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

TechNotes

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NFSA Wants To Hear From YOU!

Be one of the first to complete the NFSA member survey! I'm happy to share with readers of *Tech Notes* that we are launching a member survey this week that will help us better meet your needs and serve you in ways that make a difference.

NFSA is using the remainder of this year to finetune our strategic plan, incorporating the input provided from members and staff alike. Tim Nolan explains the importance of applied strategic planning in a meaningful way --- *the process by which the guiding members of an organization envision its future and develop the necessary procedures and operations to achieve that future.*

Thank you for taking the time to complete the survey. 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

Click To Participate in Our Survey

TechNotes Issue # 445
August 11, 2020
Best of July 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 July 2020. This information is being brought forward as the "Best of July 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

Upcoming Technical Tuesdays

Coming Up in September

Seismic Protection for Dummies

Sizing Fire Pumps for Sprinkler Contractors

11 Steps of Hydraulic Calculation Review

NFSA is offering all three of the above Tech Tuesdays **free** to members next month! More details coming soon!

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**.

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 -Refrigerated Spaces

Section 8.8 of the 2019 edition of NFPA 13 outlines the rules for refrigerated spaces. What is the definition of "refrigerated spaces" and when are the mains required to be pitched at a minimum of ½ in. per 10 ft? Does this only apply when temperature is maintained below 32°F?

Answer: NFPA 13 does not formalize "refrigerated spaces" in a definition. NFPA 13 Section 8.8.1 does note that the rules found in Section 8.8 do not apply where temperatures are maintained above 32°F in refrigerated spaces. This means that in areas with temperatures above 32°F, mains would have to be pitched at least ¼ in. per 10 ft per Section 16.10.3.1. In spaces maintained at temperatures below 32°F, the rules found in Section 8.8.2 would apply and as noted in Section 8.8.2.3, the sprinkler mains would need to be pitched at least ½ in.per 10 ft, in accordance with Section 16.10.3.3.

Question #2 - Exterior Entry Overhang in NFPA 13R

Do exterior, covered, entry "stoops" that serve a common area need to be protected with sprinklers in accordance with the 2016 edition of NFPA 13R?

Answer: No. NFPA 13R Section 6.6.5 permits sprinklers to be omitted from exterior overhangs that are open and attached including the entry canopies. The handbook commentary on this section indicates that NFPA 13R is concerned with life safety by way of an affordable installation. Open and exterior areas are generally allowed to be unprotected, while still providing an acceptable degree of building protection.

Section 6.6.5.1 does require exterior balconies, decks, and ground floor patios serving dwelling units with a roof or deck above in Type V construction to have sprinkler protection. The handbook commentary explains that this requirement is specific to balconies, decks, and ground floor patios attached directly to a dwelling unit based on concerns of discharged smoking materials and cooking grills.

The described entry canopies would not be classified as a balcony, deck, or ground floor patio and also serve a common hallway/stair and are not directly attached to a dwelling unit. Therefore, the requirements of section 6.6.5.1 are not applicable and sprinkler protection would not be required by NFPA 13R as permitted by section 6.6.5.

Question #3-Using the Fire Pump Rating in Hydraulic Calculations

Are a fire pump's pressure and flow ratings sufficient for the purposes of hydraulic calculations when used independently of a water supply?

Answer: The fire pump rating on its own would not be sufficient to hydraulically calculate a system. The single point of the fire pump rating is only one performance point on a wide range of curves that could be associated with any fire pump of a particular rating. Per NFPA 20, the fire pump performance is to provide no less than 65% of the rated pressure when flowing 150% of the rated capacity and provide no more than 140% of the rated pressure when in the no flow (churn) condition. These three points can be used to estimate the discharge flow and pressure of the fire pump when added to another water supply (municipal waterworks, gravity tank, water tower, etc.), but the final performance of the fire pump needs to be confirmed through flow testing at acceptance.

Question #4 - Interior Platforms

Section 8.15.6 in the 2016 edition of NFPA 13 allows sprinklers to be omitted from the space under ground floors, exterior docks and platforms in certain situations. Does this section apply to interior platforms of combustible construction?

Answer: No. this section applies to exterior platforms only. The space below an interior platform would be considered a concealed space and sprinklers would be permitted to be omitted if one of the conditions the section 8.15.1.2 is met.

The language of this section is not clear that this was intended to apply to exterior platforms only but will be clarified in the 2022 edition of NFPA 13. A first revision was accepted to the next edition of NFPA 13 which will add clarification that this concept will apply to exterior platforms only. First Revision No. 1093 changed the title of this section (Section 9.2.2 in the 2022 edition) to clarify this intent as follows:

> ***9.2.2 Spaces Under Ground Floors, Exterior Docks, and Exterior Platforms***

The committee statement for this change states, "This section applies to exterior spaces, however the way it is currently written with a comma before "and platforms" could be read as applying to all platforms (interior or exterior)". There were no public comments to this proposed change so it is likely that this will be included in the 2022 edition and can be considered a clarification to this section in earlier editions.

Question #5 - Flooded Suction

In practical terms, please define flooded suction as used in NFPA 20? Please clarify the relationship between -3 psi with flooded suction versus 0 psi when non-flooded at the vortex.

Answer: The 2019 edition of NFPA 20 defines flooded suction in Section 3.3.27

> ***3.3.27 Flooded Suction.*** *The condition where water flows from an atmospheric vented source to the pump without the average pressure at the pump inlet flange dropping below atmospheric pressure with the pump operating at 150 percent of its rated capacity.*

A fire pump arrangement would be considered to have a "flooded suction" when it is fed from a water tank open to atmosphere (static pressure other than gravity) and the level of the anti-vortex plate is at or above the elevation of the centerline of the suction flange of the fire pump. This definition might add confusion when applying the requirements of the standard as this definition exists in Chapter 3 but is not present anywhere else in NFPA 20. Where a flooded suction exists, NFPA permits the suction pressure to drop to -3 psi:

> ***4.16.3.2**** *The requirements of 4.16.3.1 shall not apply where the supply is a suction tank with its base at or above the same elevation as the pump, and the gauge pressure at the pump suction flange shall be permitted to drop to -3 psi (−0.2 bar) at 150 percent of rated flow with the lowest water level after the maximum system demand and duration have been supplied.*

The -3 psi allowance accounts for the assumed friction loss in the supply piping from the tank discharge to the fire pump suction flange. Where the conditions of 4.16.3.2 do not exist, the suction pressure is limited to 0 psi. This is explained in the annex note to 4.16.3.2:

> ***A.4.16.3.2*** *It is permitted that the suction pressure drop to -3 psi (-0.2 bar) for a centrifugal pump that is taking suction from a grade level storage tank where the pump suction elevation is at or below the water level in the water storage tank at the end of the required water flow duration. This negative suction pressure is to allow for the friction loss in the suction piping when the pump is operating at 150 percent capacity.*

Question #6-Intermediate Temperature-Rated Sprinklers in Light Hazard

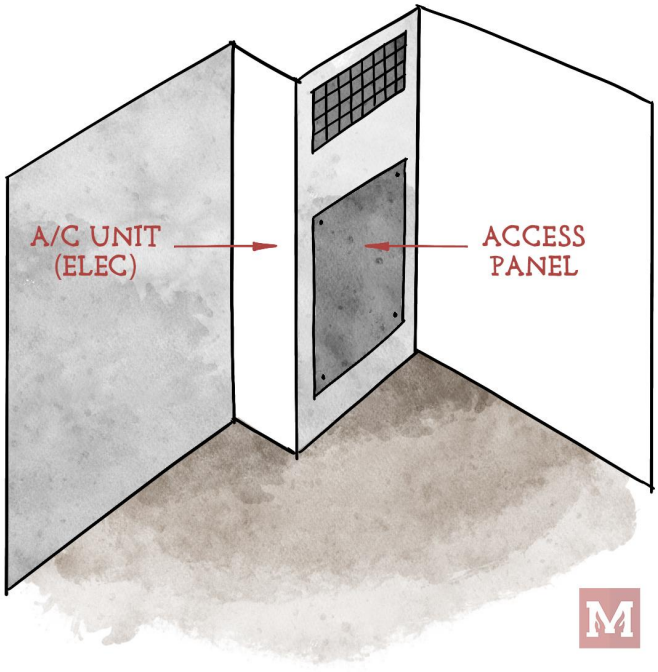
Can intermediate temperature-rated sprinklers be used throughout a light hazard occupancy in accordance the 2010 edition of NFPA 13?

Answer: Yes, NFPA 13, Section 8.3.2.1 permits the use of both ordinary and intermediate temperature sprinklers throughout buildings. This includes light hazard occupancies. The handbook commentary indicates that since the response time of quick response intermediate temperature rated sprinklers is not that different from ordinary temperature rated standard response

sprinklers, the standard now groups ordinary and intermediate temperature rated sprinklers together and allows intermediate temperature sprinklers throughout the building. Please also note that in the 2019 edition Section 9.4.2.1 continues this concept and has added Section A.9.4.2.1 which indicates it is acceptable to install ordinary temperature rated sprinklers, intermediate temperature sprinklers, or a mix or ordinary and intermediate temperature sprinklers throughout a building.

Question #7 -A/C in Concealed Space with Access Panel

A noncombustible enclosure containing an electrical A/C unit was described. This enclosure includes an access panel for maintenance purposes. If considered a concealed space, sprinklers would not be required per the 2016 edition of NFPA 13 Section 8.15.1.2, however, would the presence of the electric A/C unit and access panel mean that sprinklers are now required in this space?



Answer: No.sprinklers would not be required in this A/C enclosure as long as the access panel and the configuration of this space will not allow storage. This concept will be clarified in the 2022 edition of NFPA 13. NFSA submitted a Public Input to clarify this exact concept. During the First Draft stage of the revision cycle to NFPA 13, a first revision (FR-1351) to the Annex of Section 9.2.1.1.2 was accepted that reads as follows:

> ***A.9.2.1.1.2*** *Noncombustible spaces with non-fuel-fired equipment and access panels should be*

considered a concealed space and should not require sprinkler protection.

During the second draft stage, NFSA submitted a public comment to move this concept to the body of the standard and a second revision was accepted (SR-1056) which reads as follows:

9.2.1.2.2 The space shall be considered a concealed space even with non-fueled fired equipment and access panels.*

***A.9.2.1.2.2** Noncombustible and limited-combustible spaces with non-fuel-fired equipment and access panels should be considered a concealed space and should not require sprinkler protection.*

As the revision cycle for the 2022 edition is ongoing, it is not clear which language will end up in the standard (the Second Revision has not yet been voted on) however it is clear the Installation Committee agrees that an enclosure such as described, is a type of concealed space and presence of non-fueled fired equipment and access panels would not add a requirement to provide sprinklers.

Question #8-"Dummy" Cover Plates

An architect has requested that concealed sprinkler cover plates without the sprinkler be added in order to make existing concealed sprinkler heads symmetrical. Are "dummy" cover plates allowed to be installed to make existing sprinkler heads symmetrical?

Answer: No. Using concealed sprinkler cover plates give the appearance of a working fire sprinkler system and the use cover plates for aesthetic reasons are prohibited by several codes and standards. The *International Fire Code* (IFC) specifically calls out false equipment imitating a life safety system as being prohibited in Section 901.4.5.The *NFPA 1 Fire Code* has similar language. The architect should also be aware that the owner is responsible for the system through NFPA 25 and false equipment will be problematic for future inspections.

***901.4.5** Appearance of equipment. Any device that has the physical appearance of life safety or fire protection equipment but that does not perform that life safety or fire protection function shall be prohibited.*

Question #9 -Sprinkler Piping Passing through Stairwell

Regarding sprinkler pipe passing through an interior stairwell in a 2-story building: is it true that sprinkler pipe can only enter the stairwell to provide coverage in that stairwell?

Answer: Yes, but this answer needs further clarification. Standpipes, sprinklers, and combined systems are allowed to be in the stair enclosure and penetrate the stair enclosure to serve the floor(s). This means water-based fire protection piping such as a riser or standpipe is allowed to penetrate the stair enclosure extend through the same stairwell,then penetrate walls, floors, and landings to serve other parts of the building through the stair enclosure, such as a riser serving several floors. What the *International Building Code* (IBC) and NFPA 101 are trying to do is prohibit the stair shaft for being a raceway for nonessential systems and equipment. Where some contractors or layout technicians get in trouble is they will use the stair enclosure as a short cut for continuous branch lines connecting the ceiling system, meaning, the branch line(s)pass through the stair enclosure. This is not permitted by the IBC, Section 1022.5 or NFPA 101,Section 7.1.3. Fire sprinkler piping is specifically called out in NFPA 101 Section 7.1.3.2.1(10)(f). This section permits sprinkler piping to penetrate the stair enclosure and further penetrate the same stairwell walls, floors, and landings to serve other parts of the building, such as a riser serving several floors. Note, these are through-penetrations and are required to be protected with approved firestopping materials and methods.

Question #10 - Room Design Method and Dry System Increase

A dry system is being installed in a room in a highly compartmented building. Is the 30% dry system increase required if the room design method is utilized?

Answer: No. The 30% increase for dry systems is applicable to the density/area method only. The room design method and density/area method are two separate ways to calculate a sprinkler system. The method chosen for a specific project is at the discretion of the sprinkler designer. If the room design method is the desired option, then the 30% increase required by the density/area method is not applicable and only the requirements of the 2019 edition of NFPA 13 Section 19.3.3.3 would apply.

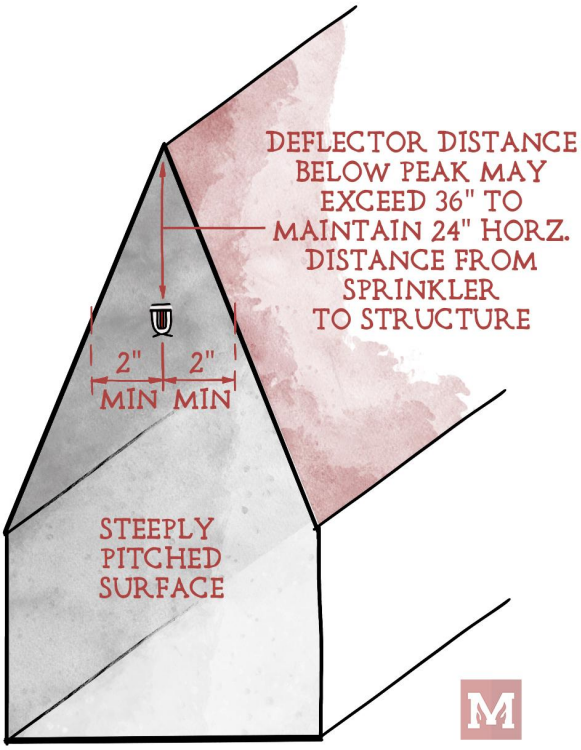
Question #11 - Flow Test for NFPA 13D

Does NFPA 13D require a hydrant flow test to determine the strength of the water supply?

Answer: No. NFPA 13D does not require a water flow test and bases calculations from the static pressure rather than a hydrant flow test. Section 10.1.2 in the 2019 edition of NFPA 13D makes this clear and states that as long as the public water main is at least 4 inches in size, static pressure is acceptable,"...regardless of the method used to determine the adequacy of the piping."

Question #12 - Distance from Peak under Steeply Pitched Ceilings

Section 10.2.6.1.3.3 in the 2019 edition of NFPA 13 states that the distance from the peak to the sprinklers can exceed 36 inches to maintain adequate clearance from the structure. Is there a maximum distance from the peak of the room that the sprinkler can be located?



Answer: No. Section 10.2.6.1.3.3 states that the sprinkler can exceed the 36 in. distance below the peak so that 24 in. clearance to other structural members on each side is met. This will ensure that the spray pattern of the sprinkler is not unduly obstructed. There is no limit to the deflector distance below the peak as is that the steeper the roof is pitched the faster that area will be filled with the hot gasses and the heat will bank down and operate the sprinkler without an unacceptable delay.

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