipment. IBC 901.8
5. Breezeways (Exterior stairs/Open-ended corridors) shall be constructed in buildings protected by NFPA 13R systems by one of the following options:
 - (1) Breezeway enclosures shall be constructed as fire barriers in accordance with Section 707 or horizontal assemblies in accordance with Section 711, or both. Opening protectives shall be in accordance with the requirements of Section 716 and shall be limited to those necessary for exit access to the enclosure from normally occupied spaces and for egress from the enclosure. IBC 1026.6, 1022
Note: In this approach, NFPA 13R 6.6.5 may be applied: the building would be protected throughout in accordance with IBC 903.3.1.2.
 - (2) Separation from the interior of the building is not required for exterior stairways or ramps connected to open-ended corridors, when designed in accordance with IBC 1026.6(4).

MP&E Requirements

1. Where aboveground water-filled supply pipes, risers, system risers, or feed mains pass through open areas, cold rooms, passageways, or other areas exposed to temperatures below 40°F (4°C), the pipe shall be protected against freezing by insulating coverings, frost proof casings, listed heat tracing systems, or other reliable means capable of maintaining a minimum temperature between 40°F (4°C) and 120°F (48.9°C). NFPA 13 8.6.4.1.3, NFPA 13R 6.7.2.1
2. The dry-pipe valve room must be lighted and heated and the source of heat must be a permanently installed type. NFPA 13 7.2.5.2.1 and NFPA 13 7.2.5.2.1
3. Automatic Sprinkler Systems, from the point of service, shall be monitored by an approved supervising station. Rule 0780-02-07-.01(g), IBC 901.6.1
4. On the Electrical drawings, specify the NFPA 72 compliant monitoring and signal transmission device and show the location of all supervisory and alarm components which will perform the functions required by IBC 903.4 and 903.4.1 for the automatic sprinkler system.

Civil Utility Plan Requirements

1. Civil Drawings shall include the following items that pertain to the design of the private fire service main (IFC 507.2.1 and NFPA 24 4.1.3):
 - (1) Size and location of all water supplies and *underground utilities*.
 - (2) The following items that pertain to *private fire service mains*:
 - (a) Size, length, location, material
 - (b) Point of connection to the main
 - (c) Sprinkler system *point of service*. Point of service means the point immediately after the tap of the service main where water is used exclusively for fire protection purposes.
 - (d) Sizes, types, and locations of valves, valve indicators, regulators, meters, and valve pits.
 - (e) Depth at which the top of the pipe is laid below grade.
 - (f) Method of restraint
 - (3) The following items that pertain to *hydrants*:
 - (a) Size, location, number of outlets, and whether outlets are to be equipped with independent gate valves.
 - (b) Static and residual hydrants used in flow
 - (c) Method of restraint
 - (4) Size, location, and piping arrangement of *fire department connections*
2. All connections to private fire service mains for fire protection systems shall be arranged in accordance with *one of the following* so that they can be isolated (IFC 507.2.1 and NFPA 24 6.2.11):
 - (1) A post indicator valve installed not less than 40 ft. from the building. For buildings less than 40 ft. in height, a post indicator valve shall be permitted to be installed closer than 40 ft. but at least as far from the building as the height of the wall facing the post indicator valve.
 - (2) A wall post indicator valve.
 - (3) An indicating valve in a pit, installed in accordance with Section 6.4.
 - (4) A backflow preventer with at least one indicating valve not less than 40 ft. from the building. For buildings less than 40 ft. in height, a backflow preventer with at least one indicating valve shall be permitted to be installed closer than 40 ft. but at least as far from the building as the height of the wall facing the backflow preventer.
 - (5) A nonindicating valve, such as an underground gate valve with an approved roadway box, complete with T-wrench, located not less than 40 ft. from the building. For buildings less than 40 ft. in height, a nonindicating valve shall be permitted to be installed closer than 40 ft. but at least as far from the building as the height of the wall facing the backflow preventer.
 - (6) Control valves installed in a fire-rated room accessible from the exterior.
 - (7) Control valves in a fire-rated stair enclosure accessible from the exterior.

Automatic Sprinkler System Design Intent Site Plan (Underground)

1. Provide the following information on the Automatic Sprinkler System Design Intent site plan:
 - (1) Show the location of the point of service for the underground sprinkler piping on the site plan. and provide a note stating "Installation of all sprinkler system piping from the point of service must be performed by a Tennessee registered sprinkler contractor." Rule 0780-2-7-.08
 - (2) Provide details of the underground piping from the point of service to the building. Identify: the NFPA 24 6.2.11 system isolation valve location & type, underground piping material type and size, depth of bury, valve pit, trench detail, and thrust block size and location. IFC 507.2.1, NFPA 24 Chapter 4, 5, 10, and NFPA 13 Chapter 10, NFPA 13R 5.3, NFPA 13D 5.3
 - (3) The potable water supply shall be protected against backflow in accordance with the requirements of this section and the International Plumbing Code. IBC 903.3.5, IPC 608.16.4

- (4) Identify whether a reduced pressure backflow preventer or meter are present. When used, specify that this equipment is listed for fire protection use. NFPA 24 5.3
 - (5) With respect to hydrants, driveways, buildings and landscaping, and fire department connections shall be so located that fire apparatus and hose connected to supply the system will not obstruct access to the buildings for other fire apparatus.
 - (a) Visible location: Fire department connections shall be located on the street side of buildings, fully visible and recognizable from the street or nearest point of fire department vehicle access or as otherwise approved by the fire chief. IBC 912.2.2
 - (b) Existing buildings: On existing buildings, wherever the fire department connection is not visible to approaching fire apparatus, the fire department connection shall be indicated by an approved sign mounted on the street front or on the side of the building.
 - (6) Show the location of the fire pump and/or water tank location when required by design. NFPA 24 5.6, and 5.7
2. All connections to private fire service mains for fire protection systems shall be arranged so that they can be isolated (NFPA 24 6.3.1). The sprinkler system isolation valve must be electronically supervised by a fire alarm system. IBC 903.4
- Exception:* Underground key or hub valves in roadway boxes provided by the municipality or public utility are not required to be monitored. IBC 903.4.1, Exception 1
3. Service mains must not run under buildings unless special precautions are taken. Provide details showing the method utilized, e.g., arched foundation walls, covered trenching, and isolation valves. NFPA 13 10.6.1, 10.6.2
4. Provide a lead-in detail where the underground piping passes through the foundation and attaches to the riser. Clearance shall be provided around all piping extending through walls, floors, platforms, and foundations, including drains, fire department connections, and other auxiliary piping. NFPA 13 9.3.4.1

General Automatic Sprinkler Design Intent

1. Sprinkler systems shall be designed and installed in accordance with Section 903.3.1.1 (NFPA 13) unless otherwise permitted by Sections 903.3.1.2 (NFPA 13R), and 903.3.1.3 (NFPA 13D), or other chapters of this code, as applicable (IBC 903.3.1). Identify the standard used in the design and the specific type of system used (Wet, Dry, Preaction or Deluge, etc.). NFPA Chapter 13
2. Where automatic sprinkler systems are required by this code, quick-response or residential automatic sprinklers shall be installed in the following areas in accordance with Section 903.3.1 and their listings in accordance with IBC 903.3.2:
 - (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 treatment rooms in ambulatory care facilities.
 - (3) Dwelling units and sleeping units in Group I-1 and R occupancies.
 - (4) Light-hazard occupancies as defined in NFPA 13.
3. Automatic sprinklers shall be installed with due regard to obstructions that will delay activation or obstruct the water distribution pattern. Automatic sprinklers shall be installed in or under covered kiosks, displays, booths, concession stands, or equipment that exceeds 4 feet in width. Not less than a

3-foot clearance shall be maintained between automatic sprinklers and the top of piles of combustible fibers. IBC 903.3.3

4. Where the domestic service provides the water supply for the automatic sprinkler system, the supply shall be in accordance with IBC 903.3.5.1.
 - (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 (or when required by NFPA 101 9.7.1.2).
 - (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 13D or NFPA 13R.
 - (3) A single combination water supply shall be allowed provided that the domestic demand is added to the sprinkler demand as required by NFPA 13R. IBC 903.3.5.1.2
 - (4) An automatic secondary on-site water supply having a capacity not less than the hydraulically calculated sprinkler demand, including the hose stream requirement, shall be provided for high-rise buildings assigned to Seismic Design Category C, D, E or F as determined by the International Building Code. An additional fire pump shall not be required for the secondary water supply unless needed to provide the minimum design intake pressure at the suction side of the fire pump supplying the automatic sprinkler system. The secondary water supply shall have a duration of not less than 30 minutes as determined by the occupancy hazard classification in accordance with NFPA 13. IBC 903.3.5.2
5. Provide a sprinkler system riser schematic with control and check valves, backflow prevention devices, supply and system pressure gauges, water flow switches, tamper supervising switches, local waterflow alarm location, and spare sprinkler head cabinet location.
NFPA 13 8.16.1.1, NFPA 13R 9.3, NFPA 13D 6.2
6. Specify that all system gauges and valves must be accessible for operation, inspection and maintenance. NFPA 13 8.1.2
7. Show that the automatic sprinkler system is supervised per IBC 903.4:
 - (1) Provide tamper switches at all control valves.
 - (2) Provide a flow switch or alarm check valve and specify connection to the general building alarm that sounds within 90 seconds of flow. 2002 NFPA 72 5.10.2 and NFPA 13 6.9.1
For systems protecting storage in accordance with NFPA 13 12.3, provide alarm service per NFPA 13 8.16.1.7.
 - (3) For high-rise buildings, the requirements of NFPA 13 8.16.1.6 must be met.
8. Identify the type of above ground pipe or tube materials used for the sprinkler system.
NFPA 13 6.3, NFPA 13R 5.2, NFPA 13D 5.2
9. All sprinkler pipe and fittings shall be so installed that the system can be drained. NFPA 13 8.16.2, NFPA 13R 6.9.1, NFPA 13D 7.2.1. Provide a method for drainage where the lead-in terminates at a point lower than grade.
- 10 Show location of the test connection(s). Test connections shall be provided at locations that will permit flow tests of water supplies and connections. NFPA 8.17.4.1.1, NFPA 13R 6.10.1, NFPA 13D 7.2.4.
11. Specify seismic restraints for sprinkler piping in seismic areas required by IBC 1613. Specify flexible couplings at flexure joints per NFPA 13 9.3.2.1 and, where required, clearance around piping passing through concrete floors and concrete/CMU walls and foundations. NFPA 13 9.3.4, NFPA 13R 6.13

Show typical seismic bracing details, location of 4-way bracing, longitudinal and latitudinal bracing, line restraint bracing, and the clearance required around sprinkler pipe based on pipe size.

12. A proposed sprinkler system solenoid valve used for elevator hoistways and machine rooms must be tested and listed for this particular application and be supervised by the fire alarm system to satisfy the code. NFPA 13 6.1.1 and 8.15.1.1.2
13. Protection of atrium glass walls designed as smoke partitions shall comply with all of the following:
 - (1) Automatic sprinklers are provided along both sides of the separation wall and doors, or on the room side *only if there is not a walkway on the atrium side.*
 - (2) The sprinklers shall be located between 4 inches and 12 inches away from the glass and at intervals along the glass not greater than 6 feet.
 - (3) The sprinkler system shall be designed so that the entire surface of the glass is wet upon activation of the sprinkler system without obstruction. IBC 404.6, Exception 1, NFPA 101 8.6.7(1)(c)
14. Where specific application window sprinklers are specified, they shall be installed in accordance with their listing. NFPA 13, 6.1.1

Water Supply Availability and System Demand

1. When additions to existing building systems are made, provide flow test data for the existing sprinkler system riser: static psi, residual psi, and gpm. Include who performed the test and when the test was performed. NFPA 13 14.1.3 (30)
2. Identify the sprinkler system occupancy hazard classification for the facility or portion of the facility, as follows: *Light and Ordinary (Groups 1 and 2), Extra (Groups 1 and 2), or Special Occupancy Hazards.* NFPA 13 Chapter 5

Note: Commercial kitchens, Storage spaces 50 sf or larger, janitor closets, and gas furnace rooms must be Ordinary Group 1. Large stack rooms in Libraries and Stage Areas must be Ordinary Group 2. Laboratories using chemicals must be classified Ordinary Group 1 (Class C or D laboratory) or Ordinary Group 2 (Class A or B laboratory). NFPA 45 6.2.1.1

3. Provide the following calculations based on NFPA 13 Chapter 11, NFPA 13R Chapter 7, or NFPA 13D Chapter 8:
 - (1) Identify the hydraulically most demanding area of the building
 - (2) Provide preliminary flow (gpm) and pressure (psi) demand calculations for the greatest demand area. Include the required sprinkler head pressure, sprinkler system piping elevation loss, and friction loss (including device friction loss such as backflow preventers and isolation valves). NFPA 13 Chapter 11
 - NFPA 13: Density/Area Concept, duration is based upon occupancy hazard
 - NFPA 13R: 4-Head design, 30 minute duration
 - NFPA 13D: 2-Head design, 10 minute duration
 - (3) Provide a graph plotting the water supply curve (static psi at zero gpm flow and residual psi at gpm flow) and system demand (preliminary calculated point of residual psi at gpm flow) to show that the water supply (fire hydrant test) exceeds sprinkler system water demand for the building.
4. For protection of special storage and commodities see NFPA 13 Chapter 12.

5. Where the potential exists for water pressures exceeding 175 psi, provide a pressure reducing valve meeting the requirements of NFPA 13 8.15.1.2.

NFPA 13 Systems

1. 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 Section 903.3.1.1.1.

Exempt Locations (IBC 903.3.1.1.1): 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 any room merely because it is damp, of fire-resistance-rated construction or contains electrical equipment.

- (1) Any room where the application of water, or flame and water, constitutes a serious life or fire hazard.
- (2) Any room or space where sprinklers are considered undesirable because of the nature of the contents, when 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 and machinery spaces associated with occupant evacuation elevators designed in accordance with Section 3008.

Multiple buildings attached by canopies, covered breezeways, common roofs, or a common wall(s) shall be permitted to be supplied by a single fire sprinkler riser. The maximum system size shall comply with 8.2.1. IBC 903.3.1.1, NFPA 13 8.2.4

2. Provide the total area protected of each floor for each system riser. The maximum area limitation for the provided number of risers is: Light or ordinary hazard - 52,000 sq. ft. per riser and extra hazard - 40,000 sq. ft. per riser. NFPA 13 8.2.1
3. Clearance shall be provided around all piping extending through walls, floors, platforms, and foundations, including drains, fire department connections, and other auxiliary piping. NFPA 13 9.3.4.1
4. Except as permitted by IBC 903.3.1.1.1, all areas must be protected, including:
 - (1) Elevator shafts must be sprinklered at the bottom of the shaft. NFPA 13, 8.14.5
 - (2) Provide sprinkler protection under an accessible first landing of a noncombustible stair and at the top of the stair shaft. NFPA 13 8.14.3.2.1
 - (3) Provide sprinklers under all combustible ground floors, exterior docks, and platforms (see reference for exceptions). NFPA 13 8.14.6
 - (4) Provide sprinklers under combustible exterior roofs or canopies exceeding 4 ft. in width (see reference for exceptions). NFPA 13 8.14.7
 - (5) Provide sprinklers in every aisle and tier for library stack rooms (see reference for exceptions). NFPA 13 8.14.9
 - (6) Provide sprinklers for electrical equipment rooms (see reference for exceptions). NFPA 13 8.14.10
 - (7) Provide sprinkler protection for elevator equipment rooms. NFPA 13 8.14.5.3

Note: The electrical equipment room exception does not apply elevator equipment rooms.

- (8) Provide sprinklers at stages, under the stage (if combustible construction or used for storage), and at all adjacent stage areas. NFPA 13, 8.14.15.2
Note: Where proscenium opening protection is required provide a deluge system with open heads no more than 3 feet from the stage side of the opening, and at a maximum of 6 feet on center.
NFPA 13 8.14.15.2
- (9) Combustible concealed spaces must be sprinklered per NFPA 13 8.14.1.
- (10) Within dwelling units, bathrooms, closets, and pantries are to be sprinklered per NFPA 13 8.14.8.

NFPA 13R Systems

1. Automatic sprinkler systems in Group R occupancies up to and including four stories in height shall be permitted to be installed throughout in accordance with NFPA 13R. IBC 903.3.1.2, NFPA 13R 1.1
2. The water supply source shall be *one of the following*:
 - (1) A connection to a reliable waterworks system with or without a pump, as required.
 - (2) An elevated tank
 - (3) A pressure tank installed in accordance with NFPS 13 and NFPS 22
 - (4) A stored water source with an automatically operated pump
3. Any type of pipe or tube acceptable under the plumbing code for underground supply pipe shall be acceptable as underground supply for the system when installed between the point of connection and the system riser. NFPA 13R 5.3
4. A wet pipe system shall be used where piping is installed in areas that can be maintained reliably above 40°F (4°C). NFPA 13R 5.4.1
5. Piping in areas that cannot be maintained reliably above 40°F (4°C) shall be protected by use of *one of the following* methods (NFPA 13R 5.4.2):
 - (1) Antifreeze system
 - (2) Dry pipe system
 - (3) Preaction system
 - (4) Listed standard dry-pendent, dry-upright, or dry-sidewall sprinklers extended from pipe in heated areas.
Where antifreeze systems, dry pipe systems, and preaction systems are installed, they shall be installed in accordance with NFPA 13. NFPA 13R 5.4.3
6. Sprinkler protection shall be provided for exterior balconies, decks and ground floor patios of dwelling units where the building is of Type V construction, provided there is a roof or deck above. Sidewall sprinklers that are used to protect such areas shall be permitted to be located such that their deflectors are within 1 inch to 6 inches below the structural members and a maximum distance of 14 inches below the deck of the exterior balconies and decks that are constructed of open wood joist construction. IBC 903.3.1.2.1
7. Breezeways (Exterior stair/Open-ended corridor) shall be constructed and protected by one of the following options:
 - (1) Breezeway enclosures shall be constructed as fire barriers in accordance with Section 707 or horizontal assemblies in accordance with Section 711, or both. Opening protectives shall be in accordance with the requirements of Section 716 and shall be limited to those necessary for exit

access to the enclosure from normally occupied spaces and for egress from the enclosure.

IBC 1026.6, 1022

Note: In this approach, NFPA 13R 6.6.5 may be applied and the building and the building would be protected throughout in accordance with the IBC.

- (2) Separation from the interior of the building is not required for exterior stairways or ramps connected to open-ended corridors, when designed in accordance with IBC 1026.6, *Exception 4*, as follows:
 - (a) The building, including corridors, stairways or ramps, shall be equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2.
 - (b) The open-ended corridors comply with Section 1018.
 - (c) The open-ended corridors are connected on each end to an exterior exit stairway or ramp complying with Section 1026.
 - (d) The exterior walls and openings adjacent to the exterior exit stairway or ramp comply with Section 1022.7.
 - (e) At any location in an open-ended corridor where a change of direction exceeding 45 degrees (0.79 rad) occurs, a clear opening of not less than 35 square feet or an exterior stairway or ramp shall be provided. Where clear openings are provided, they shall be located so as to minimize the accumulation of smoke or toxic gases.
8. Sprinklers shall be installed in all areas except where omission is permitted by NFPA 13R 6.6.2 through 6.6.7.
 - (1) Sprinklers shall not be required in bathrooms where the bathroom area does not exceed 55 ft².
 - (2) Except where specified in 6.6.4, sprinklers shall not be required in clothes closets, linen closets, and pantries within dwelling units that meet all of the following conditions:
 - (a) The area of the space does not exceed 24 ft²
 - (b) The least dimension does not exceed 3 ft.
 - (c) The walls and ceilings are surfaced with noncombustible or limited-combustible materials.
 - (3) Sprinklers shall be installed in any closet used for heating and air-conditioning equipment except when fuel-fired equipment is present, at least one quick-response intermediate temperature sprinkler shall be installed above the equipment.
 - (4) Sprinklers shall not be required in any porches, balconies, corridors, carports, and stairs that are open and attached, unless required by IBC 903.3.1.2.1 (exterior balconies, decks and ground floor patios of dwelling units where the building is of Type V construction) or Breezeways designed using IBC 1026.2 Exception 4.
 - (5) Sprinklers shall not be required in attics, penthouse equipment rooms, elevator machine rooms, concealed spaces dedicated exclusively to and containing only dwelling unit ventilation equipment, crawl spaces, floor/ceiling spaces, noncombustible elevator shafts where the elevator cars comply with ANSI A17.1, Safety Code for Elevators and Escalators, and other concealed spaces that are not used or intended for living purposes or storage and do not contain fuel-fired equipment.
 - (6) Sprinklers shall not be required in closets (regardless of size) on exterior balconies and exterior breezeways/corridors, regardless of size, as long as the closet does not have doors or unprotected penetrations directly into the dwelling unit.
9. Piping hanging and bracing methods shall comply with NFPA 13. NFPA 13R 6.13

NFPA 13D Systems

1. Automatic sprinkler systems installed in Group R-3 or R-4 *Congregate residences* with 16 or fewer residents and Group R-3 *Care facilities* with 5 or fewer residents (excluding staff) shall be permitted to be installed throughout in accordance with NFPA 13D. IBC 903.3.1.3, 903.2.8.1, 903.2.8.2
2. The following water supply sources shall be considered to be acceptable by this standard (NFPA 13D 6.2):
 - (1) A connection to a reliable waterworks system with or without an automatically operated pump;
 - (2) An elevated tank;
 - (3) A pressure tank designed to American Society of Mechanical Engineers (ASME) standards for a pressure vessel with a reliable pressure source;
 - (4) A stored water source with an automatically operated pump; or
 - (5) A well with a pump of sufficient capacity and pressure to meet the sprinkler system demand.
3. Any type of pipe or tube acceptable under the plumbing code for underground supply pipe shall be acceptable as underground supply for the system when installed between the point of connection and the system riser. NFPA 13D 5.3
4. Where system piping is located in areas not maintained above 40°F (4°C), the pipe shall be protected against freezing by use of one of the following methods:
 - (1) Dry pipe system and preaction systems in accordance with 8.3.4.
 - (2) Antifreeze system in accordance with 8.3.3.
 - (3) Listed standard dry-pendent or dry-sidewall sprinklers extended from pipe in heated areas into unheated areas not intended for living purposes.
5. Sprinklers shall be installed in all areas except where omission is permitted by 8.6.2 through 8.6.7. NFPA 13D 9.6.1
 - (1) Sprinklers shall not be required in bathrooms of 55 ft² and less.
 - (2) Sprinklers shall not be required in clothes closets, linen closets, and pantries that meet all of the following conditions:
 - (a) The area of the space does not exceed 24 ft².
 - (b) The least dimension does not exceed 3 ft.
 - (c) The walls and ceilings are surfaced with noncombustible or limited-combustible materials.
 - (d) Sprinklers shall not be required in garages, open attached porches, carports, and similar structures.
 - (e) Sprinklers shall not be required in attics, penthouse equipment rooms, elevator machine rooms, concealed spaces dedicated exclusively to and containing only dwelling unit ventilation equipment, floor/ceiling spaces, elevator shafts, crawl spaces, and other concealed spaces that are not used or intended for living purposes and do not contain fuel-fired equipment.
 - (f) When fuel-fired equipment is present, at least one quick-response intermediate temperature sprinkler shall be installed above the equipment.
 - (g) Sprinklers shall not be required in covered unheated projections of the building at entrances/exits as long as the dwelling unit has another means of egress.
 - (h) Sprinklers shall not be required for ceiling pockets that meet the following conditions:
 - i. The total volume of unprotected ceiling pocket does not exceed 100 ft³.
 - ii. The entire floor under the unprotected ceiling pocket is protected by the sprinklers at the lower ceiling elevation.
 - iii. Each unprotected ceiling pocket is separated from any adjacent unprotected ceiling pocket by a minimum 10 ft. horizontal distance.

- iv. The interior finish of the unprotected ceiling pocket is noncombustible or limited-combustible material.
 - v. Skylights not exceeding 32 ft² shall be permitted to have a plastic cover.
6. Listed pipe shall be supported in accordance with any listing limitations. Pipe that is not listed, and listed pipe with listing limitations that does not include piping support requirements, shall be supported from structural members using support methods comparable to those required by applicable local plumbing codes. Piping laid on open joists or rafters shall be supported in a manner that prevents lateral movement. Sprinkler piping shall be supported in a manner that prevents the movement of piping upon sprinkler operation. NFPA 13 7.4