NFSA NATIONAL FIRE SPRINKLER ASSOCIATION
The Voice of the Fire Sprinkler Industry
TechNotes

Editor - Roland Asp, CET | #453 | 12/08/2020

Best of November 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 November 2020. This information is being brought forward as the "Best of November 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.

Question #1 – Overhang with Occupancy Above

Are sprinklers required under an exterior projection of noncombustible construction when there is occupancy above?

This is one of those questions that NFPA 13 does not answer directly. Section 8.15.7 of the 2016 edition of NFPA 13 implies that as long as the overhang is non-combustible and the area below the overhang is not used for storage, that sprinklers are not required. However, in the annex note that accompanies Section 8.15.7.2, there is a statement about sprinklers being considered, in hotels and motels, if the overhang does have occupied space above it. This annex notes goes on to say areas under exterior ceilings should be protected where there is an occupancy above. Since the annex of the standard is not legally enforceable, we would conclude that it would be difficult to force an owner to put sprinklers into every situation where there was occupied space above an overhang. Yet, it is something that every responsible design professional should think about and determine if it is necessary for each individual situation.

It should be noted that that the upcoming 2022 edition will likely add a section that will require porte-cocheres with occupancy above to be protected with sprinklers. This likely change is found in Second Revision # 1057 and reads as follows:

9.2.3.2.1 *Sprinklers shall be required for porte-cocheres that are located directly below floors intended for occupancy.*

It must also be noted that the revision cycle for 2022 edition of NFPA 13 in not complete and the above will not be considered to be part of the standard until it is issued in fall of 2021.

Question #2 – Sauna in NFPA 13D

In a home with a 13D fire sprinkler system, there is to be a sauna. Sprinkler protection is to be provided on the room where the sauna will be located. Would sprinkler protection be required in the new sauna?

Yes, sprinkler protection would be required in the sauna in accordance with Section 8.3.1 of the 2018 edition of NFPA 13D which states that sprinklers must be installed in all areas except when their omission is allowed by Section 8.3.2 through 8.3.8. In this case, a sauna does not meet any of these exceptions and sprinklers must be provided. It must also be noted that saunas, by their design, have elevated temperatures and the temperature rating of the sprinkler must be considered.

The 2019 edition of NFPA 13D in Section 7.5.6.3 (4) states:

Sprinklers installed in saunas and steam rooms where the maximum ambient ceiling temperatures are between 151°F and 225°F (66°C to 107°C) shall be high temperature–rated spray sprinklers.

Question #3 – Strainer on Suction Side of Pump fed from Municipal Water Supply

Rocks and debris have been found in the suction side of the pump on a system fed from the city water main. Are strainers allowed to be installed on the suction side of a horizontal split-case fire pump that is fed from a municipal water supply?

NFPA 20, 2019 edition, Section 4.16.9.2 permits the installation of suction strainers on suction pipe where required by other sections of the standard. Section 6.3.2 for centrifugal pumps indicates where necessary, pipeline strainers shall be provided.

The standard does not appear to provide any additional requirements and no requirement for a centrifugal pump taking suction from a city water supply to be equipped with a suction strainer. It needs to be determined that the suction strainer is required by the standard and is necessary. A suction strainer should not typically be necessary with a connection to a municipal water supply.

It is not recommended that a strainer be installed on the suction side of a fire pump with connection to a municipal water supply as it should not be necessary. Proper flushing of the suction piping and underground city water service in accordance with Section 14.1.1 would eliminate debris and eliminate the need for a suction strainer.

If a suction strainer is deemed to be necessary and/or provided, due to debris in the water supply that would affect the fire pump performance, it needs to be listed for use on a fire protection system, located a minimum of 10 pipe diameters from the fire pump suction, properly sized to account for friction loss, and properly inspected, tested, and maintained in accordance with NFPA 25. This is all required by the standard to ensure the strainer will not restrict or stop the discharge of the fire pump.

Question #4 – Riser-mounted Air Compressor

Section 4.6 of the 2016 edition of NFPA 13 states that "sprinkler system components shall not be used to support nonsprinkler components unless expressly permitted by this standard". Air compressors are not defined as sprinkler system components in Chapter 3 (Section 3.5). Is mounting an air compressor to a dry sprinkler riser pipe permitted?

Yes, it is permitted to mount an air compressor on a dry pipe system riser. Riser mounted compressors are common and are used frequently on small

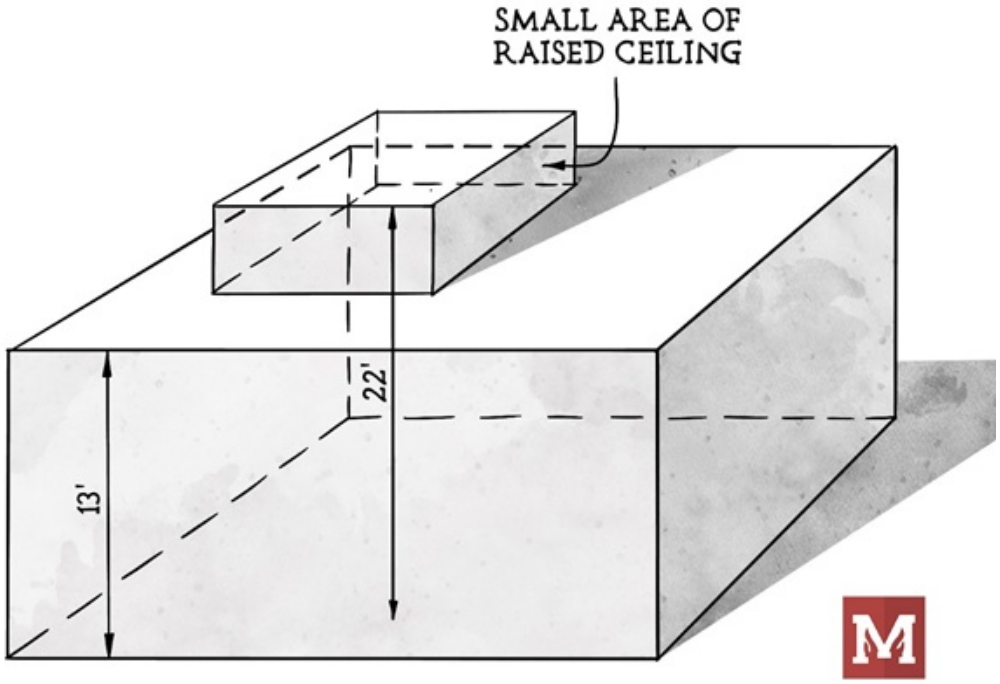
systems where floor space may be limited.

Section 4.6 of NFPA 13 does prohibit the supporting of non-sprinkler system components from the sprinkler system, however, in this case, I would consider an air compressor to be a ”sprinkler system component” and the provisions of Section 4.6 would not be applicable.

Question #5 - Small Raised Ceiling

There is a small, raised ceiling area where the ceiling height is more than 20 feet in a room where the surrounding ceiling heights are 13 feet. There are quick response sprinklers in this area (including the ceiling pocket). As this raised area is minimal would the quick response reduction found in Section 11.2.3.2.3 still apply?

No, NFPA 13, 2016 edition, section 11.2.3.2.3 is only applicable if the maximum ceiling height is less than 20 feet above the finished floor. The design area for the portion of the system with the ceiling height greater than 20 feet cannot use the quick response design area reduction of Section 11.2.3.2.3. Please note that one of the conditions of this section (11.2.3.2.3.1 (3) state that the ceiling height cannot exceed 20 ft.



Question #6 - Hose Connections in NFPA 13

Section 16.15.1.1 of the 2019 edition of NFPA 13 provides installation guidance on installing small 1 ½ inch hose connections. Section 16.15.1.1 states that these hose connections must be installed, "Where required". Who determines when these connections are required, the authority having jurisdiction (AHJ) or NFPA 13? Also, if not required, is NFPA 13 referring to the entire hose line system and piping, or just the lined hose, and not the valved hose connection?

NFPA 13 does not have a requirement to install hose connections at all. The purpose of Section 16.15.1.1 is to provide installation guidance in cases where the AHJ does require that these small hose connections be installed. To answer your second question, NFPA does not have a requirement to install any part of a small hose connection including the pipe and the hose connection itself. This is not limited to hose only. However, if the AHJ does require that small hose connections be installed, section 16.15.1.1.2 (and A.16.15.1.1) does state that the hose line itself is not required "subject to the approval of the authority having jurisdiction".

For a little history on this topic the below is paraphrased from question 12 of **TechNotes # 236**:

In the 2002 and previous editions, hose stations were required for all storage occupancies except for those where the material being stored was Class I-IV and the material was 12 ft or less in height. This rule applied regardless of the kind of sprinklers being used at the ceiling. See section 12.1.3 for the base requirement and Section 12.2.2.1.3 for the exemption for class I-IV commodities stored less than 12 ft in height.

For the 2007 and 2010 editions of NFPA 13, the committee has changed the rule slightly. Section 12.2 only requires the hose station if the Authority Having Jurisdiction specifically says that the hose stations are necessary. The rule was written this way due to concerns by building owners over interpretations of OSHA standards. According to many interpretations of OSHA standards, a building owner has to provide fire fighter training and equipment (including personal protective gear) for everyone that works near a hose connection who is supposed to use the hose to fight a fire. This is an onerous requirement for most building owners. Rather than provide firefighter training to their warehouse employees, the owners are petitioning to get the hose connections removed. The sprinkler committee agrees that it is better to get everyone out of the building and let the sprinkler system do its job. Therefore, the standard has been changed. Now, you really only need the hose stations if the fire department is saying that they need the stations in order to do their job.

Question #7 - Standpipe Flow switch

NFPA 14 2016 Section 5.6.1 - states a standpipe shall be provided with a listed waterflow device. Does this apply to a combined system also? If not, please provide reference stating where it is not required. I have seen some with flow switches and some without.

The requirement for a waterflow device is based on the standpipe type and not whether it is or is not a combined system. Section 5.6.1 requires a waterflow on each standpipe except for manual dry and manual wet standpipe systems. This allows a combined system, consisting of an automatic fire sprinkler and a wet manual standpipe, to be exempt from the requirement of a waterflow device.

Question #8 – ITM Requirements for Limited Area Systems

I was contacted by a local code official who has asked if limited area systems (under 25 sprinklers) are subject to the inspection, testing, and mainteance (ITM) requirements of NFPA 25.

Are limited area systems, as allowed by NFPA 13, subject to ITM requirements of NFPA 25?

NFPA 25 does not directly address limited area systems as allowed by NFPA 13. Depending on how the limited system is installed it may meet the definition of a sprinkler system found in Section 3.6.4 of NFPA 25. To meet this definition, it must have a water supply, control valve, drain, and alarm device. If it does not meet this definition then the authority having jurisdiction would have the final decision on what requirements for inspection, testing, and maintenance would be needed. Also note that even though these systems may not be directly addressed by NFPA 25, it is good practice to ensure that the components installed are properly maintained, NFPA 25 would be the document to determine the correct ITM requirements for each individual component for limited area sprinkler systems. Also note that the *International Fire Code* also states that sprinkler systems shall be tested and maintained in accordance with Section 901.6 which references NFPA 25.

Question #9 – PRV Testing

My question relates to flow testing floor control valves that are pressure reducing valves (PRV) type in a high-rise setting. There is means of testing these devices. Is there a specific flow that needs to be moved through these valves while recording static and residual pressures? A standpipe PRV is tested at 250 gpm at 100 psi, is there something similar for the floor control valves?

NFPA 25 does not require a specific flow requirement when testing pressure reducing valves on floor control valves. There is some text in the NFPA 25 handbook that adds some guidance on testing pressure reducing

valves and essentially says that they should be flowed at approximately system demand and that the outlet pressure should be 10 psi less than what the components are rated for. Section 13.5.1.2 of NFPA 25 only states that inlet and outlet pressures shall be compared to previous tests.

Question #10 – Storage of Idle Wood Pallets above Dock Doors

I have a storage facility with an adjacent dock that will have up to 8 ft. of idle wood pallet storage above the dock doors. They will be stored on a single-row style hanging "rack" with a wire mesh floor. Understanding how to determine the storage height/ceiling height for storage above dock doors from Section 12.12.3.3 (2016 edition of NFPA 13), do I have to consider this pallet storage arrangement to be "on floor" or "on floor or rack without solid shelves" from Table 12.12.1.2(a)?

Is this storage considered to be "on floor" or "on floor or rack without solid shelves" from Table 12.12.1.2(a) if stored on a hanging, single-row rack with wire mesh floor?

The idle pallet storage above the dock doors would be considered on a rack (even though it is only one level) and require use of the "on the floor or rack without solid shelving" row in table 12.12.1.2(a). The handbook commentary on Section 12.12.1.3 indicates when idle wood pallets are stacked on the floor, one of the characteristics that helps to achieve fire control is the collapse of the pallets inward as the fire consumes the pallets low in the pile. The collapse cuts off the flow of oxygen to the burning surfaces and slow down the process by which additional fuel becomes available the fire. But in a rack situation, the rack structure does not allow the collapse of the piles and continues to hold the fuel of the pallets available for combination with oxygen in the air, making it more difficult to fight a fire in a stack of idle wood pallets on a rack structure.

Even though your rack structure is only be one level, it will hold the pallets up and prevent collapse of the pallets inward as is expected when stored directly in a solid pile on the floor.

Question #11 – Using 3,000 sq ft Design Area to Omit Sprinklers in a Concealed Space

We have a manufacturing building constructed with trusses 10 ft. on center with 2x4 wood purlins and a metal roof (typical pole-barn construction). There is a metal ceiling at the bottom cord of the truss thus creating a combustible blind space. The owner is requesting us to omit the dry system for the attic.

Can we use NFPA 13 (2016) Section 11.2.3.1.4 (3) and calculate 3,000 sq. ft. below the ceiling only (thus omitting sprinklers in the attic)?

The adjacent design area increase of 3,000 sq. ft. can be used, however, the area without sprinklers has to be specifically allowed by the standard. Increasing the adjacent design area does not exempt a space from sprinklers.

Sections 8.15.1.2 and 8.15.6 (special situations) allows sprinklers to be omitted. Section 11.2.3.1.4 (3) (water demand) applies an increased area of operation to the areas adjacent to the spaces where sprinklers are omitted. If an area is exempt from sprinklers, the fire load (or chance of) increases, so, an additional demand (in terms of 3,000 sq ft) is put on the system surrounding the exempt area. Some of the exempted areas in 8.15.1.2 and 8.15.6 are also exempt from the 3,000 sq ft area increase, meaning, no increase of 3,000 sq ft to the adjacent area is required.

The sprinkler system in the attic is required and is only exempted from sprinklers if the space meets 8.15.1.2. For example, if the attic is constructed entirely of fire-retardant treated wood, or is filled entirely of non-combustible insulation, etc. it can omit sprinklers. These two examples are also not required to have the adjacent areas increased to 3,000 sq. ft. (see 11.2.3.1.4 (4) (c) and (f)). These spaces do not support combustion or provide significant material to burn uncontrolled, so, they are not expected to burden an adjacent area to the point of overtaxing the system.

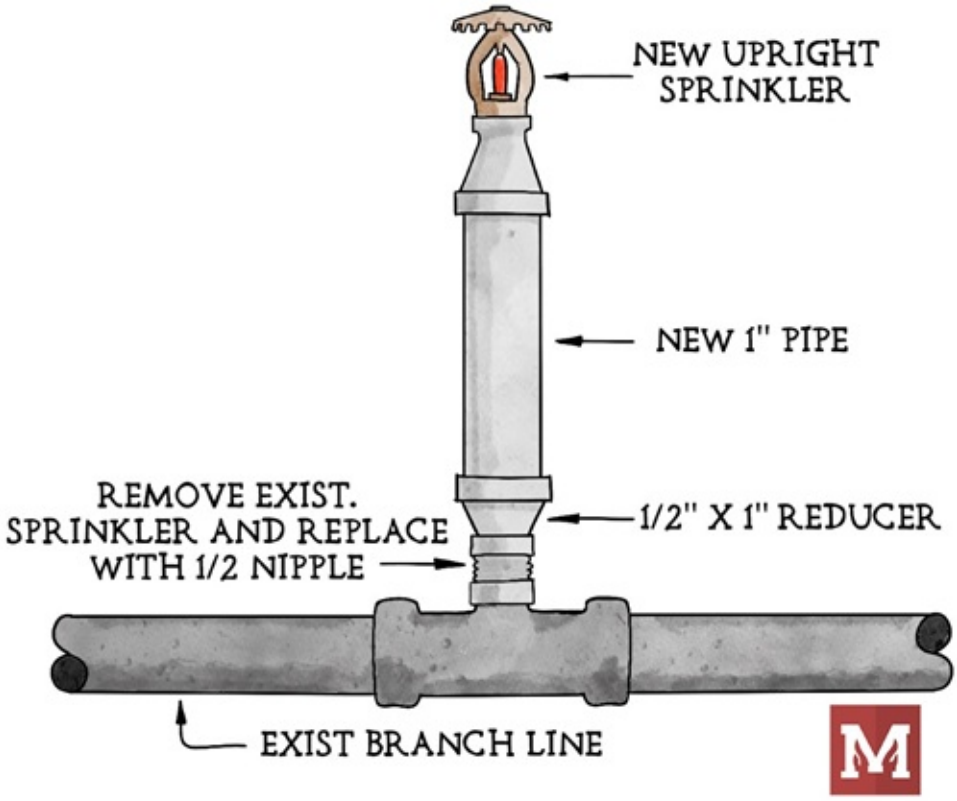
To conclude, the exempt area first has to be permitted and an entire attic is not allowed to be exempt from sprinklers unless some special provisions are made. Increasing the design area may or may not be required, however, nothing in the standard allows the increased design area to exempt a space from sprinklers.

Question #12 – Reusing 1/2" Outlets

Does NFPA-13 (2007) permit us to re-use an existing 1/2 in. outlet (i.e. remove the existing upright head from a tee or elbow), install a 1/2 in. x 1 in. reducer, install a 1 in. sprig (24 in.), and install a new upright head into the sprig?

NFPA 13 8.15.19.4.1 and 8.15.19.5.1 allows for nipples less than 4 inches in length to be installed in branch line fittings less than 1 inch in diameter to be used when revamping pipe schedule systems and hydraulically designed systems. All other piping than the nipple shall be a minimum of 1 inch in diameter in accordance with Section 8.15.19.4.2 It should be noted that pipe nipple less than 1 inch are not permitted in areas subject to earthquakes. See 8.15.19.5.1 and 8.15.19.5.4.

While these sections are specifically for feeding pendent sprinklers under a new ceiling, the concepts are the same and should be permitted. In fact, the charging language simply states: *a nipple not exceeding 4 in. in length shall be permitted to be installed in the branch line fitting.*



Top Tech Competition

NFSA TOP TECH COMPETITION 2021

The 2021 Top Tech Competition will be held in October 2021. The window for testing will open summer 2021. We look forward to your participation. More details will be out soon. Keep studying!

Join the NFSA Team

We are searching for a Fire Protection Engineer to join Team NFSA!

Fire Protection Engineer

This position supports the mission by providing technical services including representation on committees, research of sprinkler system performance, preparing written reports and developing and teaching seminars. Please view the entire position description and apply here: **Fire Protection Engineer**

Position

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
514 Progress Dr, Ste A,
Linthicum Heights, MD 21090
1-800-683-NFSA (6372)

Contact Us