



TechNotes

Editor - Roland Asp, CET

Issue # 443

July 14, 2020

TechNotes Issue #443 July 14, 2020 Best of June 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 June 2020. This information is being brought forward as the "Best of June 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 - Drain Pipe in a Seismic Zone](#)

[Question #2 - 5-Year Internal Inspections of Dry Systems](#)

[Question #3 - Fire Pump Arrangement for Standpipes with Vertical Zones](#)

[Question #4 - Protection of Car Stackers](#)

[Question #5 - Flow Meter Arrangement for a Diesel Fire Pump](#)

[Question #6 - Code vs. Standard](#)

[Question #7 - Hose Valves in Unprotected Stairs](#)

[Question #8 - Sloped Ceiling Pocket](#)

[Question #9 - Roof Hose Valve Requirements](#)

[Question #10 - Quick Response Sprinkler Reduction for Concealed Spaces](#)

[Question #11 - Protection of Vertical Openings](#)

[Question #12 - Loaded Sprinklers](#)

Question #1 - Drain Pipe in a Seismic Zone

Is a drain pipe that crosses a seismic separation required to be installed with an approved seismic separation assembly if the drain piping in question is after the normally closed drain valve?

Upcoming Technical Tuesdays

July 21, 2020

Sizing Fire Pumps for Sprinkler Contractors

Presented by Mike Joanis,
P.E., Director of Contractor
Services

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](#).



Answer: No. NFPA 13, 2016 edition Section 9.3.3.1 indicates that an approved seismic separation assembly shall be installed where sprinkler piping, regardless of size, crosses building seismic separation joints at ground level and above. This section specifically references sprinkler piping - not all piping. This section would not apply to drain pipe passing across a seismic separation assembly. Conversely, Section 9.3.4.1 indicates clearance shall be provided around all piping extending through walls, floors, platforms, and foundations, including drains, fire department connections, and other auxiliary piping. As such, the drain piping would be required to meet the requirements for the standard for clearance since it is specifically called out in this section of the standard. Finally, Section 9.3.5.1.6 specifically exempts drain piping downstream of the drain valve from the bracing requirements in Section 9.3.5.

Question #2 - 5-Year Internal Inspections of Dry Systems

If multiple dry pipe systems are being inspected in a building, can 5-year inspections be performed on half of the systems with the other half being inspected at the next 5-year interval?

Answer: No. Unlike wet pipe systems, all dry pipe systems are required to have an internal assessment every five years per NFPA 25, 2017 edition. Per NFPA 25-2017:

14.2.1.1 *An assessment of the internal condition of piping shall be conducted at a minimum of every 5 years or in accordance with 14.2.1.2 for the purpose of inspecting for the presence of foreign organic and inorganic material.*

14.2.2* *In buildings having multiple wet pipe systems, every other system shall have an assessment of the internal condition of piping as described in 14.2.1.*

Section 14.2.1.1 states that piping shall have an internal assessment conducted every five years and does not specify a type of system. Section 14.2.2 is the only exception which allows for every other wet pipe system to have an internal assessment every five years.

Question #3 - Fire Pump Arrangement for Standpipes with Vertical Zones

Fire pumps are installed in series to supply two vertical zones of a standpipe system in a fully sprinklered building. The lower zone feeds five standpipes (1,000 gpm demand) and two upper zone are fed from two additional fire pumps installed on the 14th floor of each building. The upper zone fire pumps supply two standpipes each in separate buildings. Is the upper zone fire pump permitted to be rated for 750 gpm to meet the



lower volume demand of the upper zone?

Answer: Yes. Fire pumps are sized to meet the demands downstream and fire pumps installed in series are not required to have the same rated flow. Pumps installed in series must follow the requirements of NFPA 20, 2019 edition Section 4.21.2. Since the fire pump only feeds two standpipes each, the system demand would only require 750 gpm. It should be noted that fire pumps are permitted to perform up to 150% of their rated flow, so a 500 gpm rated fire pump could be appropriate as well to supply a system demand of 750 gpm.

Question #4 - Protection of Car Stackers

For the protection of a parking garage utilizing two-car stackers, does NFPA 13, 2019 edition require protection under the top car or is roof/ceiling protection at Extra Hazard (Group 2) adequate?

Answer: Questions regarding hazard or commodity classification are difficult except in those circumstances where an NFPA committee has specifically addressed the issue. This is especially true because the classification is considered in many states to be the most important aspect of fire protection system design, and an obligation of the responsible design professional. One reason many states require involvement of a responsible design professional is to ensure that the site-specific attributes of the project are recognized and properly addressed, which cannot be accomplished in a generic manner.

In this case, Extra Hazard (Group 2) without sprinklers installed below the top car would be adequate for this two-car stacker given current requirements in NFPA 13.

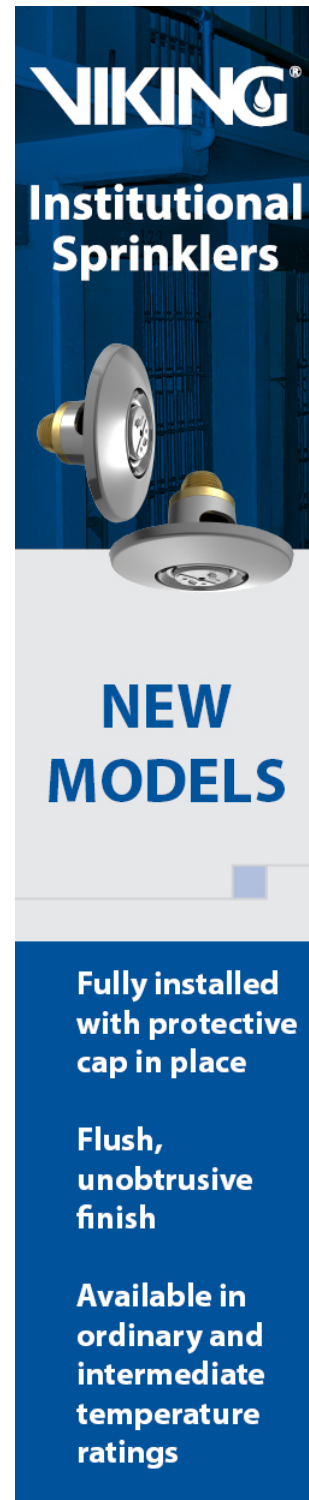
NFPA 13 Section A.4.3.6 provides examples of Extra Hazard (Group 2) occupancies in which "car stackers and car lift systems with two cars stacked vertically" is included as one of the examples. This is mostly due to the extensive shielding, per Section 4.3.6, that is present when a car is parked:

4.3.6* Extra Hazard (Group 2) (EH2). *The following shall be protected with EH2 occupancy criteria in this standard:*

1. *Spaces with very high quantity and combustibility of contents*
2. *Spaces with substantial amounts of combustible or flammable liquids*
3. *Spaces where shielding of combustibles is extensive*

This requirement suggests that the overhead density is sufficient to control and contain a fire for car stacker with up to two cars.

The current revision cycle for the 2022 edition, is



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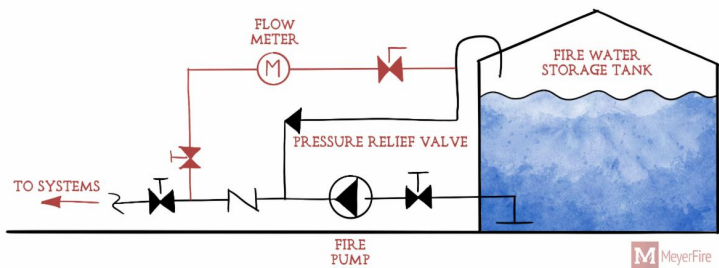
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working with this topic and may provide insight in future editions. There are proposals submitted to NFPA 13 that would specifically allow sidewall sprinkler(s) to protect under cars in lift systems. Providing sprinkler protection under the cars would allow the overhead sprinkler system to be classified separately from the car lift system. Currently, the annex of NFPA 13, suggests that parking garages should be treated as an Ordinary Hazard (Group 1) occupancy. This suggested classification, however, may also be changed in the upcoming edition.

Question #5 - Flow Meter Arrangement for a Diesel Fire Pump

A diesel fire pump is arranged where the pressure relief valve is piped back to a water storage tank with an air gap. The specifications require the fire pump test header to also discharge in the water storage tank. In the proposed arrangement below, the test header will tie into the discharge pipe of the pressure relief valve downstream of the valve.



Is the proposed arrangement acceptable per NFPA 20, 2019 edition?

Answer: Yes. This arrangement is specifically addressed in NFPA 20-2019 Section 4.20.6.4. "Relief valve discharge piping from a single fire pump returning water back to the supply source shall be permitted to be combined with fire pump test piping downstream of any control valve in a manner that complies with 4.20.6, 4.22.2, and 4.22.3." Although this section was added in the 2019 edition, this arrangement should be acceptable in earlier versions due to the equivalency provisions in Section 1.5 of prior editions of the standard.

Question #6 - Code vs. Standard

Does an amended version of the IBC that is adopted by a local jurisdiction take precedence over NFPA 14 for standpipe system pipe sizing design requirements?

Answer: Yes. Standards supplement the code by setting forth conditions or requirements that a material or method must meet, thereby providing an acceptable level of safety for building occupants. When the code has specific requirements that vary from those found in a referenced standard, the requirements of the code take

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precedence over the standard. If the code is silent on a particular issue, then the provisions in the standard are applicable to the prescribed extent of the reference to that standard.

For example, New Jersey amends the 2018 International Building Code (NJ IBC) design requirements for standpipes in Section 905.2.1.2. While NFPA 14-2016 requires a maximum flow rate of 1,250 gpm in nonsprinklered buildings and 1,000 gpm in sprinklered buildings, the NJ IBC requires all common system piping to be sized for a minimum 500 gpm flow with an additional 250 gpm for each additional riser up to a maximum flow of 1,250 gpm with an exception for Group B, I, R-1 and R-2 occupancies to utilize a minimum flow of 250 gpm for common pipe plus 250 gpm for each additional riser, up to a maximum flow of 750 gpm. In this case, the NJ IBC would override the requirements of NFPA 14.

Question #7 - Hose Valves in Unprotected Stairs

An architectural plan shows hose valves on the landings of an exterior exit stair that is only enclosed on two sides. Are hose valves permitted to be installed in this location?

Answer: No. The 2015 International Building Code (IBC) made a change and separated the term "stairway" used in previous editions into the defined terms of exterior exit stairway and interior exit stairway. This is to correlate to the interior (Section 1023) and exterior (Section 1027) stair sections in Chapter 10 of the 2015 IBC. In the code change process to correlate this terminology, the interior exit stairway was added to the standpipe hose connection requirement section in IBC, 905.4 (1). The change in this section went from the 2012 IBC of, "1. In every required stairway..." to the 2015 IBC that states, "1. In every required interior exit stairway..." Because the IBC differentiates between interior and exterior stairs, a strict reading of this section excludes standpipe hose connections on the exterior exit stairs, provided it meets the construction requirements in Section 1027.

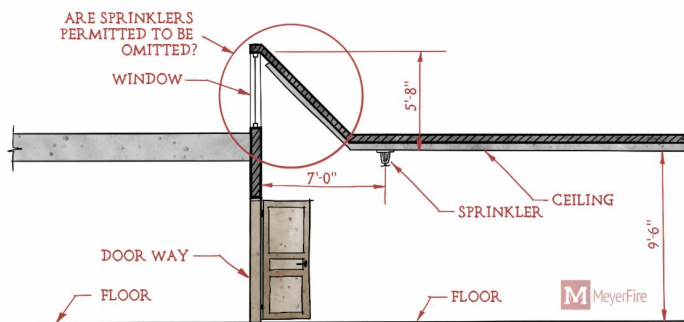
The exterior exit stair has specific open side requirements and is permitted as a means of egress for a five-story building. Clarify with the architect if the exterior stair meets Section 1027. If so, the interior exit stairs will have hose connections on each floor, however, the exterior exit stair will not.

One of the questions that may be raised is the differences between the IBC and the referenced NFPA 14, 2013 edition. Where the IBC, Section 905.4 (1) has hose connections only in interior exit stairs, NFPA 14 Section 7.3.2 handles it differently. NFPA 14 requires hose connections in all exit stairways, similar to how earlier editions of the IBC read. In this case, the IBC has specific hose connection requirements and will overrule the NFPA 14 installation standard.

It is important to note that while the exterior stair is open to the balcony, fire sprinklers are required on the open balcony, corridor, and open stair, per IBC Section 1027.6 (3), this may be different than how NFPA 13 or NFPA 13R handles sprinklers in these areas.

Question #8 - Sloped Ceiling Pocket

If a sprinkler can be installed within 7 ft 0 in. from the wall per the drawing below, is it acceptable to omit sprinkler protection in the sloped portion of the ceiling leading to a window? It should be noted that the deflector distance of a sprinkler located 7 ft 0 in. from the wall would not be within 12 inches of the high point of the ceiling.



Answer: There are two scenarios where sprinklers could be omitted from this ceiling construction according to *NFPA 13, 2016 edition*:

1. If the opening to this sloped architectural feature does not exceed 32 sq. ft, sprinkler protection may be permitted to be omitted per Section 8.5.7. This section is for skylights, and the AHJ would need to be consulted as the configuration of this feature is not typical of skylights.
2. The only other alternative provided to install sprinklers at a greater distance below a ceiling is provided in Section 8.1.1*(6). If calculations or testing demonstrates comparable performance of the sprinklers, then a greater distance from the ceiling could be acceptable.

Question #9 - Roof Hose Valve Requirements

Does a stairway with a roof hatch and ladder qualify as stair access allowing the roof hose connection to be omitted?

Answer: Yes. NFPA 14, 2013 edition Section 7.3.2(5) states that hose connections are required at the highest landing of stairwells equipped with stair access to the roof or on the roof in buildings without access and a slope less than 4 in 12. This section has been debated and applied both ways over the years. The "stair access" found in Section 7.3.2(5) is addressing roof access from a stairwell and not a stairwell leading to the roof. This

issue is explained in NFPA 14, 2019 edition.

7.3.2.7 Hose connections shall be provided at the highest landing of stairways with stairway access to a roof.*

A.7.3.2.7 Access to a roof can be via a stairwell that terminates at the roof level. Access could also be a permanent ladder, permanent ladder rungs, or pull-down stair with a roof hatch.

7.3.2.9 In stairways that do not access the roof, a hose connection shall be provided on the roof.

The standard cites the lack of access in Section 7.3.2.9 and the additional requirement for a hose connection on the roof for this case. Examples of "access" are provided in Section A.7.3.2.7.

Question #10 - Quick Response Sprinkler Reduction for Concealed Spaces

Is an unobstructed combustible concealed space permitted to utilize the quick-response sprinkler area reduction per NFPA 13, 2016 edition Section 11.2.3.2.3?

Answer: Yes. The scenario described meets all five requirements found in NFPA 13 to utilize the design area reduction for quick-response sprinklers.

11.2.3.2.3.1 Where listed quick-response sprinklers, including extended coverage quick-response sprinklers, are used throughout a system or portion of a system having the same hydraulic design basis, the system area of operation shall be permitted to be reduced without revising the density as indicated in Figure 11.2.3.2.3.1 when all of the following conditions are satisfied:

- 1. Wet pipe system*
- 2. Light hazard or ordinary hazard occupancy*
- 3. 20 ft maximum ceiling height*
- 4. No unprotected ceiling pockets as allowed by 8.6.7 and 8.8.7 exceeding 32 ft²*
- 5. No unprotected areas above cloud ceilings as allowed by 8.15.24*

Combustible concealed spaces are typically classified as light or ordinary hazard and as long as the sprinkler system in the combustible concealed space is a wet pipe system and the other requirements are met, the use of Figure 11.2.3.2.3.1 is permitted utilizing the distance from the inside face of the ceiling enclosing the concealed space to the roof deck.

Question #11 - Protection of Vertical Openings



Question 1: Are closely space sprinklers and a draft stop required on the lower level of the attached design based on NFPA 13, 2010 edition Section 8.15.4.4?

Answer: Yes.

Based on the prescriptive requirements of the standard, the building design does not meet the minimum area and spacing requirements for omitting closely spaced sprinklers and draft stops per Section 8.15.4.4, those fire protection features must be installed at openings to all floors adjacent to the vertical opening per Section 8.15.4.1.

8.15.4.1 General. Unless the requirements of 8.15.4.4 are met, where moving stairways, staircases, or similar floor openings are unenclosed and where sprinkler protection is serving as the alternative to enclosure of the vertical opening, the floor openings involved shall be protected by closely spaced sprinklers in combination with draft stops in accordance with 8.15.4.2 and 8.15.4.3.*

8.15.4.4 Large Openings. Closely spaced sprinklers and draft stops are not required around large openings such as those found in shopping malls, atrium buildings, and similar structures where all adjoining levels and spaces are protected by automatic sprinklers in accordance with this standard and where the openings have all horizontal dimensions between opposite edges of 20 ft (6.1 m) or greater and an area of 1000 ft² (93 m²) or greater.

The standard does not specify which floors, so all openings on all floors would need to be included.

Question 2: Can closely spaced sprinklers and draft stops be omitted from the vertical openings on the first floor on the basis that the second floor has full height glass surrounding the openings with window sprinklers installed?

Answer: No.

Because there is still an opening on the first floor, closely spaced sprinklers and draft stops must be installed. Where there is full height glass installed on the second floor, this additional protection can be omitted because

there are no openings.

A case could be made that these fire protection features are not required if the staircase and opening in question would not be required to be enclosed by the building and life safety codes adopted in your jurisdiction if sprinklers were not present. This is explained in the annex:

A.8.15.4.1 *It is the intent of this section to require closely spaced sprinklers and draft stops to openings where protection or enclosure is required by building and life safety codes.*

Question #12 - Loaded Sprinklers

Are there any alternatives to protecting sprinklers susceptible to being loaded with dust in between quarterly inspections?

Answer: No, there are no prescriptive alternatives to protect sprinklers from overloading in high dust areas. NFPA 25, 2017 edition and NFPA 13, 2016 edition only address protective coverings in spray areas and mixing rooms.

A.5.2.2.2.1 *In lieu of replacing sprinklers that are loaded with a coating of dust, it is permitted to clean sprinklers with compressed air or a vacuum, provided that the equipment does not touch the sprinkler*

5.4.1.1 *Where a sprinkler has been removed for any reason, it shall not be reinstalled*

5.4.1.8 *Protective Coverings.*

5.4.1.8.1* *Sprinklers protecting spray areas and mixing rooms in resin application areas installed with protective coverings shall continue to be protected against overspray residue so that they will operate in the event of fire.*

Sprinklers can be cleaned with compressed air or a vacuum as long as the sprinkler is not physically touched. It should also be noted that if a sprinkler is removed for any reason it cannot be reinstalled.

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