ABOUT CODE CORNER

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SECTION 903 AUTOMATIC SPRINKLER SYSTEMS PART 4

About the 2012 Edition … CCFS will be publishing sections of the 2012 IFC for your review and comparison. Please note that CCFS is not suggesting you adopt this new regulation. Any regulations used in your state/ organization should be in accordance with the recommendations set forth by your local Building Regulations Organization and State Fire Marshal's Office.

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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 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 of the *International Building Code*.

▫ *This section allows the omission of sprinkler protection in certain locations if an approved automatic fire detection system is installed. Buildings in compliance with one of the five listed conditions would still be considered fully sprinklered throughout in compliance with the code and NFPA 13 and thus would be eligible for all applicable code alternatives, exceptions or reductions. Elimination of the sprinkler system in a sensitive area is subject to the approval of the fire code official.*

1. Information required on shop drawings includes:

__ Name of owner and occupant
__ Location, including street address
__ Point of compass
__ Ceiling construction
__ Full-height cross section
__ Location of fire walls
__ Location of partitions
__ Occupancy of each area or room
__ Location and size of blind spaces and closets
__ Any questionable small enclosures in which no sprinklers are to be installed
__ Size of city main in street, pressure and whether dead end or circulation and, if dead end, direction and distance to nearest circulating main, city main test results
__ Other source of water supply, with pressure or elevation
__ Make, type and orifice size of sprinkler
__ Temperature rating and location of high-temperature sprinklers
__ Number of sprinklers on each riser and on each system by floors and total area by each system on each floor
__ Make, type, model and size of alarm or dry pipe valve
__ Make, type, model and size of preaction or deluge valve
__ Type and location of alarm bells
__ Total number of sprinklers on each dry pipe system or preaction deluge system
__ Approximate capacity in gallons or each dry pipe system
__ Cutting lengths of pipe (or center-to-center dimensions)
__ Type of fittings, riser nipples and size, and all welds and bends
__ Type and location of hangers, inserts and sleeves
__ All control valves, checks, drain pipes and test pipes
__ Small hand-hose equipment
__ Underground pipe size, length, location, weight, material, point of connection to city main; the type of valves, meters and valve pits; and the depth that top of the pipe is laid below grade
__ When the equipment is to be installed as an addition to an old group of sprinklers without additional feed from the yard system, enough of the old system shall be indicated on the plans to show the total number of sprinklers to be supplied and to make all connections clear
__ Name, address and phone number of contractor and sprinkler designer
__ Hydraulic reference points shall be shown by a number and/or letter designation and shall correspond with comparable reference points shown on the hydraulic calculation sheets
__ System design criteria showing the minimum rate of water application (density), the design area of water application and the water required for hose streams both inside and outside
__ Actual calculated requirements showing the total quantity of water and the pressure required at a common reference point for each system
__ Elevation data showing elevations of sprinklers, junction points and supply or reference points

2. Information required on calculations includes:

__ Location
__ Name of owner and occupant
__ Building identification
__ Description of hazard
__ Name and address of contractor and designer
__ Name of approving agency

3. System design requirements include:

__ Design area of water application
__ Minimum rate of water application (density)
__ Area of sprinkler coverage
__ Hazard or commodity classification
__ Building height
__ Storage height
__ Storage method
__ Total water requirements, as calculated, including allowance for hose demand water supply information
__ Location and elevation static and residual test gauge with relation to the riser reference point
__ Flow location
__ Static pressure, psi
__ Residual pressure, psi
__ Flow, gpm
__ Date
__ Time
__ Test conducted by whom
__ Sketch to accompany gridded system calculations to indicate flow quantities and directions for lines with sprinklers operated in the remote area

4. Additional information necessary for complete review includes:

__ Sprinkler description and discharge constant (K-value)
__ Hydraulic reference points
__ Flow, gpm
__ Pipe diameter (actual internal diameter)
__ Pipe length
__ Equivalent pipe length for fittings and components
__ Friction loss in psi per foot of pipe
__ Total friction loss between reference points
__ Elevation difference between reference points
__ Required pressure in psi at each reference point
__ Velocity pressures and normal pressure if included in calculations
__ Notes to indicate starting points, reference to other sheets or classification of date

5. Included with the submittal must be a graph sheet showing water supply curves and system requirements including:

__ Hose demand plotted on semilogarithmic graph paper so as to present a graphic summary of the complete hydraulic calculations

Figure 903.3
SAMPLE SPRINKLER SYSTEM DRAWING AND DATA SUBMITTALS

Condition 1 addresses restrictions where the application of water could create a hazardous condition. For example, sprinkler protection is to be avoided where it is not compatible with certain stored materials (i.e., some water-reactive hazardous materials such as calcium carbide). Combustible metals, such as magnesium and aluminum, may burn so intensely that the use of water to attempt fire control will only intensify the reaction.

It is not the intent of Condition 2 to omit sprinklers solely because of a potential for water damage. A desire to not sprinkler a certain area (such as a computer room or operating room) does not fall within the limitations of the exception unless there is something unique about the space that would result in water being incompatible. A computer room can be adequately protected using an automatic sprinkler system or an alternative gaseous suppression agent system or a combination of these systems. The intent of Condition 2 is to consider whether or not the contents would react adversely to the application of water. It is important to note that the fire code official must approve the use of this item.

Note also that with respect to computer rooms, NFPA 75-Protection of Information Technology Equipment (not a referenced standard), recognizes automatic sprinklers as the primary fire protection of computer rooms.

Condition 3 recognizes the low fuel load and low occupancy hazards associated with generator and transformer rooms and, therefore, allows the omission of sprinkler protection if the rooms are separated from adjacent areas by 2-hour fire-resistance-rated construction. This condition assumes the room is not used for any combustible storage. This condition is similar to Section 8.15.10.3 of NFPA 13, which exempts electrical equipment rooms from sprinkler protection, provided the room is dedicated to the use of dry-type electrical equipment, is constructed as a 2-hour fire-resistance-rated enclosure and is not used for combustible storage.

Condition 4 requires the construction of the room or area, as well as the contents, to be noncombustible. An example would be an area in an unprotected steel frame

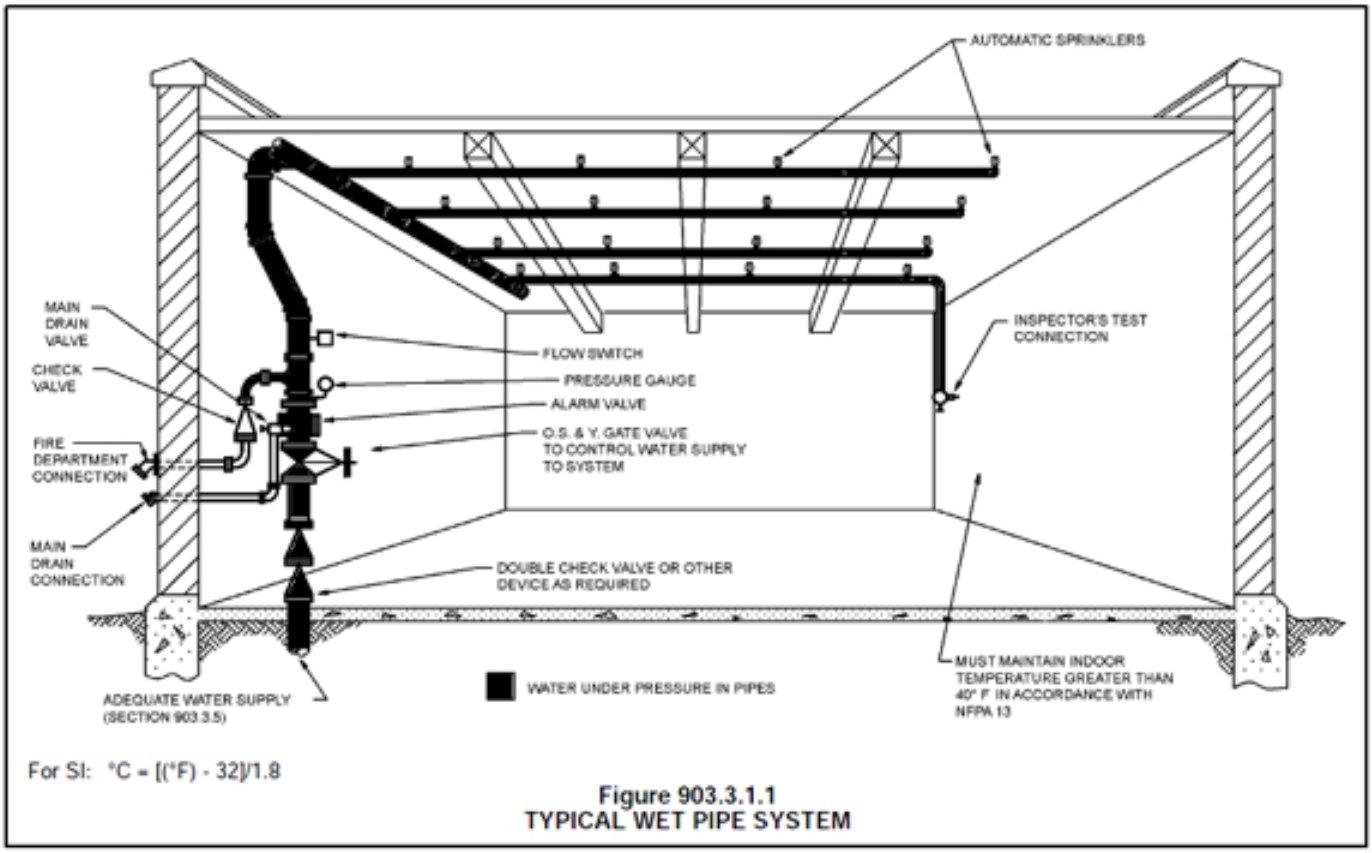

Figure 903.3.1.1
TYPICAL WET PIPE SYSTEM

building (Type IIB construction) used for steel or concrete block storage. Neither involves any significant combustible packaging or sources of ignition, and few combustibles are present (see Figure 903.3.1).

Condition 5 addresses the concern for elevator machine rooms and machinery spaces associated with fire service access elevators as required for buildings with occupied floors greater than 120 feet (36.58 m) from the lowest level of fire department access by Sections 403.6.1 and 3007 of the IBC. These elevators need to work during fire situations and their operation cannot be threatened by the activation of a sprinkler in a machine room or space that may affect the operation of the elevator. Fire service access elevators are required to be continuously monitored at the fire command center in accordance with Section 3007.6 of the IBC.

Condition 6, similar to Condition 5, exempts sprinklers from the machine rooms and machinery spaces for occupant evacuation elevators. Like fire service access elevators, these elevators need to work during fire situations and their operation cannot be threatened by the activation of a sprinkler in a machine room or machinery spaces. Such elevators are required to be monitored at the fire command center in accordance with Section 3008.8 of the IBC.

903.3.1.2 NFPA 13R sprinkler systems. 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.

▫ *NFPA 13R contains design and installation requirements for a sprinkler system to aid in the detection and control of fires in low-rise (four stories or less) residential occupancies.*

Sprinkler systems designed in accordance with NFPA 13R are intended to prevent flashover (total involvement) in the room of fire origin and to improve the chance for occupants to escape or be evacuated. The design criteria in NFPA 13R are similar to those in NFPA 13 except that sprinklers may be omitted from areas in which fatal fires in residential occupancies do not typically originate (bathrooms, closets, attics, porches, garages and concealed spaces).

A common question is whether a mixed occupancy building which contains a Group R occupancy could still use NFPA 13R for the design. If one of the mixed-use occupancies would require a sprinkler system throughout the building in accordance with NFPA 13, then a 13R system would not be allowed. If, however, the only reason a sprinkler system is being installed is because there is a Group R fire area, then a NFPA 13R system would be an appropriate design choice. The areas that are not classified as Group R would require protection in accordance with NFPA 13.

It must be noted that although the building would be considered sprinklered throughout in accordance with NFPA 13R, not all of the code sprinkler alternatives could be applied. Any alternative that requires the installation of an NFPA 13 system would not be applicable if a portion of the building utilizes an NFPA 13R system.

The code provisions that allow for an increase in building height according to Section 504.2 of the IBC do not compound this section. NFPA 13R is applicable to buildings that are up to four stories in height. If the design of a residential building intends to take advantage of the sprinkler height increase so that the building is five stories or more, the sprinkler system must be an NFPA 13 system. Because this section limits the height to four stories, four stories is the maximum height for a building that can utilize an NFPA 13R system. This is consistent with the scoping provisions in the NFPA 13R standard.

The limitation of four stories in height is to be measured with respect to the established grade plane, which is consistent with IFC Interpretation No. 43-03. As such, a basement would not be considered a story above grade for purposes of determining the applicability of this section.

903.3.1.2.1 Balconies and decks. Sprinkler protection shall be provided for exterior balconies, decks and ground floor patios of dwelling units where the building is of Type V construction, provided there is a roof or deck

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

▫ *Balconies, decks and patios in buildings of Type V construction and used for Group R occupancies are required to have sprinkler protection when there is a roof or deck above. This is in addition to the requirements of NFPA 13R, which primarily addresses the life safety of occupants and not property protection. The intent is to address hazards such as grilling and similar activities. Since NFPA 13R does not require such coverage, there is potential that a fire on a balcony could grow much too large for the system within the building to handle. The concern is that a potential exterior balcony fire could spread to unprotected floor/ceiling assemblies and attic spaces and result in major property damage. Section 308.1.4 specifically addresses restrictions on open flame cooking devices used on combustible balconies.*

Regardless of whether the exterior walking surface is attached to the building and called a balcony or is a freestanding structure such as a deck or patio the concern for fire ignition in the area adjacent to the exterior wall is the same. Sidewall sprinklers should be selected based on the area of coverage and climate. If the potential for freezing exists, a dry sidewall sprinkler should be used. Where the overhanging deck or balcony is extensive, an extended coverage sprinkler should be selected.

903.3.1.3 NFPA 13D sprinkler systems. Automatic sprinkler systems installed in one and two-family dwellings, Group R-3 and R-4 congregate living facilities and townhouses shall be permitted to be installed throughout in accordance with NFPA 13D.

▫ *NFPA 13D contains design and installation requirements for a sprinkler system to aid in the detection and control of fires in one- and two-family dwellings, mobile homes and townhouses. This section also specifically allows the use of an NFPA 13D system for small congregate living facilities (Group R-4 and R-3, respectively). This is consistent with the NFPA 13D requirements and is also consistent with FHA court cases based on nondiscrimination for group homes.*

Similar to NFPA 13R, sprinkler systems designed in accordance with NFPA 13D are intended to prevent flashover (total involvement) in the room of fire origin and to improve the chance for occupants to escape or be evacuated. Although the allowable omission of sprinklers in certain areas of the dwelling unit in NFPA 13D is similar to that in NFPA 13R, the water supply requirements are less restrictive. NFPA 13D uses a two-head sprinkler design with a 10-minute duration requirement, while NFPA 13R uses a four-head sprinkler design with a 30-minute duration requirement. The decreased water supply requirement emphasizes the main intent of NFPA 13D to control the fire and maintain tenability during evacuation of the residence.

903.3.2 Quick-response and residential sprinklers. Where automatic sprinkler systems are required by this code, quick response or residential automatic sprinklers shall be installed in the following areas in accordance with 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 the International Building 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.

▫ *Quick-response and residential sprinklers are similar in nature. They use a lighter material for the operating mechanism, thus reducing the heat lag in the element. The faster the heat can be absorbed, the sooner the sprinkler will begin to discharge water. Quick response sprinklers have shown that they operate up to 25 percent faster than traditional sprinklers and create conditions in the room of origin that significantly increase the tenability of the environment. In tests performed by*

Factory Mutual (FM) for the Federal Emergency Management Agency (FEMA), the gas temperature in the room of origin was 550°F (288°C) with quick-response sprinklers, while it was 1,470°F (799°C) for conventional sprinklers at the time of sprinkler activation. More importantly, while the carbon monoxide (CO) level was 1,860 ppm for conventional sprinklers, the CO level when tested with quick response sprinklers was only around 350 ppm. Comparatively, the National Institute of Occupational Safety and Health (NIOSH) considers the IDLH (immediately dangerous to life and health) level of CO to be 1,200 ppm. Thus, quick-response sprinklers have been shown to add significantly to the life safety effects of standard sprinkler systems.

Condition 1 requires the use of approved quick response or residential sprinklers in smoke compartments containing care recipient sleeping units in Group I-2 occupancies. Even though properly operating standard sprinklers are effective, the extent of fire growth and smoke production that can occur before sprinkler activation creates the need for early warning to enable faster response by care providers and initiation of egress that is critical in occupancies containing persons incapable of self-preservation. The faster response time associated with quick-response or residential sprinklers increases the probability that the sprinklers will actuate before the care recipient's life would be threatened by a fire in his or her room.

Condition 2 requires the use of approved quick response or residential sprinklers in smoke compartments containing treatment rooms in ambulatory care facilities. The justification is the same as that for Condition 1. When there is a potential for care recipients to be incapable of self-preservation, the use of residential sprinkler or quick-response sprinklers are critical.

Because of the kind of occupants sleeping in Group R and I-1 occupancies, as indicated in Condition 3, a faster responding type of sprinkler is desirable. Similar to the first condition, because occupants will be sleeping, the use of quick-response sprinklers creates additional safety by reducing sprinkler response time, thereby increasing the time available for egress and allowing for the time necessary for occupants to wake up and recognize the emergency event.

Condition 4 recognizes light-hazard occupancies in accordance with NFPA 13. These could include restaurants, schools, office buildings, places of religious worship and similar occupancies where the fire load and potential heat release of combustible contents are low.

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

> **Exception:** Kitchen equipment under exhaust hoods protected with a fire-extinguishing system in accordance with Section 904.

▫ *To provide adequate sprinkler coverage, sprinkler protection must be extended under any obstruction that exceeds 4 feet (1219 mm) in width. Large air ducts are another common obstruction where sprinklers are routinely extended beneath the duct. The 3- foot (914 mm) storage clearance requirement for combustible fibers is caused by their potential high heat release. Most storage conditions require only a minimum 18-inch (457 mm) storage clearance to combustibles, depending on the type of sprinklers used and their actual storage conditions.*

The exception recognizes that an alternative extinguishing system is permitted for commercial cooking systems in place of sprinkler protection for exhaust hoods that may be more than 4 feet (1219 mm) wide.

The application of this section is more critical to the ongoing use of the space. The obstruction conditions, therefore, should have already been addressed during plan review and installation inspection. This section gives the fire official and building owner adequate information to avoid the most typical obstruction related issues in terms of proper sprinkler coverage.

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

▫ *The intent of this section is to eliminate the need for occupant intervention during a fire. As such, it is assumed that it will not be necessary for a person to manually open a valve or perform some other physical activity in order to allow the sprinkler system to activate.*

Wet-pipe and dry-pipe sprinkler systems, for example, are essentially fail-safe systems in the sense that, if the system is in proper operating condition, it will operate once a sprinkler fuses. Dry systems have an inherent time lag for water to reach the sprinkler; therefore, the response is not as fast as for a wetpipe system. Other types of sprinkler systems, such as preaction and deluge, rely on the actuation of a detection system to operate the sprinkler valve.

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.

▫ *To be effective, all sprinkler systems must have an adequate supply of water. The criteria for an acceptable water supply are contained in the standards referenced in Section 903.3.1. For example, NFPA 13 contains criteria for different types of water supplies as well as the methods to determine the pressure, flow capabilities and capacity necessary to get the intended performance from a sprinkler system. An acceptable water supply could consist of a reliable municipal supply, a gravity tank or a fire pump with a pressure tank or a combination of these.*

This section also establishes the requirements for protecting the potable water system against a nonpotable source, such as stagnant water retained within the sprinkler piping. As stated in Section 608.16.4 of the IPC, an approved double check valve device or reduced pressure principle backflow preventer is required.

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.

▫ *This section establishes the scope of domestic services for limited area sprinkler systems and residential combination services.*

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.

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.

▫ *The use of limited area sprinkler systems is restricted to cases in which the code requires a limited number of sprinklers and not a complete automatic sprinkler system. For example, limited area sprinkler systems may be used to protect stages; storage and workshop areas; stories, including basements, without openings; painting rooms; trash rooms and chutes; furnace rooms; kitchens and hazardous exhaust systems and incidental accessory occupancies as regulated in Section 508.2.5 of the IBC. When a wet automatic standpipe is not available, limited-area sprinkler systems may be connected to the domestic water supply.*

The water supply to the sprinkler system is to be controlled only by the same valve that controls the domestic water supply to the building; no shutoff valves are permitted in the sprinkler system piping. These restrictions increase the likelihood that the sprinkler system will be operational should a fire occur. Likewise, if the sprinkler system needs restoration after having operated in response to a fire or needs repairs requiring that the water supply be shut off, this section increases the probability that the system will be restored quickly, because having the domestic water supply to the entire building shut off is an inconvenience to occupants that they will not tolerate for very long.

The exception recognizes the value of standard sprinkler system valve supervision complying with Section 903.4 as providing the level of system reliability contemplated by this section.

Documentation, usually in the form of hydraulic calculations, must be submitted demonstrating that the domestic water system is adequate to supply the sprinkler demand in addition to the peak domestic demand. The domestic demand would normally be determined as stated in the IPC.

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.

▫ *NFPA 13R permits a common supply main to a building to serve both the sprinkler system and domestic services if the domestic demand is added to the sprinkler demand. NFPA 13R systems do not provide the same level of property protection as NFPA 13 systems.*

903.3.5.2 Secondary water supply. 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 in 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.

Exception: Existing buildings.

▫ *The intent of this section is that a secondary water supply be provided on the high-rise building site in order to provide a high level of functional reliability for the fire protection systems in the event a seismic event disables the primary water supply for high-rise buildings assigned to Seismic Design Category C, D, E or F. The categories are described in Section 1613.5 of the IBC.*

The text's specific wording that the secondary supply be "on-site" rather than "to the site" would preclude the use, for example, of a second connection to the municipal supply remote from the primary connection to the municipal supply to achieve compliance with this requirement. It should be noted, however, that the fire code official has the authority to modify the provisions of the code in accordance with Section 104.8 should there be practical difficulties preventing precise compliance with the text.

The required amount of water is equal to the hydraulically calculated sprinkler demand plus hose stream demand for a minimum 30-minute period dependent upon the appropriate occupancy hazard classification in NFPA 13.

Note that the beginning of Section 903.3.5.2 requires that the secondary water supply be automatic; in other words, switchover to the secondary water source cannot occur manually. This is consistent with the definitions of "Automatic sprinkler system" and "Classes of standpipe systems" in that both systems are required to be connected to a reliable water supply.

Generally, this section does not automatically require a second fire pump but, if necessary, an additional pump may be required. A second pump would be necessary if

the secondary water supply does not provide the necessary water pressure for intake into the primary fire pump.

The exception recognizes the infeasibility of requiring a secondary water supply in existing high-rise buildings.

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.

▫ *The threads on connections and fittings that the fire department will use to connect a hose must be compatible with the fire department threads.*

Design documents must specify the type of thread to be used in order to be compatible with the local fire department equipment after consultation and coordination with the fire code official. The criteria typically apply to fire department connections for sprinkler and standpipe systems, standpipe hose connections, yard hydrants and wall hydrants.

The majority of fire departments in the United States use the American National Fire Hose Connection Screw Thread also commonly known as the national standard thread (NST) and NS. NFPA 1963 gives the screw thread dimensions and the thread size of threaded connections, with nominal sizes ranging from 3/4 inch (19 mm) to 6 inches (152 mm) for the NS thread. Although efforts to standardize fire hose threads began after the Boston conflagration in 1872, there are still many different screw threads, some of which give the appearance of compatibility with the NH thread. While NFPA 1963 may be used as a guide, the code does not require that any particular standard be used. Rather, it is important that the fire code official be consulted for the appropriate thread selection. The intent is that the threads match those of the local department identically so that adapters are not required within the fire department's own district.

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

▫ *See the commentary to Section 912.2.*

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

Exceptions:

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

2. Limited area systems serving fewer than 20 sprinklers.

3. *Automatic sprinkler systems* installed in accordance with NFPA 13R 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.

▫ *The reliability data on automatic sprinkler systems clearly indicate that a closed valve is the leading cause*

of sprinkler system failure. There are also a number of other critical elements that contribute to successful sprinkler system operation, including, but not limited to, pumps, water tanks and air pressure maintenance devices; therefore, this section requires that the various critical elements that contribute to an available water supply and to the function of the sprinkler system be electrically supervised.

Automatic sprinkler systems in one- and two-family dwellings are typically designed to comply with NFPA 13D, which does not require electrical supervision (see Exception 1).

Limited area sprinkler systems are generally supervised by their connection to the domestic water service (see Exception 2). Compliance with the exception means that none of the following alarm provisions are applicable to limited area systems. Consequently, limited area sprinkler systems do not require local alarms or supervision. Electrical supervision is required only if a control valve is installed between the riser control valve and the sprinkler system piping.

Similar to limited area sprinkler systems, electrical supervision is not required for NFPA 13R residential combination services when a shutoff valve is not installed (see Exception 3). NFPA 13R sprinkler systems are supervised in that the only way to shut off the sprinkler system is to also shut off the domestic water supply.

The valves discussed in Exceptions 4 through 7 can be sealed or locked in the open position because they do not control the sprinkler system water supply.

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

Exceptions:

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

2. Backflow prevention device test valves located in limited area sprinkler 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.

▫ *Automatic sprinkler systems must be supervised as a means of determining that the system is operational. A valve supervisory switch operating as a normally open or normally closed switch is usually used. NFPA 72 does not permit valve supervisory switches to be connected to the same zone circuit as the waterflow switch unless it is specifically arranged to actuate a signal that is distinctive from the circuit trouble condition signal.*

Required sprinkler systems are to be monitored by an approved supervising service to comply with NFPA 72. Types of supervising stations recognized in NFPA 72 include central stations, remote supervising stations or proprietary supervising stations.

A central station is an independent off-site facility operated and maintained by personnel whose primary business is to furnish, maintain, record and supervise a signaling system. A proprietary system is similar to a central station system; however, a proprietary system is typically an on-site facility monitoring a number of buildings on the same site for the same owner. A remote station system has an alarm signal that is transmitted to a remote location acceptable to the authority having jurisdiction and that is attended 24 hours a day. The receiving equipment is usually located at a fire station, police station, regional emergency communications center or telephone answering service. An alternative use to the three previous supervising methods is an audible signal that can be transmitted to a constantly attended location approved by the fire code official.

Exception 1 recognizes that underground key or hub valves in roadway boxes are not normally supervised or required to be supervised by this section or NFPA 13.

Exception 2 acknowledges that local water utilities and environmental authorities in many instances require, by local ordinances, that backflow prevention devices be installed in limited-area sprinkler system piping. To make the testing and maintenance of backflow prevention devices easier, test valves are installed on each side of the device. These valves are typically indicating-type valves and can function as shutoff valves for the sprinkler system and, therefore, require some level of supervision.

Because these infrequently used valves may be the only feature of protection requiring supervision in occupancies not otherwise required to be equipped with a fire alarm system, Exception 2 permits these valves to be locked in the open position; however, if the occupancy is protected by a fire alarm system, these valves must be equipped with approved valve supervisory devices connected to the fire alarm control panel on a separate (supervisory) zone so that the supervisory signal is transmitted to the designated receiving station. Installation and testing of backflow preventers in sprinkler systems are regulated in Sections 312.10 (testing) and 608.16.4 (devices) of the IPC.

Next Month: Section 903.4.2 Alarms

August 2012—ICC Update

ICC/ASHE Ad Hoc Committee on Healthcare: Must Read

In 2010, ICC and the American Society for Healthcare Engineers (ASHE) partnered to form the Ad Hoc Committee on Healthcare. The objective of the committee is to develop code change proposals to the I-Codes which will result in the most contemporary, effective and efficient provisions for hospital and ambulatory care ensuring the highest level of safety for users. The ASHE/ICC Ad Hoc recognized that hospitals face unique challenges and a regulatory system that imposes Federal requirements as well as local fire and building code requirements, and the Committee has endeavored to harmonize the requirements of the regulations to be consistent with the I-Codes. To date, the Committee has spent hundreds of hours—in person and via conference call—developing over 30 proposals for the IBC and continues to research and work on proposals for the IFC. Check out ICC's dedicated page to find out about future meetings, minutes from past meetings, and technical information: http://www.iccsafe.org/AHC

ASHE recently published an Advocacy Report which specifically discusses codes and how they affect the health care physical environment. The background rationales for a number of pending and future code proposals are covered. "[ASHE] estimates that the health care industry wastes potentially billions of dollars a year because of overlapping and conflicting codes… By revamping codes--and reducing code conflicts-- hospitals have the potential to focus more of their valuable resources on patient care." Check out the full publication: http://www.ashe.org/resources/pdfs/ASHE_Advocacy_Report_2012.pdf

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We invite you to register now for the International Code