Code Corner
SECTION 905 STANDPIPE SYSTEMS PART 1

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.

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Your local codes or ordinances may vary.

905.1 General. Standpipe systems shall be provided in new buildings and structures in accordance with this section. Fire hose threads used in connection with standpipe systems shall be approved and shall be compatible with fire department hose threads. The location of fire department hose connections shall be approved. In buildings used for high-piled combustible storage, fire protection shall be in accordance with Chapter 32.

▫ *Standpipe systems are required in buildings to provide a quick, convenient water source for fire department use where hose lines would otherwise be impractical, such as in high-rise buildings. Standpipe systems can also be used prior to deployment of hose lines from fire department apparatus. The requirements for standpipes are based on practical requirements of typical fire-fighting operations and the nationally recognized standard NFPA 14.*

The threads on connections to which the fire department may connect a hose must be compatible with the fire department hose threads (see commentary, Section 903.3.6). Chapter 32 requires a Class I standpipe system in exit passageways of buildings used for high-piled storage. Note that If a building containing high-piled storage does not contain an exit passageway then standpipes would not be required. High-piled storage involves the solid piled, bin box, palletized or rack storage of Class I through IV commodities over 12 feet (3658 mm) high. High-hazard commodities stored higher than 6 feet (1829 mm) are also considered high piled.

905.2 Installation standard. Standpipe systems shall be installed in accordance with this section and NFPA 14.

▫ *This section requires the installation of standpipe systems to comply with the applicable provisions of NFPA 14 in addition to Section 905. NFPA 14 contains the minimum requirements for the installation of standpipe and hose systems for buildings and structures. The standard addresses additional requirements not addressed in the code, such as pressure limitations, minimum flow rates, piping specifications, hose connection details, valves, fittings, hangers and the testing and inspection of standpipes. The periodic inspection, testing and maintenance of standpipe systems must comply with NFPA 25.*

Section 905 and NFPA 14 recognize three classes of standpipe systems: Class I, II or III. The type of system required depends on building height, building area, type of occupancy and the extent of automatic sprinkler protection. Section 905 also recognizes five types of standpipe systems: automatic dry, automatic wet, manual dry, manual wet and semiautomatic dry. The use of each type of system is limited to the building conditions and locations identified in Section 905.3. The classes and types of standpipe systems are defined in Section 902.1.

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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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905.3 Required Installations. Standpipe systems shall be installed where required by Sections 905.3.1 through 905.3.8. Standpipe systems are allowed to be combined with automatic sprinkler systems.

Exception: Standpipe systems are not required in Group R-3 occupancies.

- *Standpipe systems are installed in buildings based on the occupancy, fire department accessibility and special conditions that may require manual fire suppression exceeding the capacity of a fire extinguisher. Standpipe systems are most commonly required for buildings that exceed the height threshold requirement in Section 905.3.1 or the area threshold requirement in Section 905.3.2. Specific occupancies, such as covered and open mall buildings, stages and underground buildings, because of their use or occupancy, also require a standpipe system.*

This section also states that a standpipe system does not have to be separate from an installed sprinkler system. It is common practice in multistory buildings for the standpipe system risers to also serve as risers for the automatic sprinkler systems.

In these instances, precautions need to be taken so that the operation of one system will not interfere with the operation of the other system. Therefore, control valves for the sprinkler system must be installed where the sprinklers are connected to the standpipe riser at each floor level. This allows the standpipe system to remain operational, even if the sprinkler system is shut off at the floor control valve.

The exception recognizes that standpipe systems in Group R-3 occupancies would be of minimal value to the fire department and would send the wrong message to the occupants of a dwelling unit. In the case of multiple single-family dwellings, each dwelling unit has a separate entrance and is separated from the other units by 1-hour fire partitions. These conditions permit ready access to fires and also provide for a degree of fire containment through compartmentation, which is not always present in other occupancies.

905.3.1 Height. Class III standpipe systems shall be installed throughout buildings where the floor level of the highest story is located more than 30 feet (9144 mm) above the lowest level of the fire department vehicle access, or where the floor level of the lowest story is located more than 30 feet (9144 mm) below the highest level of fire department vehicle access.

Exceptions:

1. Class I standpipes are allowed in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2.

2. Class I manual standpipes are allowed in open parking garages where the highest floor is located not more than 150 feet (45 720 mm) above the lowest level of fire department vehicle access.

3. Class I manual dry standpipes are allowed in open parking garages that are subject to freezing temperatures, provided that the hose connections are located as required for Class II standpipes in accordance with Section 905.5.

4. Class I standpipes are

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allowed in basements equipped throughout with an automatic sprinkler system.

5. In determining the lowest level of fire department vehicle access, it shall not be required to consider:

5.1. Recessed loading docks for four vehicles or less, and

5.2. Conditions where topography makes access from the fire department vehicle to the building impractical or impossible.

▫ *Given the available manpower on the fire department vehicle, standard fire-fighting operations and standard hose sizes, a 30-foot (9144 mm) vertical distance is generally considered the maximum height to which a typical fire department engine company can practically and readily extend its hose lines. Thus, the maximum vertical travel (height) threshold is based on the time it would take a typical fire department engine (pumper) company to manually suppress a fire. The standpipe connection reduces the time needed for the fire department to extend hose lines up or down stairways to advance and apply water to the fire. For this use, a minimum Class III standpipe system is required.*

With respect to the height of the building, the threshold is measured from the level at which the fire department can gain access to the building directly from its vehicle and begin vertical movement. Floor levels above grade are measured from the lowest level of fire department vehicle access to the highest floor level above [see Figure 905.3.1 (1)]. If a building contains floor levels below the level of fire department vehicle access, the measurement is made from the highest level of fire department vehicle access to the lowest floor level. In cases where a building has more than one level of fire department vehicle access, the most restrictive measurement is used because it is not known at which level the fire department will access the building. In other words, the vertical distance is to be measured from the more restrictive level of fire department vehicle access to the level of the highest (or lowest, if below) floor [see Figure 905.3.1 (2)].

The threshold based on the height of the building is independent of the occupancy of the building, the area of the building or the presence of an automatic sprinkler system. This is based on the universal need to be able to provide a water supply for fire suppression in any building and on the limitations of the physical effort necessary to extend hose lines vertically. Before discussing the exceptions it is important to understand the differences between the different classes and operational characteristics of standpipes. More detailed information is included in Section 202 for the definitions of the different classes and types of standpipes.

Standpipes can be dry or wet, manual, automatic or semiautomatic. Automatic systems can be either wet or dry. Manual systems can be either wet or dry. A semiautomatic system is always in association with a dry system.

The code is written such that it could be assumed the default is an automatic wet system. This is, however, not the case. The requirement is

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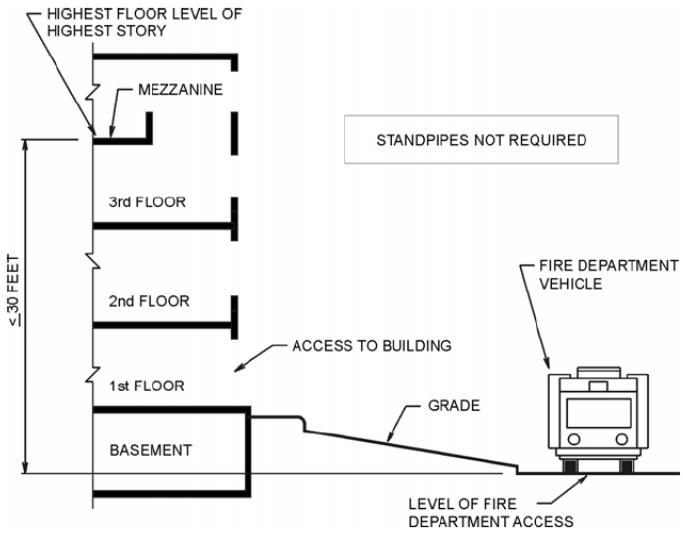
left to the design standard, NFPA 14. Section 5.4.1.1 of NFPA 14 indicates that Class I standpipes can be manual if the building is not high-rise. Section 5.4.1.4 of the standard indicates that a Class I standpipe must be wet except where the pipe is subject to freezing. Thus, where a Class I standpipe is installed, possibly as a part of Exception 1, the system can be manual wet if the building is not a high rise. This is consistent with IFC Committee Interpretation No. 33 -03. As long as the building is not high rise, it can be provided with a Class I standpipe system that is manual wet.

Class II and III standpipes are required to be automatic- wet or semiautomatic wet except where the piping is subject to freezing according to Section 5.4.3 of NFPA 14. They cannot be manual. Only Class I standpipes can be manual and only be used under the conditions noted in this code. Note that other sections of the code may specify whether the system must be automatic or not. If the requirement is not noted elsewhere in the code, then the decision to use an automatic or manual system is left to the designer.

Exception 1 recognizes the fact that with a fully operational automatic sprinkler system, the time that the fire department has to extend hoses within the building is substantially increased and that the amount of effort required is greatly reduced. Consequently, a single Class I connection can be provided. The second, 11 /2 -inch (38 mm) connection is allowed to be omitted. NFPA 14 also has a similar provision but is more restrictive as it only



For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

Figure 905.3.1(1)
HEIGHT THRESHOLD FOR STANDPIPES

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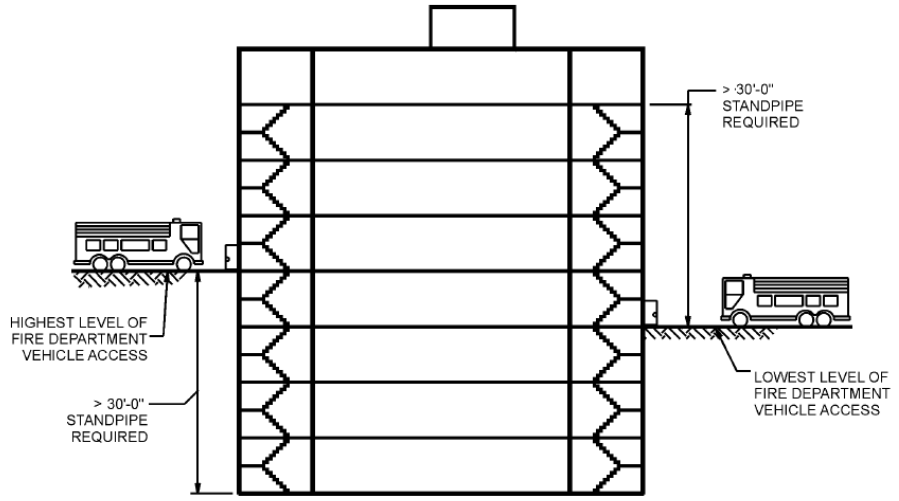
eliminates the hose station and additionally requires a 21 /2 inch by 11 /2 inch (65 mm by 40 mm) reducer and a cap attached with a chain (Section 7.3.4.1 of NFPA 14). In accordance with Section 102.7, the code would take precedence and the reducer and cap would not be required.

Exception 2 identifies one of the issues relative to open parking garages. This exception allows for the garage, when not more than 150 feet (45 720 mm) in height above the lowest level of fire department access, to have a wet standpipe but without additional operating pressure until the fire department connects and begins pumping into the system. This makes sense since normal operations typically do not begin until after the fire department is on the scene and has made its initial assessments. This is generally considered to be the maximum safe height for pumpers to overcome the hydrostatic head presented by 150 feet (45 720 mm) of water. Careful considerations should be made since not all fire departments have equipment capable of this type of pumping capacity.

Exception 3 is similar to the prior exception but with the added provision that the standpipe can be dry if subject to freezing, regardless of height. Because the standpipe will be without water and dependent upon the fire department to provide both water and pressure, standpipe outlets must be spaced more frequently, as noted in Section 905.5 for Class II standpipes so that fire fighters can connect and begin operations quicker. The exception does not require Class II outlets; only that the spacing be consistent with the requirement for Class II.

Exception 4 is similar to Exception 1 but only addresses sprinklers in the basement. Thus it is possible to use this exception if only the basement is protected by automatic sprinklers. However, Class I connections can only be provided in the



For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

Figure 905.3.1(2)
HEIGHT REQUIREMENTS FOR STANDPIPES

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basements— not on the upper floors. The exception cannot be used for stories above grade unless the entire building is sprinklered and, therefore, compliant with Exception 1.

Exception 5 provides additional information about what must be considered when determining building height with respect to the level of fire department vehicle access. The first item is a practical one that excludes loading docks of a limited size. The second item notes that although it may be possible to have a fire department vehicle arrive adjacent to the building at a low level, it may not be possible for the fire department to access the building from that level. An example of this condition would be where a road surface is located below a building constructed on a bluff. Although the fire department vehicles can approach from the lower road, fire department personnel cannot access the building from that lower level. Thus, the standpipe requirement would not be based on the road below the bluff.

Next Month: 905.3.2 Group A. Class I automatic wet standpipes shall be provided in nonsprinklered Group A buildings having an occupant load exceeding 1,000 persons.