

## Best of December 2023

The following are a dozen questions answered by the NFSA's Codes, Standards, and Public Fire Protection staff as part of the Expert of the Day (EOD) member assistance program during the month of December 2023. This information is being brought forward as the "Best of December 2023." If you have a question for the NFSA EOD submit your question online through the "My EOD" portal.

It should be noted that the following are the opinions of the NFSA Engineering, Codes, and Standards staff, generated as members of the relevant NFPA and ICC technical committees and through our general experience in writing and interpreting codes and standards. They have not been processed as formal interpretations in accordance with the NFPA Regulations Governing Committee Projects or ICC Council Policy #11 and should therefore not be considered, nor relied upon, as the official positions of the NFSA, NFPA, ICC, or its Committees. Unless otherwise noted the most recently published edition of the standard referenced was used.

## Question #1 – Manifold Test Connection

The *Enhanced Content* found in NFPA 13 (2022) states, "Paragraph 8.2.3.7.1 provides the option of a manual flow test..... This option of a manual test is not a test to verify the calculated water delivery time from 8.2.3.5 but is an independent and equally acceptable design option."

**Does this negate the need for meeting the discharge time limitations?**

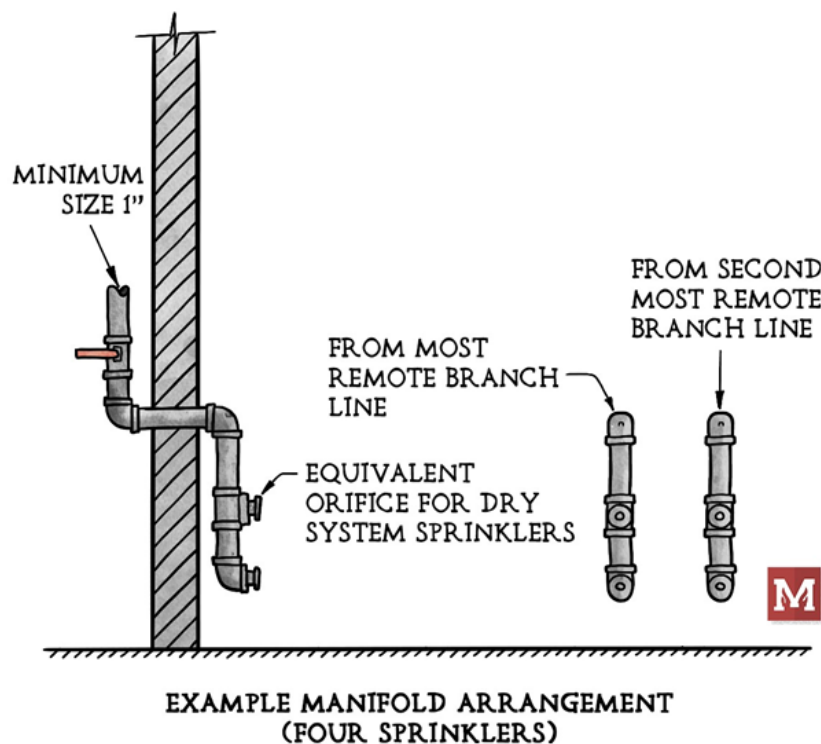
No. The manifold test connection outlined in Section 8.2.3.7.1 in the 2022 edition of NFPA 13 is one of four options listed in NFPA 13 to comply with the system size criteria for a dry pipe system. But the criteria in Section 8.2.3.7.1 does not negate the need to comply with the timed water delivery requirements in Table 8.2.3.6.1. The options outlined in NFPA 13 are:

- Water discharged from the inspector's test connection (ITC) in no more than 60 seconds.
- Systems up to 500 gallons do not have to deliver water to the ITC in a specified time.
- Systems up to 750 gallons with a quick-opening device do not have to deliver water to the ITC in a specified time.

- Calculate the discharge time with a listed program complying with Table 8.2.3.6.1.

The manifold test connection simulates the flow of water through the required number of sprinklers based on Table 8.2.3.6.1. Section 8.2.3.7.1 still requires the system size to be such that the initial water discharge from the system trip test connection or manifold is in compliance with Table 8.2.3.6.1. But as mentioned previously, it does not negate the need to comply with the timed water delivery requirements in Table 8.2.3.6.1.

Lastly, it should be noted that residential dwelling units utilizing a dry pipe system have a lower delivery time (15 sec.).



## Question #2 – Nonfunctional Jockey Pump?

**Is a nonfunctional jockey pump considered an Impairment or Critical Deficiency in NFPA 25?**

A nonfunctional jockey pump is not considered an impairment or critical deficiency. Table A.3.3.8 in the 2023 edition of NFPA 25 only addresses no power to the jockey pump stating that it is a noncritical deficiency.

By definition, an impairment means that the system is not operable. Clearly the system is operable without a jockey pump. A critical deficiency means that if not repaired it can have material effect on the system to operate, again lack of the operation of the jockey pump has no material effect on the operation of the sprinkler system.

One reason a jockey pump is only in place to prevent the main fire pump from unnecessarily operating. NFPA 20 only states that a means to maintain pressure shall be provided, a pressure maintenance pump (also known as a make-up or jockey pump) is one of the means provided. Another significant purpose of this is to prevent water hammer should a main fire pump activate. Lack of a jockey pump does not inhibit a fire protection system from operating.

### Question #3 – Fire Department Connection Pipe Sizing

#### How do you size fire department connection piping in accordance with NFPA 14 (2016)?

NFPA 14, *Standard for the Installation of Standpipe and Hose Systems*, Section 7.7.1 requires all Class I and III standpipes to be sized so the system demand can be supplied from each fire department connection (FDC)

The sizing minimums are found in Section 7.6 and does not specifically size pipe for flow. The minimum pipe size allowed for use in standpipes is 4 inches (Section 7.6.1). Buildings partially sprinkled with combine systems shall be 6 inches in size (Section 7.6.2) and 4 inches when fully protected with a NFPA 13 or 13R system.

FDCs are sized by flow, with each 2 ½ inch inlet providing 250 gpm. In the case of an un-sprinklered garage with a 1,250 gpm design, it would require 5 x 2 ½ inch inlets. Large diameter quick connect FDC's are allowed but do not have any flow sizing requirement in the 2016 edition of the standard.

The new 2024 edition now provides guidance moving forward. These numbers are correlated with the conservative flow numbers assigned to 2 ½ inch inlets.



### Question #4 – Dry Sprinklers in Coolers

#### Do dry barrel sprinklers located in coolers and freezers need to have a higher temperature rating due to the defrosting function of these coolers/freezers?

Yes, however only when those freezers/coolers have automatic defrost. NFPA 13 (2016) Section 8.3.2.5(10) dictates that sprinklers in coolers and freezers equipped with automatic defrost capabilities shall be intermediate-temperature classification or higher. While coolers and freezers are obviously at low temperatures, normally defrosting can reach temperatures up to 165°F.

### Question #5 - Split Hanger Ring Size to Match Pipe

#### Is it acceptable to use a 1 inch split hanger ring on ¾ inch CPVC tubing?

NFPA 13 (2019 Edition) – Section 17.1.6.1 requires hangers attached to sprinkler pipe be listed. There are a few exceptions for mild steel rods and hangers, fasteners in concrete, fasteners in steel, and fasteners in wood.

Section 17.1.6.1 indicates that unless permitted by 17.1.6.2 or 17.1.6.3, the components of hanger assemblies that directly attach to the pipe, building structure, or racking structure shall be listed.

Most CPVC sprinkler pipe manufacturers recommend using listed hangers, especially in areas where the pipe will be exposed. One manufacturer's installation guide allows some steel pipe hangers if suitable but goes on to say that they must be selected to accommodate the specific pipe size.

The literature also cautions that hangers and supports must not compress, distort, cut, or abrade the pipe and must allow movement for thermal expansion and contraction. One possible concern with using an over-sized split ring hanger is movement within the hanger allowing the pipe to be cut or damaged. The specific pipe manufacturer should be consulted on this for their recommendation.

## **Question #6 - Remote FDC Connection**

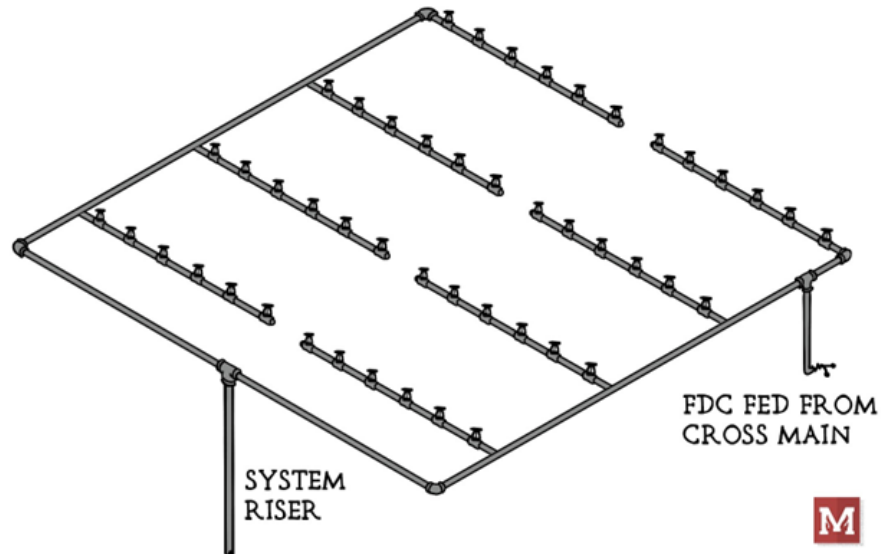
**NFPA 13 (2019) does not allow fire department connection to be attached to branch lines but does allow it to be connected to the "main piping."**

**Does "main piping" include cross mains which feed a lot of branch pipes before it reaches the Fire Riser? (Cross main size may be smaller than the FDC pipe size.)**

Yes, NFPA 13 (2019 Edition) – Section 12.12.5.3 allows the fire department connection (FDC) to attach to "main" piping in wet-pipe or deluge systems. There are two types of sprinkler "mains" defined in NFPA 13: Cross Mains and Feed Mains.

- A "cross main" is defined as: 3.3.53 Cross Mains. The pipes supplying the branch lines, either directly or through riser nipples.
- A "feed main" is defined as: 3.3.72 Feed Mains. The pipes supplying cross mains, either directly or through risers.

Basically, this section allows the FDC to be connected to piping other than branch lines. It can be connected to the riser assembly, feed mains (if present), or cross mains.



## Question #7 – System Protection Area Limitations for Low Piled Storage

**Does the 40,000 square foot system area limitation found in NFPA 13 (2019) apply to miscellaneous or low piled storage situations?**

No. The 40,000 square foot size limitation outlined in Section 4.5.1(4) in the 2019 edition of NFPA 13 applies only to high-piled storage situations. Per NFPA 13, this applies to Class I-IV commodities stored over 12 feet, or Group A plastics stored over 5 feet.

Miscellaneous storage and low-piled storage are not subject to the 40,000 square foot size limitation requirement in Section 4.5.1(4) since both of these storage scenarios are not considered high-piled storage. Miscellaneous storage is defined as, “storage that does not exceed 12 feet in height...”. Low-piled storage is considered solid-piled, palletized, rack storage, bin box, and shelf storage “up to” 12 feet in height.

## Question #8 – Mixed Storage Commodities

**Can 5 feet of a group a plastic commodity be stored above a Class I or II commodity and still be considered 5 feet of group a plastic?**

No. While NFPA 13 (2022) does not address this specifically, Section 4.3.1.5.2 dictates that storage of Group A plastics greater than 5 foot in height cannot be considered low piled storage.

Storage of Group A plastics higher than 5 feet, even if the height of the Group A plastics portion is less than 5 feet, would not be compliant with Section 4.3.1.5.2. In addition, Section

20.4.13.3 only allows the protection to be based on the lower commodity if the total pallet load of group A plastics is less than 10 pallet loads for protection based on Class III and IV Commodities and 5 pallet loads for protection based on Class I and II Commodities. Therefore, if the pallet load limit is exceeded any storage above 5 feet would be considered high piled.

## Question #9 – Omission of Sprinklers in Small Rooms for 3,000 Square Foot Calculation

**For hydraulic calculations with design areas exceeding Table 23.4.4.6.2, does the omission of sprinklers in hydraulic calculations in small rooms, such as closets and washrooms, apply to 3,000 square foot calculations required by 11.2.3.1.4.(3)?**

Yes, NFPA 13, 2013 edition, Section 23.4.4.6.2 is applicable anytime the design area is equal to or greater than the area in Table 23.4.4.6.2. This would include when the design area is increased in accordance with Section 11.2.3.1.4(3) for non-sprinkler protected combustible void spaces. There is no restriction in the standard to applying Section 23.4.4.6.2 is Section 11.2.3.1.4(3) is applicable.

Annex Section A.23.4.4.6.2 explains the intent of this section is not to allow the omission of discharge from sprinklers in small rooms where the design area has been reduced below the values in Table 23.4.4.6.2 for situations such as quick-response sprinklers. Where quick-response sprinklers are used, the discharge from sprinklers in small rooms in the design area can be omitted as long as the design area meets the size required by Table 23.4.4.6.2.

Please note that the 2022 edition, Section 28.2.4.7.2 now requires these small rooms to be compartments as defined by the standard and less than 55 square feet.



## Question #10 – Sprinklers Under Ducts on Roof

**Is sprinkler protection required under large objects located on exposed roofs of buildings?**

Based on NFPA 13, no; sprinkler protection is not typically required for spaces outside of the building (with a few exceptions – like balconies, overhangs, or exposure protection). NFPA 13 uses the term “building” in several sections, and this is widely interpreted to mean the space inside the walls and roof of the building. Providing sprinkler protection outside of the building creates problems in many areas of the country (due to climate) and many sprinkler components are not intended for outdoor installation.

If the code official is using a different standard or has adopted a specific ordinance, that standard or ordinance would override NFPA 13.

Specific to your question about mechanical equipment, NFPA 13 (2016 edition) – Section 8.1.1 was revised to include a new item #8 that reads: 8.1.1 The requirements for spacing,



location, and position of sprinklers shall be based on the following principles: (8) Sprinklers shall not be required to be installed within electrical equipment, mechanical equipment, or air handling units not intended for occupancy.

In addition, NFPA 13 (2016 edition) – Section 8.5.5.3.1.5 exempts sprinklers under noncombustible obstructions that are 24 inches or less above the floor or deck.

## **Question #11 – Residential Sprinklers in the Stairwell**

**In a six-story wood frame residential building, residential sprinklers are installed in dwelling units and their adjoining corridors. Are these sprinklers allowed in the combustibles stairwells as well?**

No, the prescriptive requirements of NFPA 13, 2013 edition, do not specifically allow the installation of residential sprinklers in egress stair enclosures.

Section 8.4.5 for installation requirements and the application of residential sprinklers indicates in Section 8.4.5.1 that residential sprinklers shall be permitted in dwelling units and their adjoining corridors, provided they are installed in conformance with their listing. The annex Section A.8.4.5.1 also explains residential sprinklers can only be used in corridors that lead to dwelling units.

There is no allowance in the standard to permit the installation of residential sprinklers within the egress stair enclosures.

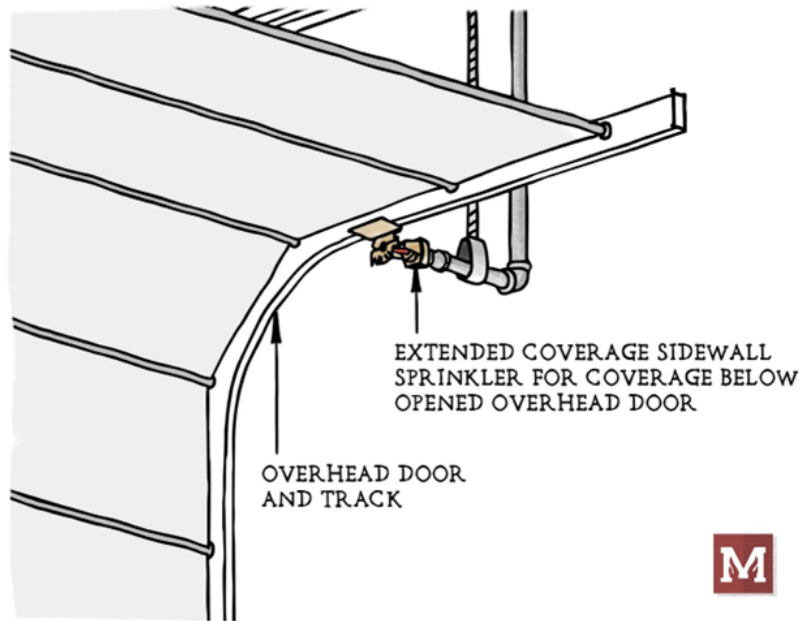
The standard especially limits the installation of residential sprinklers to dwelling units as defined by Section 3.3.10 and their adjoining corridors. The terms corridor and stair are not defined by Chapter 3, therefore as noted in Section 3.1 where terms are not defined in this chapter or within another chapter, they shall be defined using their ordinarily accepted meanings within the context in which they are used. Merriam-Webster's Collegiate Dictionary, 11th edition, shall be the source for the ordinarily accepted meaning. The building code defines a corridor as an enclosed exit access component that defines and provides a path of egress travel and a stair as a change in elevation, consisting of one or more risers.

## **Question #12 – Extended Coverage Heads Below Overhead Doors**

**Can an extended coverage sidewall that is listed for light hazard only be used below an overhead door per NFPA 13, 2022 edition, Section 10.3.4.1.7 in an ordinary hazard occupancy?**

Yes, NFPA 13, 2022 edition, Section 11.3.4.1.5 for extended coverage sidewall sprinklers indicates where sidewall extended spray sprinklers are installed to protect areas below overhead doors within ordinary hazard occupancy spaces or rooms, listed light hazard sidewall extended coverage spray sprinklers shall be permitted and the protection area and maximum sprinkler spacing for light hazard as specified in Table 11.3.3.2.1 shall be permitted.

Table 11.3.3.2.1 indicates the maximum protection area and sprinkler spacing for light hazard extended coverage sprinklers shall be 400 square feet and 28 feet, respectively.



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