

## NFSA Wants To Hear From YOU!

I'm thankful for your participation in our latest member survey. If you have not, it only takes a few minutes and I encourage you to do so. Surveys help us better meet your needs and serve you in ways that make a difference.

We value your input and look forward to learning your latest thoughts on our service to you. It's exciting to think about the opportunities ahead for the NFSA and our members.

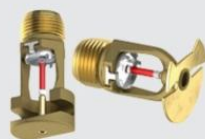
In service,  
**Shane Ray**,  
*President*

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## Best of August 2020

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 August 2020. This information is being brought forward as the "Best of August 2020." 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 recent published edition of the standard referenced was used.



### Viking Window Sprinklers VK960 & VK962

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Does a copy of NFPA 25 need to be given to the owner on all projects including small tenant improvements or is it just required for new projects only? Does this apply to NFPA 13R projects as well?

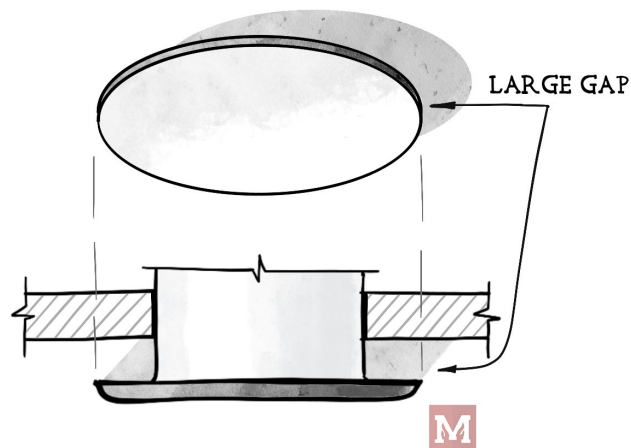
**Answer:** Section 25.4 of the 2016 edition of NFPA 13, requires a copy of NFPA 25 to be part of the instruction packet that the installing contractor provides to the owner. This requirement only applies to new installations and is not required for tenant improvements. The 2019 edition of NFPA 13, Section 28.4 added an annex note that supports this by stating, "A copy of NFPA 25 is not required for system alterations or additions".

Regarding the second question, NFPA 13R has similar requirements found in Section 11.4 of both the 2016 and the 2019 edition of NFPA 13R.

## Question #2 - Concealed Sprinkler Cover Plate not Flush with Ceiling

If a concealed sprinkler cover plate is not tight to ceiling (1/4" - 1/2" gap) - would this be considered by NFPA 13 as a system impairment that requires correction or only an aesthetics issue?

**Answer:** This is a situation that would require correction. Concealed sprinklers (including the cover plate) are listed assemblies and must be installed per the manufacturer's instructions. Concealed sprinklers typically include a small gap between the cover plate and the ceiling, however, installations where this gap is excessive indicates that the manufacturer's instructions were not followed and may have a detrimental effect on the operation of the sprinkler. Additionally, improper installation may cause other issues such as improper deflector distance.



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## Question #3 - Mixing Sprinkler Heads from Different Manufacturers

Are there any prohibitions on mixing sprinkler heads (of the same response type) in the same compartment that are manufactured by different companies?

**Answer:** There is no requirement in NFPA 13 that sprinklers within the same compartment be from the same manufacturer. Sprinklers from multiple manufacturers can be used in the same compartment as long as they are of the same response type.

## Question #4 - Vertical Pipe Chase with Electric Wires

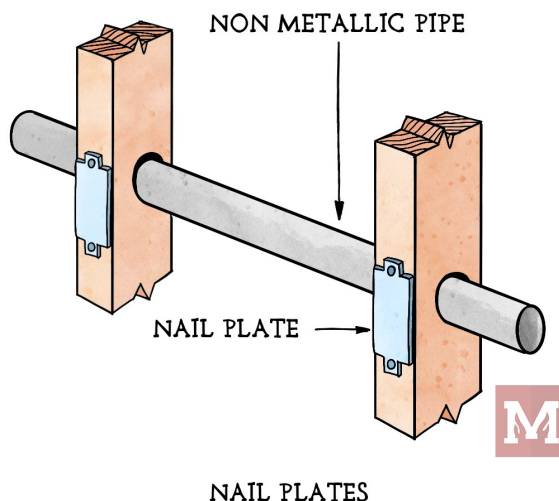
There is a vertical pipe chase under 10 sq. ft. that meets the requirements of the 2016 edition of NFPA 13, Section 8.15.1.2.14 that would allow sprinklers to be omitted. This section does require that there be no sources of ignition within the chase. There is electrical conduits within the chase which the AHJ is suggesting is a source of ignition. Is there a code definition for a source of ignition? And is the wire in the conduit a source of ignition?

**Answer:** NFPA 13 and the NFPA Glossary of Terms (which is the repository of all NFPA defined terms) does not define what a source of ignition is. However, typically a source of ignition is something that will initiate a spark or flame that ignites combustibles. An example of a source of ignition would be a fuel-fired appliance in a combustible space or potentially an electrical piece of equipment in a hazardous materials room with flammable vapors. A wire inside a metallic (conduit) or non-metallic sheathing (Romex) passing through a concealed space would not be considered as a source of ignition.

## Question #5 - Nail Plates

When installing CPVC pipe within the wood 2x6 and 2x4 walls, are nail plates required so as to protect the CPVC piping from accidental nail/ screw penetration?

**Answer:** The 2019 and earlier editions of NFPA 13 do not have specific requirements regarding the protection of non-metallic piping against nails or screws (mechanical damage). Non-metallic piping should be installed in accordance with its listing limitations, including installation instructions per Section 6.3.9.1.2 from the 2016 edition. However, these instructions are silent on this issue. Although not



applicable in this situation, other codes do provide guidance. For example, the *International Plumbing Code (IPC)* provides instruction on this exact situation. Section 305.6 of the 2018 IPC states the following:

*305.6 Protection against physical damage. In concealed locations where piping, other than cast iron or galvanized steel, is installed through holes or notches in studs, joists, rafters or similar members less than 1 1/4 inches (32 mm) from the nearest edge of the member, the pipe shall be protected by steel shield plates. Such shield plates shall have a thickness of not less than 0.0575 inch (1.463 mm) (No. 16 gage). Such plates shall cover the area of the pipe where the member is notched or bored, and shall extend not less than 2 inches (51 mm) above sole plates and below top plates.*

The 2022 edition of NFPA 13 will likely include requirements for this issue. It is still going through the final steps for approval, so nothing is final as of now, however, it is expected to the next edition of NFPA 13, NFPA 13R and NFPA 13D will include provisions for nail plates when installing nonmetallic pipe. These new requirements will likely include the following requirements when installing pipe other than steel through wood or metal studs:

1. Steel shields required where the face of piping is less than 1 ¼ inches from the edge of stud.
2. Steel shield shall be at least 16 gauge
3. Steel shield shall cover the area of the pipe where member is notched or bored

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### Question #6 - Standpipe Pressure Verification

To verify the pressure on a standpipe, is it acceptable to use the pressure gauge at the top of the riser or is it required to use a gauge at the hose valve itself?

**Answer:** No, you cannot use the gauge at the top of the riser. The acceptance test verification of pressure on the hydraulically most remote standpipe is taken through the two most remote hose connections. The intent is to verify the pressure while flowing the two most hydraulically calculated hose connections, on the discharge side of the valve. The gauge at the top of the standpipe is not required for the acceptance test. It is part of the overall system installation requirements for gauge locations, intended to allow pressures to be read from different specific locations.

NFPA 14-2019, Section 11.5.1.2 requires the flow test to confirm the approved hydraulic calculation of each standpipe, as required by Section 7.8.1, for pressure.

### 7.8.1 Minimum Design Pressure for Hydraulically Designed Systems.

Hydraulically designed standpipe systems shall be designed to provide the waterflow rate required by Section 7.10 at a minimum residual pressure of 100psi at the hydraulically most remote 2 ½ in. hose connection and 65psi at the outlet of the hydraulically most remote 1 ½ in. hose connection.

## Question #7 - Face Sprinklers and ESFR

NFPA 13 does not specifically state if, and when, face sprinklers are required for ESFR systems. It is only referenced in the 2016 edition of NFPA 13 in Section 17.3.3.4.9. When are face sprinklers required when ESFR sprinklers are used with in-rack sprinklers?

**Answer:** Face sprinklers are not required for ESFR systems. The section noted in the 2016 edition of NFPA 13 (17.3.3.4.9) was first in the 1999 NFPA 13, for standard spray sprinklers in Sections 7-4.3.1.2 and 7-4.4.2.4. The figures in this edition, Section 7-4, for storage over 25 feet, such as Figures 7-4.4.2.4.1 (a), (b), etc. frequently point out the face sprinkler locations for standard spray sprinklers. In updated editions, the “Face sprinklers in such racks...” text appears in NFPA 13 as follows:

- The 2010 edition, Section 12.3.1.14.2 for standard spray sprinklers indicates figures with face sprinklers.
- The 2013 edition, Section 17.1.10.2.1 shows the same “Face sprinklers in such racks...” text as a general in-rack sprinkler requirement.
- The 2013 edition, Section 17.3.3 does not have figures or text requiring face sprinklers for ESFR systems, therefore no requirement to install.
- The 2016 edition, Section 17.3.3.4.9 has face sprinklers in the text of the ESFR in-rack section, but no text or figure references that specifically require face sprinklers for ESFR systems as previous editions did for standard spray sprinklers.

The 2016 edition removed the “Face sprinklers in racks...” text from the Chapter 12 general in-rack requirements for all sprinklers and specifically correlated this text to multiple sections that addressed storage over 25 feet. This was a global correlation and the additional text for ESFR systems is done in error. The 2019 edition, Chapter 23 for ESFR rack systems does not reference text or figures with face sprinklers. Furthermore, the 2019 edition, Section 25.5.1.7, for in-rack sprinklers for storage over 25 feet states, “Where rack storage...requires face sprinklers, the face sprinklers shall be located...” Without a requirement from Chapter 23, the face sprinkler would not be required.

In summary, face sprinklers are required for standard spray, CMDA, or CMSA sprinklers in every edition, however when ESFR sprinklers for storage over 25 feet entered the standard, the text loosely followed but was technically without a requirement. In the 2019 edition the issue is solidly clarified by the absence of any face sprinkler reference in the ESFR requirements of Chapter 23.



## Question #8 - IBC/IFC Secondary water Supply for High-Rise Buildings

Shall the secondary water supply required for a high-rise building be sized based on a 30 minute duration or the applicable duration required for a greater hazard (e.g., ordinary or extra hazard) based on NFPA 13 Table 11.2.3.1.2 to comply with IBC, 2018 edition, Section 403.3.3 and IFC, 2018 edition, Section 914.3.2?

**Answer:** We interpret both the IBC and the IFC to require a secondary water supply (for Seismic Design Category C, D, E or F) with a minimum capacity of not less than the hydraulically calculated sprinkler demand, including the required water supply duration, or a minimum duration of 30 minutes, whichever is larger.

## Question #9 - Steel Column Protection - Sidewall Heads

We need to provide protection for steel columns using sidewall sprinklers and are trying to locate information about where and how to position the standard sidewall head(s) along the steel columns. Where in the 2010 edition of NFPA 13 are requirements for using sidewall sprinklers to protect steel columns?

**Answer:** The 2010 edition of NFPA 13 states in Section 17.1.4.1(1) for columns without fire proofing located in storage racks can be protected with sidewall sprinklers, "...at the 15 ft elevation, pointed toward one side of the steel column".

However, it is important to note that these requirements are for columns located in storage racks for the protection of plastic and rubber commodities. Chapter 16 has similar requirements for columns located within rack systems for the protection of Class I - IV commodities. However, NFPA 13 does not have requirements to protect columns in general, therefore, would not have requirements outside of columns within racks.

## Question #10 - Seismic Bracing Requirements for CPVC Systems

On a NFPA 13R (2016 edition) project utilizing all CPVC piping, (1" & 1-1/2" pipe sizes), listed two-hole standoff hangers are being used to support the pipe in a wood structure. Is seismic bracing required in addition to the rigid hangers?

**Answer:** The answer is a little more complicated than a simple "yes" or "no" answer. The first condition that must be met to require seismic bracing (regardless of pipe material) is a code requirement to require seismic protection. The building codes will determine, based upon the location of the project, whether seismic protection is required. Next, the 2016 edition of NFPA 13R simply sends you to NFPA 13 for all hanging and bracing requirements. See Section 6.13.

NFPA 13 does not eliminate any seismic requirements simply based upon the fact that the piping material is CPVC. Therefore, the answer to your question is: yes, seismic bracing is required even if the piping in question is CPVC.

NFPA 13 has different requirements for lateral bracing and for longitudinal bracing as follows:

### **Lateral Bracing:**

NFPA 13 requires lateral sway bracing on all mains regardless of pipe diameter and on all branch lines that are 2 ½ inches and larger (see Section 9.3.5.5.1). You have indicated that the pipe sizes in your situation are 1 inch and 1 ½ inches so based upon the language of Section 9.3.5.5.1 the branch lines would not require lateral bracing as they are smaller than 2 ½ inches. These branch lines would, however, be required to be provided with restraint (see Section 9.3.5.5.1.1). The stand-off hangers used may meet the requirements for restraint.

The mains would be required to be provided with lateral sway bracing by Section 9.3.5.5.1, however, based upon the fact that you are using 2-hole standoff hangers lateral bracing may be omitted based upon the fact that the piping is individually supported "within 6 inches of the structure" (measured from the top of the piping to the point of attachment to the structure). This allowance can be found in Section 9.3.5.5.10.2. This section states that the lateral sway bracing can be omitted for mains if the following 6 conditions are met:

- Pipe is supported within 6 inches of the structure (measured from the top of the piping to the point of attachment to the structure)
- At least 75 % of the hangers meet the above requirement (supported within 6 inches)
- Consecutive hangers are not permitted to exceed this 6-inch requirement
- The seismic coefficient (Cp) cannot exceed 0.5
- Feed mains cannot exceed 6 inches and cross mains cannot exceed 4 inches
- Hangers cannot not be omitted per Section 9.2.4.3, 9.2.4.4, or 9.2.4.5.

### **Longitudinal Bracing:**

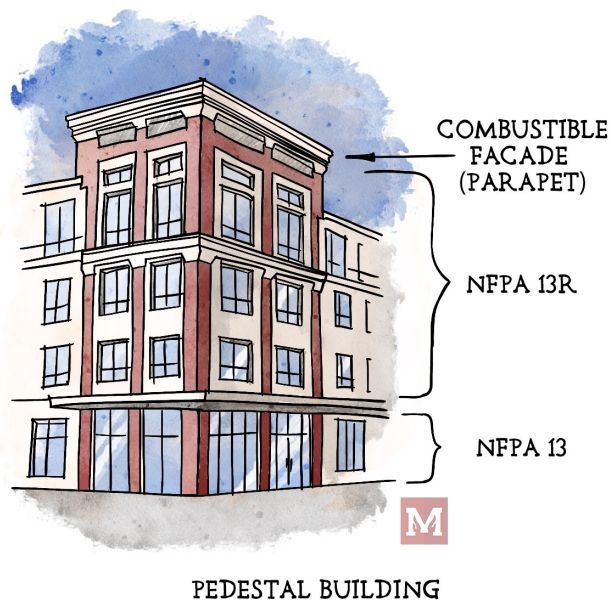
Section 9.3.5.6.1 requires that all mains (regardless of size or material) be provided with longitudinal sway bracing (maximum spacing - 80 ft). There is no section in NFPA 13 that can be used to omit these braces. Longitudinal bracing is problematic for CPVC piping as typical longitudinal brace clamps

exert compressive load on the pipe which is not permitted with CPVC pipe and there are no listed pipe clamps available for this purpose. Longitudinal bracing for CPVC piping is typically accomplished with a lateral brace at a change of direction. Per Section 9.3.5.5.8, lateral braces are permitted to act as a longitudinal brace if they are within 24 inches of a change in direction.

## Question #11 - NFPA 13R: Parapet (Combustible Building Façade) Requirements

A project consists of a podium type building with a NFPA 13 system on the ground floor and NFPA 13R system protecting the upper residential floors. There is a parapet or combustible building facade at the roof with combustible concealed space within.

**Answer:** From the description, this building does sound like this a podium or pedestal building. The building codes, mainly the International Building Code (IBC) requires the NFPA 13 system below the pedestal top (3-hr horizontal assembly) and allows the upper building to be considered separate. This means, the building on top of the pedestal top is protected according to the standard, in this case, NFPA 13R. If NFPA 13R exempts an area from sprinklers, it is permitted. Nothing in the IBC is going to trigger anything more than NFPA 13R for that structure. The 2019 edition of NFPA 13R (similar language in earlier editions) does not require sprinklers in concealed spaces such as the one described. See Section 6.6.6.



## Question #12 - NFPA 16 vs. NFPA 409 – Sprinkler Temperature Ratings

A Class II aircraft hangar is protected by a NFPA 16 closed-head foam-water system, in accordance with NFPA 409. What should the ceiling sprinkler temperatures be? NFPA 409 7.6.5 and NFPA 16 7.3.7.4 directly contradict on this issue.

**Answer:** As you pointed out the two standards are conflicting in their requirements. NFPA 409 in Section 7.6.5 requires sprinklers with a temperature rating of 175- to 225-degree Fahrenheit while the 2015 edition of NFPA 16 in Section 7.3.7.4 requires sprinklers with a temperature rating of 250 to 300 degree Fahrenheit when located at the roof or ceiling. NFPA



409 would take precedent over the installation Standard (NFPA 16) in this case.

Aircraft hangars are different from almost all other types of structures with regard to fire protection requirements. The NFPA 409 committee was given the right to override any rule from the installation standards that it deems appropriate to provide proper protection for hangars. During the 2010 revision cycle, NFSA proposed clarification of the NFPA 409 rules with respect to sprinkler temperature ratings to better align the installation standards. The proposal was rejected. It was noted that the 409 committee is specifically relying on the results of full-scale tests run by FM Global and only wants to allow the corresponding sprinkler temperature ratings to be used.

## Upcoming NFSA Training

**09/15/20 - Tech Tuesday "Irregular and Nonuniform Hydraulic Areas"**

**10/06/20 - Layout Technician Training Virtual Class**

**10/21/20 - Layout Tech Blended Learning Virtual In Class Practicum**

## 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.

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### National Fire Sprinkler Association

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1-800-683-NFSA (6372)



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Us**