



**ABOUT CODE CORNER**

CCFS would like to remind you to check with your local “Authority Having Jurisdiction (AHJ)” for questions and opinions concerning your local Fire and Building Codes.

The information contained in this article is supplied as a courtesy by the International Code Council (ICC) and is based on the International Fire and Building Codes and their respective commentaries.

Your local codes or ordinances may vary.

## Code Corner SECTION 905 STANDPIPE SYSTEMS PART 2

**905.3.2 Group A.** Class I automatic wet standpipes shall be provided in non-sprinklered Group A buildings having an occupant load exceeding 1,000 persons.

**Exceptions:**

1. Open-air-seating spaces without enclosed spaces.
2. Class I automatic dry and semiautomatic dry standpipes or manual wet standpipes are allowed in buildings that are not high-rise buildings.

□ *The main concern in assembly occupancies with a high occupant load is evacuation. Many occupants may not be familiar with either their surroundings or the egress arrangement in the building. This section also assumes the building is not sprinklered; therefore, control and suppression of the fire is left to the fire department.*

*Exception 1 exempts open-air seating without enclosed spaces, such as grandstands and bleachers. In such occupancies,*

*a buildup of smoke and hot gases is not possible because these structures are open to the atmosphere.*

*Exception 2 states that in lieu of a Class I automatic wet standpipe, automatic-dry and semiautomatic dry Class I standpipes are permitted in buildings that are not considered to be a high rise.*

**905.3.3 Covered and open mall buildings.** Covered mall and open mall buildings shall be equipped throughout with a standpipe system where required by Section 905.3.1. Mall buildings not required to be equipped with a standpipe system by Section 905.3.1 shall be equipped with Class I hose connections connected to the automatic sprinkler system sized to deliver water at 250 gallons per minute (946.4 L/min) at the most hydraulically remote hose connection while concurrently supplying the automatic sprinkler system demand. The standpipe system shall be designed not to exceed a 50 pounds per square inch (psi) (345

kPa) residual pressure loss with a flow of 250 gallons per minute (946.4 L/min) from the fire department connection to the hydraulically most remote hose connection. Hose connections shall be provided at each of the following locations:

1. Within the mall at the entrance to each exit passageway or corridor.
2. At each floor-level landing within enclosed stairways opening directly on the mall.
3. At exterior public entrances to the mall of a covered mall building
4. At public entrances at the perimeter line of an open mall building.
5. At other locations as necessary so that the distance to reach all portions of a tenant space does not exceed 200 feet (60 960 mm) from a hose connection.

□ *Covered and open mall buildings are only required to have a standpipe system if Section 905.3.1 requires such features. If standpipes*

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are not required due to building height, Class I hose connections that are connected to the automatic sprinkler system are still required. Also to ensure that both the sprinkler system and hose connections will function at an acceptable level, the system must be sized for both the sprinkler demand and the hose connection demand. This section specifies a minimum flow rate and a maximum pressure loss to the most remote hose connection so that the fire department can gain full use of the hose connection during a fire. Hose connections are required when a standpipe system is not at key locations, such as entrances to exit passageways and at entrances to the covered or open mall. Note that these locations are essentially the same locations required for Class I hose connections in Section 905.4, except that this section also requires that the distance of all portions of tenant spaces does not exceed 200 feet (60 960 mm) from a hose connection.

**905.3.4 Stages.** Stages greater than 1,000 square feet (93 m<sup>2</sup>) in area shall be equipped with a Class

III wet standpipe system with 1 1/2-inch and 2 1/2-inch (38 mm and 64 mm) hose connections on each side of the stage.

**Exception:** Where the building or area is equipped throughout with an automatic sprinkler system, a 1 1/2 inch (38 mm) hose connection shall be installed in accordance with NFPA 13 or in accordance with NFPA 14 for Class II or III standpipes.

□ Because of the potentially large fuel load and three dimensional aspect of the fire hazard associated with stages greater than 1,000 square feet (93 m<sup>2</sup>) in area, Class III standpipes are required on each side of these large stages. The standpipes must be equipped with a 1 1/2-inch (38 mm) hose connection and a 2 1/2-inch (64 mm) hose connection. The 1 1/2-inch (38 m<sup>2</sup>) connection is for the hose requirement in Section 905.3.4.1. The 2 1/2-inch (64 mm) connection is to provide greater flexibility for the fire department in its fire-fighting operations.

Stages, as used in this section, are those stages defined in Section 410.2 of the IBC, which include

overhead hanging curtains, drops, scenery or stage effects other than lighting and sound. These were traditionally referred to as "legitimate stages." It is not an appropriate application of this section to require standpipes for elevated areas in banquet rooms, or theatrical platforms where the higher fuel loads associated with a legitimate stage do not exist.

The exception recognizes the benefit of the building or area being sprinklered. If so, then only a single 1 1/2-inch (38 mm) connection is required. This hose connection is intended to be used by the fire department and apply less water from the hose due to the suppression activity of the sprinkler system. Hose threads must be compatible with those of the fire department as required in Section 903.3.6.

In a fully sprinklered building it is acceptable to supply the hose connections through the same standpipe as the sprinklers. This is reflected in the reference to both NFPA 13, which acknowledges this concept, and NFPA 14, which contains similar



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provisions. If the provisions of NFPA 14 are used, although the standpipe must be wet and Class II in its installation, the design of the water supply and interconnection of systems can be in accordance with the requirements for Class II as well as for Class III standpipes.

**905.3.4.1 Hose and cabinet.** The 1 1/2-inch (38 mm) hose connections shall be equipped with sufficient lengths of 1 1/2-inch (38 mm) hose to provide fire protection for the stage area. Hose connections shall be equipped with an approved adjustable fog nozzle and be mounted in a cabinet or on a rack.

□ *The 1 1/2 -inch (38 mm) standpipe hose installed for stages greater than 1,000 square feet (93 m<sup>2</sup>) in area is intended for use by stage personnel who have been trained to use it. The length of hose provided is a function of the size and configuration of the stage. This includes by definition the entire performance area and adjacent backstage and support areas not fire separated from the performance area. The effective reach of the fire stream from the fog nozzle is a function of the*

*available water supply, and in particular, the pressure. Fog nozzles typically require 100 pounds per square inch (psi) (690 kPa) for optimum performance.*

**905.3.5 Underground buildings.** Underground buildings shall be equipped throughout with a Class I automatic wet or manual wet standpipe system.

□ *Underground buildings present unique hazards to life safety because of their isolation and inaccessibility. Additional fire protection and fire fighting measures for the fire department are required to compensate for the lack of exterior access for fire suppression and rescue operations (see Section 405 of the IBC).*

**905.3.6 Helistops and heliports.** Buildings with a rooftop helistop or heliport shall be equipped with a Class I or III standpipe system extended to the roof level on which the helistop or heliport is located in accordance with Section 2007.5.

□ *Buildings containing rooftop helistops or heliports are required to be equipped with a Class I or III standpipe. A heliport is a distinct hazard that*

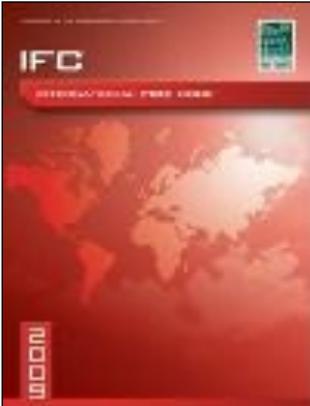
*will involve flammable fuels. In the event of an emergency, rapid deployment of hand hose lines will be necessary to attack a resulting fire, effectuate rescue and to protect exposures and the remainder of the building.*

*The requirement results in a standpipe system throughout the building, not just a connection at the roof level. This is critical in fire-fighting operations because many times the connection below the rooftop level may be needed just to gain access onto the roof. If the only connection is on the roof, it is of no use if the fire fighters cannot get to it.*

*Additionally, a heliport includes fueling operations. It is entirely possible for a spill to not only affect the rooftop, but also floors below as the liquid fuel spreads. The standpipe system will again be utilized in these situations.*

*Section 2007.5 requires a 2 1/2 -inch (64 mm) standpipe outlet to be within 150 feet (45 675 mm) of all portions of the heliport or helistop area and be either Class I or III.*

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**905.3.7 Marinas and boatyards.** Standpipes in marinas and boatyards shall comply with Chapter 36.

▫ *Section 4504.2 contains the specifics as to when standpipes are required at marinas. Marinas and boatyards have unique challenges for fire fighting. Although there is water readily available, it is not easily or effectively capable of being applied to a fire at such a facility. A fire in such facilities can spread from structure to structure and from vessel to vessel with no effective way to attack and control it. Section 4504.2 references NFPA 303 for the standpipe requirements and additionally requires that no point on the marina pier or float system exceed 150 feet (45 675 mm) from a standpipe hose connection (see commentary, Section 4504.2).*

**905.3.8 Rooftop gardens and landscaped roofs.** Buildings or structures that have rooftop gardens or landscaped roofs and that are equipped with a standpipe system shall have the standpipe system extended to the roof level on which the rooftop gar-

den or landscaped roof is located.

▫ *This section requires that if the building is equipped with a standpipe system, whether or not such systems are required, it must be extended to a roof containing a garden or that is landscaped. These requirements relate to the requirements in Section 317 that address the increased fuel load being added to roofs.*

**905.4 Location of Class I standpipe hose connections.** Class I standpipe hose connections shall be provided in all of the following locations:

1. In every required stairway, a hose connection shall be provided for each floor level above or below grade. Hose connections shall be located at an intermediate floor level landing between floors, unless otherwise approved by the fire code official.
2. On each side of the wall adjacent to the exit opening of a horizontal exit.

**Exception:** Where floor areas adjacent to a horizontal exit are reachable from exit stairway hose

connections by a 30-foot (9144 mm) hose stream from a nozzle attached to 100 feet (30 480 mm) of hose, a hose connection shall not be required at the horizontal exit.

3. In every exit passageway, at the entrance from the exit passageway to other areas of a building.

**Exception:** Where floor areas adjacent to an exit passageway are reachable from exit stairway hose connections by a 30-foot (9144 mm) hose stream from a nozzle attached to 100 feet (30 480 mm) of hose, a hose connection shall not be required at the entrance from the exit passageway to other areas of the building.

4. In covered mall buildings, adjacent to each exterior public entrance to the mall and adjacent to each entrance from an exit passageway or exit corridor to the mall. In open mall buildings, adjacent to each public entrance to the mall at the perimeter line and adjacent to each entrance from an exit passageway or exit cor-

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ridor to the mall.

5. Where the roof has a slope less than four units vertical in 12 units horizontal (33.3-percent slope), a hose connection shall be located to serve the roof or at the highest landing of a stairway with stair access to the roof provided in accordance with Section 1009.16.

6. Where the most remote portion of a non-sprinklered floor or story is more than 150 feet (45 720 mm) from a hose connection or the most remote portion of a sprinklered floor or story is more than 200 feet (60 960 mm) from a hose connection, the fire code official is authorized to require that additional hose connections be provided in approved locations.

▫ *Hose connections are required for the fire department to make use of the standpipe system. Since the fire department will typically access the building using the stairways, and most fire departments do not permit entry to the fire floor without an operating hose line, a hose connection must be installed for each floor level of each required enclosed*

*stairway.*

*Item 1 specifies that the hose connections are to be located at intermediate landings between floors. This reduces congestion at the stairway door and may reduce the hose lay distance. The hose connections, however, are still permitted at each floor level of the exit stair instead of at the intermediate landing if this arrangement is approved by the fire code official.*

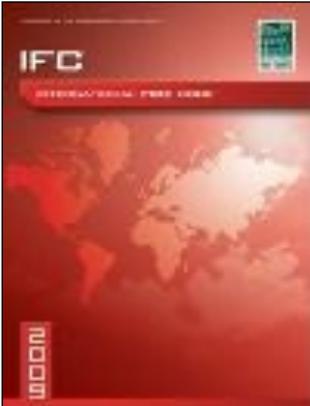
*Because horizontal exits are also primary entrances to the fire floor, Item 2 states that hose connections must also be provided at each horizontal exit. The construction of the fire separation assembly used as the horizontal exit will protect the fire fighters while they are connecting to the standpipe system. The hose connections are to be located on each side of the horizontal exit to enable fire fighters to be in a protected area, regardless of the location of the fire. The exception acknowledges that there may already be a hose connection in close proximity to the horizontal exit if there is a stairway adjacent to the horizontal exit. The intent is to allow fewer*

*standpipe outlets if the area can be adequately covered by the standpipes in stairways since those are the standpipes typically used by the fire department.*

*Item 3 states that an exit passageway in a building required to have a standpipe system is typically used as an extension of a required exit stairway. This allows use of the exit passageway for fire-fighting staging operations in the same way as an exit stair. The exception acknowledges that there may already be a hose connection in close proximity to the exit passageway. If there is a stairway containing a hose connection in close proximity to the exit passageway that can meet the 30-foot hose stream from a nozzle attached to 100 feet of hose then an additional standpipe is not required. The intent is to allow fewer standpipe outlets if the area can be adequately covered by the standpipes in stairways since those are the standpipes typically used by the fire department.*

*In covered and open mall buildings, Item 4 requires hose connections at each entrance to an exit passageway or exit corridor.*

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*In addition, covered mall buildings would be required to have connections at each exterior public entrance. Open malls would require connections at the public entrance perimeter line. These locations allow fire personnel to have a support line as soon as they enter the building.*

*Item 5 is consistent with NFPA 14 regarding the installation of Class I standpipe hose connections on the roofs of buildings. This requirement requires only one standpipe to extend to the roof level or highest landing of the stair serving the roof. This coordinates with Section 1009.16 which only requires one stairway to extend to the roof.*

*Hose connections in each exit stairway result in hose connections being located based on the travel distances permitted in Table 1016.1, which recognizes that most fire departments carry standpipe hose packs with 150 feet (45 720 mm) of hose or possibly with 100 feet (30 480 mm) of hose and an additional 50-foot (15 240 mm) section that could be easily connected.*

*With the typical travel distance permitted in nonsprinklered buildings of 200 feet (60 960 mm), reasonable coverage is provided when the effective reach of a fire stream is considered. Depending on the arrangement of the floor, however, all areas may not be effectively protected. Although this situation could easily be corrected by locating additional hose connections on the floor, such connections may rarely be used because of the difficulty in identifying their location during a fire and the fact that most fire departments require an operational hose line before they enter the fire floor. Because longer travel distances are allowed in sprinklered buildings, the problem is increased, but the need for prompt manual suppression is reduced by the presence of the sprinkler system. Item 6 gives the fire code official the authority to require additional hose connections if needed.*

**905.4.1 Protection.** Risers and laterals of Class I standpipe systems not located within an enclosed stairway or pressurized enclosure shall be protect-

ed by a degree of fire resistance equal to that required for vertical enclosures in the building in which they are located.

**Exception:** In buildings equipped throughout with an approved automatic sprinkler system, laterals that are not located within an enclosed stairway or pressurized enclosure are not required to be enclosed within fire-resistance rated construction.

▫ *To minimize the potential for damage to the standpipe systems from a fire, the risers and laterals must be located in an enclosure having the same fire-resistance rating as required for a vertical or shaft enclosure within the building. The required fire-resistance rating for the enclosure can be determined as detailed in Section 713.4 of the IBC.*

*The enclosure is not required if the building is equipped throughout with an approved automatic sprinkler system. The potential for damage to the standpipe system is minimized by the protection provided by the sprinkler system. The automatic sprinkler system may be either an NFPA 13 or 13R system,*

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*depending on what was permitted for the building occupancy.*

*If the interior exit stairway is not required to have a rated enclosure, such as in an open parking garage, the laterals are similarly not required to be in an enclosure. The protection afforded the vertical riser in the stairway must be the same as that afforded the laterals. If the stairway is not required by other sections of the code to be located in a rated enclosure then the laterals are not required to be in rated protection either.*

### **905.4.2 Interconnection.**

In buildings where more than one standpipe is provided, the standpipes shall be interconnected in accordance with NFPA 14.

▫ *In cases where there are multiple Class I standpipe risers, the risers must be supplied from and interconnected to a common supply line. The required fire department connection must serve all of the sprinklers or standpipes in the building.*

**905.5 Location of Class II standpipe hose connections.** Class II standpipe hose connections shall be

accessible and shall be located so that all portions of the building are within 30 feet (9144 mm) of a nozzle attached to 100 feet (30 480 mm) of hose.

▫ *Sections 905.5.1 through 905.5.3 specify the requirements for Class II standpipe hose connections. Class II standpipe systems are primarily intended for use by the building occupants.*

*This section for Class II standpipes does not specifically require hose stations and uses the term hose connection with a location based upon 100 feet (30 480 mm) of hose. However, the definition of Class II and III standpipes and Section 7.3.3.1 of NFPA 14 specifically require hose stations. Section 905.2 specifically references NFPA 14.*

*Although NFPA 14 requires a hose station, the decision as to whether a hose station is required may be one that is affected by the policies and procedures of the local fire department. It should be remembered that Class II hose connections and hose stations are intended for occupant use and not necessarily for fire depart-*

*ment use. The fire department typically uses the Class I connection that is compatible with 21 1/2 - inch (64 mm) hose.*

### **905.5.1 Groups A-1 and A-2.**

In Group A-1 and A-2 occupancies with occupant loads of more than 1,000, hose connections shall be located on each side of any stage, on each side of the rear of the auditorium, on each side of the balcony, and on each tier of dressing rooms.

▫ *Because of the high occupant load density in Group A-1 and A-2 occupancies, providing additional means for controlling fires in their initial stage is important to enable prompt evacuation of the building. This section is independent of the Class I standpipe requirement for stages based on square footage as indicated in Section 905.3.4.*

**905.5.2 Protection.** Fire-resistance-rated protection of risers and laterals of Class II standpipe systems is not required.

▫ *Class II standpipe systems are normally not located in exit stairways; standpipe hose connections are located near the protected area to*

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allow quick access. Therefore, it is likely that neither the risers nor the laterals would be located in any enclosure.

**905.5.3 Class II system 1-inch hose.** A minimum 1-inch (25 mm) hose shall be allowed to be used for hose stations in light-hazard occupancies where investigated and listed for this service and where approved by the fire code official.

□ *This section permits the use of 1-inch (25 mm) listed noncollapsible hose as an alternative to 1 1/2 -inch (38 mm) hose, subject to the approval of the fire code official. This alternative is limited to light-hazard occupancies, such as office buildings and certain assembly occupancies that tend to have lower fuel loads, since a smaller hose can discharge less water.*

**905.6 Location of Class III standpipe hose connections.** Class III standpipe systems shall have hose connections located as required for Class I standpipes in Section 905.4 and shall have Class II hose connections as required in Section 905.5.

□ *Class III standpipe systems that have both a*

*2 1/2 -inch (64 mm) hose connection and a 1 1/2 -inch (38 mm) hose connection must comply with the applicable requirements of Sections 905.4, 905.5 and 905.6. Thus, it is necessary to review and comply with all applicable provisions.*

**905.6.1 Protection.** Risers and laterals of Class III standpipe systems shall be protected as required for Class I systems in accordance with Section 905.4.1.

□ *Because Class III standpipe systems are intended for use by fire-suppression personnel, they must be located in construction that has a fire-resistance rating equivalent to that of the vertical or shaft enclosure requirements of the building (see commentary, Section 905.4.1).*

**905.6.2 Interconnection.** In buildings where more than one Class III standpipe is provided, the standpipes shall be interconnected in accordance with NFPA 14.

□ *As indicated in Section 905.4.2 for Class I standpipe systems, multiple standpipe risers must be interconnected with a common supply line. An indicating valve is typically installed at the base of each riser so*

*that individual risers can be taken out of service without affecting the water supply or the operation of other standpipe risers.*

**905.7 Cabinets.** Cabinets containing fire-fighting equipment, such as standpipes, fire hose, fire extinguishers or fire department valves, shall not be blocked from use or obscured from view.

□ *This section does not require that cabinets be provided to contain fire protection equipment. However, if they are provided, cabinets must be readily visible and accessible at all times. Sections 905.7.1 and 905.7.2 contain additional criteria for the construction and identification of the cabinets. Where cabinets are located in fire-resistance-rated assemblies, the integrity of the assembly must be maintained. Cabinet design for hose connections, control valves or other devices that require manual operation should be such that there is sufficient clearance between the cabinet body and the device to allow grasping of the device (quite likely with a gloved hand) and prompt operation of it.*

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**905.7.1 Cabinet equipment identification.** Cabinets shall be identified in an approved manner by a permanently attached sign with letters not less than 2 inches (51 mm) high in a color that contrasts with the background color, indicating the equipment contained therein.

**Exceptions:**

1. Doors not large enough to accommodate a written sign shall be marked with a permanently attached pictogram of the equipment contained therein.
2. Doors that have either an approved visual identification clear glass panel or a complete glass door panel are not required to be marked.
  - *This section specifies the minimum criteria to make the signs readily visible. Different color combinations may be approved by the fire code official if the color contrast between the letters and the background is vivid enough to make the sign visible at an approved distance. The exceptions address alternatives to letter signage if the cabinet is still conspicuously identified or the contents are readily*

*visible.*

**905.7.2 Locking cabinet doors.** Cabinets shall be unlocked.

**Exceptions:**

1. Visual identification panels of glass or other approved transparent frangible material that is easily broken and allows access.
2. Approved locking arrangements.
3. Group I-3 occupancies.
  - *Ready access to all fire-fighting equipment in the cabinet is essential. The exceptions, however, recognize the need to lock cabinets for security reasons and to prevent theft or vandalism (see also the commentary, Section 906.8).*

**905.8 Dry standpipes.** Dry standpipes shall not be installed.

- Exception:** Where subject to freezing and in accordance with NFPA 14.
- Wet standpipe systems are preferred because they tend to be the most reliable type of standpipe system; therefore, dry standpipes are prohibited unless subject to freezing. For example, Class I manual standpipe sys-

tems, which do not have a permanent water supply, are permitted in open parking structures. This recognizes that open parking structures are not heated and that most fires are limited to the vehicle of origin. The use of any dry standpipe system instead of a wet standpipe should take into consideration the added response time and its effect on the occupancy characteristics of the building.

**905.9 Valve supervision.** Valves controlling water supplies shall be supervised in the open position so that a change in the normal position of the valve will generate a supervisory signal at the supervising station required by Section 903.4. Where a fire alarm system is provided, a signal shall also be transmitted to the control unit.

**Exceptions:**

1. Valves to underground key or hub valves in roadway boxes provided by the municipality or public utility do not require supervision.
2. Valves locked in the normal position and inspected as provided in this code in buildings not equipped with a fire

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alarm system.

□ As with sprinkler systems, water control valves for standpipe systems must be electrically supervised as a means of determining that the system is operational (see commentary, Section 903.4).

*Exception 1 recognizes that underground key or hub valves in roadway boxes are not normally supervised or need to be supervised whether the building contains a standpipe system or an automatic sprinkler system.*

*Exception 2 does not require the control valves for the standpipes to be electrically monitored if they are locked in the normal position*

*and a fire alarm system is not installed in the building. When a fire alarm system is installed, the control valves for the standpipes must be electrically monitored and tied into the supervision required for the fire alarm system.*

**905.10 During construction.** Standpipe systems required during construction and demolition operations shall be provided in accordance with Section 3313.

□ As stated in Section 3313, at least one standpipe is required during construction of buildings four stories or more in height or during demolition of standpipe equipped buildings. Standpipe systems must

*be accessible and operable during construction and demolition operations to assist in any potential fire (see commentary, Sections 3313.1 and 3313.2 of the code and Sections 3311.1 and 3311.2 of the IBC).*

**905.11 Existing buildings.** Where required in Chapter 11, existing structures shall be equipped with standpipes installed in accordance with Section 905.

□ This section simply refers to Chapter 11 which addresses all requirements that apply to existing buildings (see commentary, Section 1103.6).

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