

Horizontal Standpipes NFPA 14 - 2020

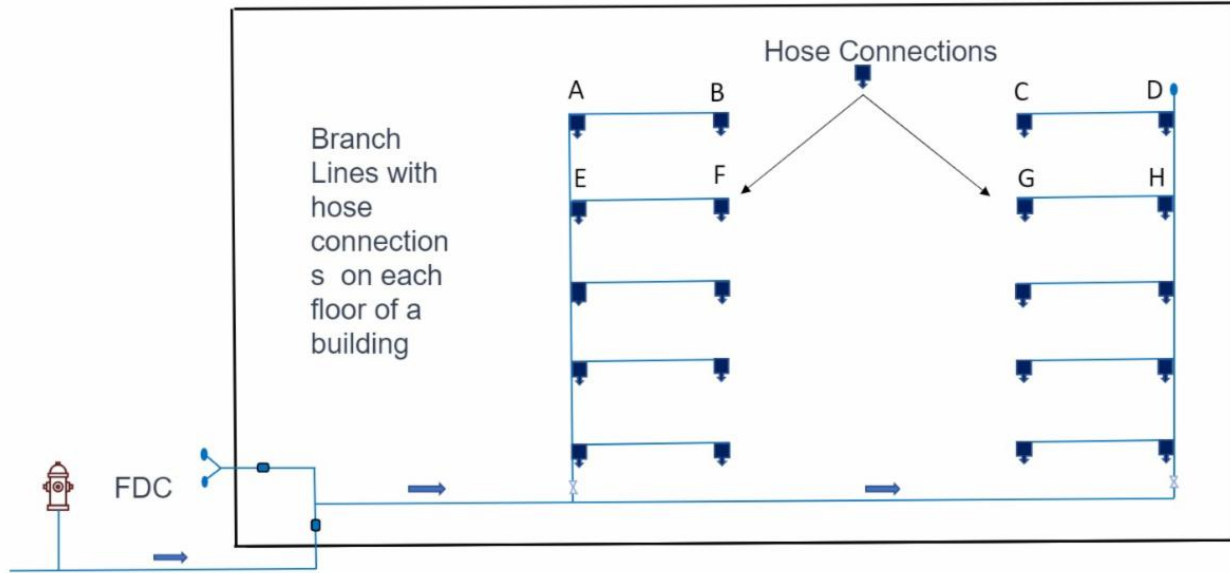
This TechNotes was prepared by Terin Hopkins, Public Fire Protection Specialist.

Understanding the definition of a horizontal standpipe will often answer some of the common questions asked about these systems in the design stage. There are two separate ways to supply hose connections on a horizontal plane but only one is considered a horizontal standpipe.

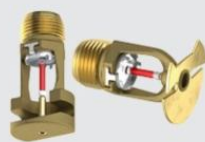
Horizontal Branch Line

The first is simply the addition of a single hose connection from a horizontal branch line. The adding of a single hose connection to a branch line can be used to meet travel distance requirements in buildings where the floor layout does not provide adequate travel distance requirements, from the stairway hose connections. It is also commonly used in instances where an additional vertical riser is problematic or not cost effective for a single hose connection. The single hose connection on a branch line does not increase the total system flow demand and is not considered an extension of the of the standpipe. Branch lines are simply sized for required flow and pressure with a minimum pipe size of 2 ½ in. The exception to this is when the system feeds a hose connection on each floor as illustrated in NFPA 14, Figure A.7.10.1.1.6. In this scenario, the extensions should be considered as additional standpipes and be flow tested at connections A, B, C & D for a sprinklered building maximum flow of 1000 gpm and A, B, C, D & H for un-sprinklered buildings maximum of 1250 gpm.

3.3.3 Branch Line. A piping system, generally in a horizontal plane, connecting not more than one hose connection with a standpipe



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Horizontal Standpipe

The second one is a horizontal standpipe that begins when two or more hose connection are added on a single horizontal water supply. The horizontal standpipe serves the same function as a vertical standpipe in supplying hose connections but instead of being vertical, it is simply horizontal. Horizontal standpipes are typically used in low-rise buildings with large floor plans, or where multiple hose connections on each floor are required to meet travel distance requirements, making multiple vertical standpipes impractical.

3.3.19.1 Horizontal Standpipe. The system piping that delivers the water supply for two or more hose connections, and for sprinklers on a combination system, on a single level.

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Flow Requirement Differences

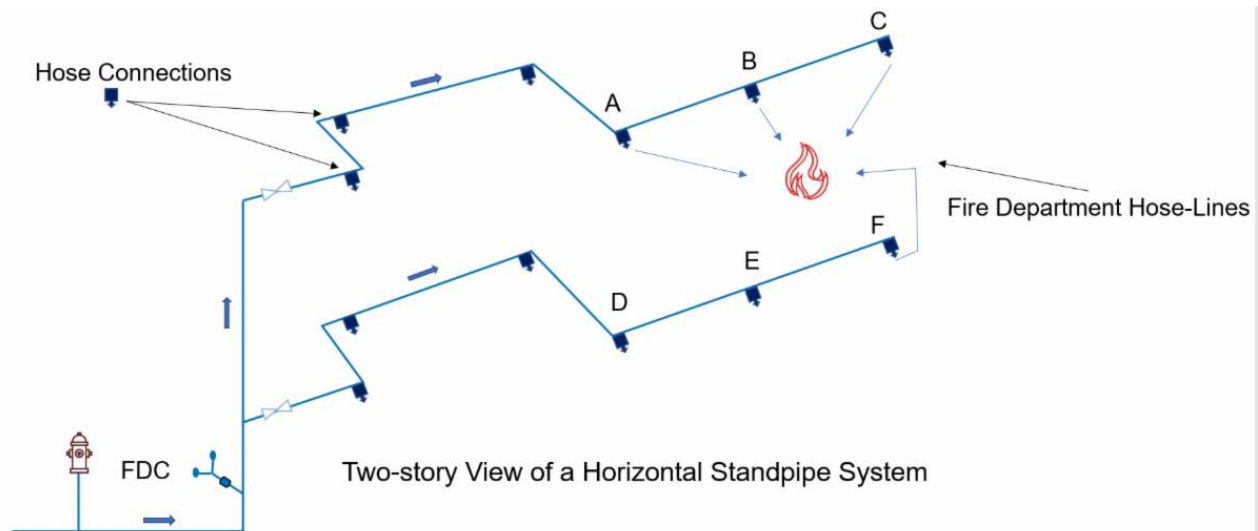
The other big difference between the hose connection on a branch line and a horizontal standpipe are the flow requirements. The horizontal standpipe is treated the same as a vertical standpipe with the exception that the minimum flow rate for the hydraulically most demanding horizontal standpipe shall be 750 gpm instead of the vertical requirement of 500 gpm.

While the typical two stairway standpipe system demand would supply a minimum flow rate of 500 gpm at the hydraulically most demanding standpipe and an additional 250 gpm for a total of 750 gpm, allowing all 750 gpm to be available on any one level. This is not the case in a horizontal standpipe design. Instead the flow requirement is increased to 750 gpm at the hydraulically most demanding standpipe. The intent of the increased flow is to provide that same minimum flow of 750 gpm on each level, that the vertical standpipe feeds, with the same 250 gpm flow from the additional standpipe risers on another levels.

7.10.1.1.2 Where a horizontal standpipe on a Class I or Class III system supplies three or more hose connections on any floor, the minimum flow rate for the hydraulically most demanding horizontal standpipe shall be 750 gpm, and the calculation procedure shall be in accordance with 7.10.1.2.2. (See image below)*

Where more vertical and horizontal standpipes are installed, 250 gpm flow must be added until total maximum flow of 1000 gpm for sprinklered buildings and 1250 gpm for un-sprinklered buildings is achieved.

7.10.1.1.3 The Minimum flow rates for additional standpipes shall be 250 gpm per standpipe for buildings with floor areas that do not exceed 80,000 sf per floor.



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Pressure Requirements

All the pressure requirements remain the same between vertical and horizontal standpipes. Section 7.8.1 requires minimum pressure of 100 psi at the outlet of the hydraulically most remote 2 ½ in. hose connection and Section 7.2.3, a maximum of 175 psi. Where pressure exceed that maximum allowable limit of 175 psi, they shall be reduced by a listed pressure regulating device capable of limited both static and residual

pressure.

7.8.1 Minimum Design Pressure for Hydraulically Designed Systems. Hydraulically designed standpipe shall be designed to provide the waterflow rate required by section 7.10 at a minimum residual pressure of 100 psi at the hydraulically most remote 2 ½ in. hose connection and 65 psi at the outlet of the hydraulically most remote 1 ½ in. hose connection.

7.2.3.2 Where the static pressure at a 2 ½ in. hose connection exceeds 175 psi, a listed pressure regulating device shall be provided to limit static and residual pressures at the hose connection to no more than 175 psi.*

The only listed pressure regulating device capable of reducing both static and residual pressure is a pressure reducing valve (PRV).

3.3.16.1 Pressure Reducing Valve. A valve designed for the purpose of reducing the downstream water pressure under both flowing (residual) and nonflowing (static) conditions.*

Summary

Horizontal standpipes are simply vertical standpipe turned on their sides. By understanding that a single hose connection can be added to branch lines, without having to meet the requirements of being a horizontal standpipe, is the beginning of meeting the appropriate design standard.



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New EOD Process

Starting on July 15, 2020, the NFSA has a new EOD process where members can submit questions, track the progress, and view their EOD cases. The step by step process is detailed in TechNotes #442.

National Fire Sprinkler Association

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