

Standpipe Systems Explained

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Standpipe systems are a series of pipe, which connect a water supply to hose connections; they are designed to provide a pre-piped water system for building occupants or the fire department. Some older buildings only have standpipe systems while many newer buildings will have a combination system, which supplies the fire sprinkler system and the standpipe system. Standpipe systems are designed to provide fire protection water for hose lines in strategically placed locations inside a building or structure. They are most common in large floor area buildings, where most of the facility may be some distance from an outside entrance, and in multistory buildings to prevent long lengths of hose in stairwells and on the ground.

There are three classes of standpipe systems:

Class I – A Class I standpipe system shall provide a 2 1/2 inch hose connection for use primarily by trained personnel or by the fire department during initial response. This class has no hose attached. The fire department will usually carry hose packs to the floor level, typically a stairwell, where they will start their operations and connect to the standpipe system. These connections must match the hose thread utilized by the fire department.

Class II – A Class II standpipe system shall provide 1 1/2 inch hose stations to supply water for use primarily by trained personnel or by the fire department dur-

ing initial response. These are typically found in cabinets with 100' of hose.

Class III – A Class III standpipe system shall provide 1 1/2 inch hose stations to supply water for use by trained personnel and a 2 1/2 inch hose connection to supply a larger volume of water for use by fire departments and those trained in heavy fire streams. Many times these connections will provide a 2-1/2 inch reducer to a 1-1/2 hose connection.

The International Building Code, International Fire Code, and NFPA 101 – Life Safety Code, require standpipe systems. They are required based on the use of the building or the height above or below fire department access.

The International Fire Code states that a Class III standpipe system shall be installed throughout buildings where the floor level of the highest story is located more than 30 feet above the lowest level of fire department access, or where the floor level of the lowest story is located more than 30 feet below the highest level of fire department access. The Code also requires a Class I, II, or III standpipe in non-sprinklered Group A buildings having an occupant load exceeding 1,000 persons, covered malls, stages, underground buildings, helistops, heliports, marinas, and boatyards.

The Code also states that standpipe systems shall be added to existing structures with occupied floors located more than 50 feet above or below the lowest level of fire department access. The

standpipes shall have an approved fire department connection with hose connections at each floor level above or below the lowest level of fire department access. The fire department is authorized to approve the installation of a manual standpipe system where the responding fire department is capable of providing the required hose flow at the highest standpipe outlet.

The location of the standpipe is based on the standpipe system classification:

Class I standpipes shall be provided in every required stairway for each floor above or below grade. The number of stairways for a building is based on occupant load and travel distance inside the building. The minimum number of stairways for a multistory building is two; additional stairways may be required based on the building layout and design.

Class I standpipes shall be located at an intermediate floor level landing between floors, unless otherwise approved by the fire department.

Class I standpipes are required on each side of a horizontal exit, in every exit passageway, on the roof or highest landing where the roof has a slope less than 4:12.

The fire department is also authorized to require a Class I standpipe system when the most remote location is more than 150 ft in a non-sprinklered building or 200 ft in a sprinklered building.

Class II standpipe hose connections shall be accessible and shall be located so that all portions of the building are



within 130 ft travel distance of a 1-1/2 inch hose connection. In Group A-1 and A-2 occupancies with loads greater than 1000, hose connections shall be located on each side of a stage, balcony, rear of the auditorium, and on each tier of dressing rooms.

Class III standpipes must comply with the Class I and Class II requirements; however the 130 ft travel distance limitation does not apply.

All hose connections and hose stations shall be unobstructed and shall be located not less than 3 ft or more than 5 ft above the floor. The hose connection shall not be obstructed by the closed or open door or other objects on the landing.

NFPA 14, *Installation of Standpipe and Hose Systems*, first issued in 1912, provides the design, layout, and water flow requirements for the systems. The Codes indicate when and where the standpipe systems are required and NFPA 14 provides the information on how they are to be installed. NFPA 25, *Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems*, provides the information on how they are to be maintained. The design of the standpipe system is governed by building height, area per floor occupancy classification, egress system design, required flow rate and residual pressure, and the distance of the hose connection from the source(s) of the water supply. The maximum pressure at any point in the system shall not exceed 350 psi. The design pressure is based on a residual



pressure of 100 psi. The fire department is permitted to reduce the pressure requirements based on local response requirements. The design pressure should be based on the amount of hose and nozzle type the first arriving fire department company will be deploying in a fire situation. Due to pressure requirements standpipe systems are limited to a maximum height of 275 ft. Those buildings over 275 ft in height will require the standpipe systems to be split in different zones. Class I and III standpipes shall be at least 4 inch in size, combined system standpipes shall be at least 6 inch in size.

The initial acceptance testing is very similar to that of fire sprinkler systems. These tests will include flush test, hydrostatic test, and flow test. The hydrostatic test is at 200 psi for 2 hours, or 50 psi in excess of the maximum working pressure. All pressure-regulat-



ing devices shall be tested with the pressure recorded on the installation certificate. To verify the system flow, the flow test shall be from the most hydraulically remote location.

All standpipe systems are required to be maintained in compliance with NFPA 25. The standard requires a weekly/monthly inspection of the control valves. A quarterly inspection of the pressure regulating devices, piping, and hose connections is required. An annual inspection of the cabinet, hose, and hose storage device is required. The alarm device, hose nozzle, and hose storage device shall be tested annually. The hose shall be tested every 3/5 years. The pressure control valves and pressure reducing valves shall be tested every 5 years. The standpipe system shall have a hydrostatic test, flow test, and main drain test every 5 years.

Standpipe systems along with portable fire extinguishers provide an important function to assist with manual fire control. Standpipe systems and portable fire extinguishers provide early fire suppression; they offer a quick and effective response that can be used by one person. They can be manually operated to clear a pathway to safety and provide temporary occupant protection. ▽

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