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

TechNotes

Editor - Roland Asp, CET #533 04/09/2024

Best of March 2024

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 March 2024. This information is being brought forward as the "Best of March 2024." 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 – Residential Sprinklers in Closets

NFPA 13R, 2010, Section 6.4.6.3.1 states that in closets not larger than 400 cubic feet, a single sprinkler located at the highest ceiling level is sufficient. This section of code does not clarify what type of sprinkler can be used in this scenario. We have a project where residential sidewall sprinklers were installed in small closets with mechanical equipment that does have some obstructions. The inspector is saying that the sidewall sprinkler is not acceptable and a pendent need to be installed. I believe they are incorrect.

Can a sidewall be used in the situation? The code does not specify, pendent, upright or sidewall, it just says "a single sprinkler".

It is acceptable to use sidewall sprinklers to protect closets as you have described.
The idea of allowing a single sprinkler to protect a small closet or enclosure smaller than 400 cubic feet without regard to obstructions is the fact that the flow from a single sprinkler should be sufficient to protect such a small area even when obstructions are present. This section does not limit this protection just to pendent sprinklers. In fact, this same section has been updated in later editions to specifically allow the use of upright, pendent and sidewall sprinklers.

Section 6.4.6.3.2 of the 2022 edition of NFPA 13R allows the protection of a closet or compartment no larger than 400 cubic feet to be protected by pendent upright or sidewall sprinklers either within 18 inches of the ceiling to avoid obstructions or at the highest level without regard to obstructions or minimum distances to walls.

Question #2 – Valve Monitoring on Incoming Service

A backflow preventer is installed outside the building on a combined fire/domestic incoming service pipe. A second backflow preventer is inside the building on the fire service after the split. Do the gate valves for both backflows need to be electronically supervised per IFC 903.4 or NFPA 24?

Yes. The International Fire Code (IFC) – Section 903.4 requires that all valves controlling water supplies for fire sprinkler systems be electrically supervised. This section has a number of exceptions, none of which address backflow prevention devices.

Question #3 – Fire Pumps

Can an existing 1,000 gpm electric fire pump and an existing 1,000 gpm diesel fire pump piped in parallel be used simultaneously to meet a 2,315 gpm hydraulic remote area demand?

Yes, fire pumps may be arranged in parallel to meet the system demand. There is no provision in NFPA 20 that prohibits the use of fire pumps arranged in parallel to meet the system demand and there are several provisions in the standard to address fire pumps arranged in parallel.

The NFPA 20, 2013 edition, Section 4.14.7 addresses suction pipe sizing for multiple pumps. The handbook commentary on this section addresses the scenario where pumps are installed in parallel to meet the system demand.

Section 10.5.2.5 for electric pumps and Section 12.7.2.4 for diesel pumps provides the requirements for sequential starting of fire pumps in parallel.

Section 14.2.6.2.5.1 addresses acceptance testing of pumps in parallel.

Question #4 – Vertical Lift Storage Module Protection

A project for a warehouse addition includes two vertical lift storage modules. The modules are 26 feet tall, enclosed, with a single opening (approx. 11 feet x 3 feet) on one side 3 inches from the bottom.

Are there any criteria for sprinkler protection of an enclosed vertical lift storage module?

Not specifically, no. NFPA 13 does not provide specific criteria for automatic storage and retrieval systems (ASRS) or vertical carousel type storage units. If these enclosures can meet the rack or shelf criteria dictated by NFPA 13 the applicable criteria can be applied but this is often not possible. FM Global Data sheet 8-33 does provide guidance for protection of vertical carousel storage systems and 8-34 provides guidance for ASRS systems. While not typically adopted officially, some authorities having jurisdiction permit FM Global or other available design criteria when the applicable criteria cannot be found in NFPA 13.

Question #5 – HVLS - "approximately" Definition in Inches

2019 NFPA 13 Section 19.2.7 (2) states "The HVLS fan shall be centered approximately between four adjacent sprinklers."

How is "approximately" defined in inches?

The requirement that the fan be centered “approximately” between four sprinklers is not intended to dictate a minimum stance from the fan. The requirement is simply that the fan perimeter is protected evenly. During the testing that dictated these requirements, it was found that the airflow created by the fan made the biggest impact on sprinkler activation. High air flow could displace the heat and activate sprinklers that are not directly over the fire. Having the fan centered between the 4 sprinklers surrounding it ensures that the airflow affects each of the sprinklers in the area equally.

Question #6 - Dry CMDA Systems

Chapter 17 of the 2019 edition of NFPA 13 deals with CMDA sprinklers for storage occupancies.

Can Dry Systems be used for storage occupancies?

Yes. The dry pipe CMDA design criteria will refer back to the general storage chapter for dry pipe systems as outlined in Section 12.5. The CMDA design criteria detailed in Chapter 17 are applicable to wet and dry pipe systems. In contrast, the CMSA criteria in NFPA 13 provide specific guidelines for both wet and dry pipe systems, whereas ESFR is restricted to wet pipe systems only. It has always been our understanding that CMDA systems can be either wet or dry. However, the CMSA specifies separate wet or dry design criteria, with the dry option being limited to less demanding storage configurations. Additionally, ESFR systems do not permit dry configurations.

Question #7 – Inspection Before Cover Up

Can the AHJ require an onsite inspection of sprinkler system during the installation to witness hydrostatic testing and verify attachment locations such as bracing and hangers prior to work being covered up?

Yes, based on Section 104.2 in the 2021 edition of the International Fire Code (IFC), the fire code official is authorized to receive applications, review construction drawings, issue permits, “inspect the premises for which such permits have been issued” to enforce the requirements of the code. Many communities issue a construction permit for the installation of automatic sprinkler systems. The IFC allows and gives the fire code official the authority to conduct inspections to enforce the provisions as part of the permit process.

Also, take a look at IFC Section 108.3. The AHJ can also accept a report via Sections 108.2 and 901.2.1. It is not necessary to witness every test, just the final system acceptance. Meaning, the contractor should do their hydro tests as their systems get covered up but call for the final and aboveground certificate.

Question #8 – Approximate Vertical Spacing

Table 16.3.1.1 in the 2016 edition of NFPA 13 states: “In-rack sprinklers approximate vertical spacing at tier nearest the vertical distance and maximum horizontal spacing.”

How is "approximate" applied when spacing sprinklers vertically when other areas of the standard provide "maximum" vertical distances?

The intent of the standard is that in rack sprinklers be located at the top of a unit load or storage tier (level) and that matches the approximate maximum vertical spacing. NFPA 13, 2016 edition, Table 16.3.1.1 foot note f indicates that Figure 16.3.1.3.1.1(A)(a) through Figure 16.3.1.3.1.1(A)(j), each square represents a storage cube that measures 4 feet to 5 feet (1.2 m to 1.5 m) on a side. Actual load heights can vary from approximately 18 inches to 10 feet (450 mm to 3.0 m). Therefore, there can be one load to six or seven loads between in-rack sprinklers that are spaced 10 feet (3.0 m) apart vertically.

There is no specific guidance on how “approximate” the maximum vertical spacing can be. Factory Mutual indicates testing was conducted with 5 feet unit loads. The intent is to locate the in-rack sprinkler at the top of the unit load closest to the approximate maximum vertical spacing. For example, if the maximum vertical spacing is 10 feet and the top of the unit load is 10 feet 6 inches, this would match the approximate maximum vertical spacing. How much variation in the maximum vertical spacing is not defined by the standard.

The NFSA Engineering & Standards committee has a task group to further address this specific issue and provide additional guidance in the future. Factory Mutual data sheets and engineering staff may currently have additional guidance on how they apply their in-rack sprinkler maximum vertical spacing requirements.

Question #9 – Concealed Space with Small Openings

Are the small openings for return air as described in Section 8.15.1.2.1.1 of the 2016 edition of NFPA 13 considered the same small openings as described in Section 8.15.1.2.1.2 with the size limitations?

The charging subsection (8.15.1.2) contains the rules for concealed spaces without sprinklers, with 8.15.1.2.1 laying out the terms, and exceptions located in Sections 8.15.1.2.1.1-.3. The first subsection, 8.15.1.2.1.1, has been present in the standard for many editions. Sections 8.15.1.2.1.2 and 8.15.1.2.1.3 were added in the 2016 edition.

Specifically addressing the question, yes, these sections apply to 8.15.1.2.1.1 concerning small openings. The 2016 edition introduced these new rules and their application to cloud-type ceilings. The technical committee's response confirms the application, stating that this 2016 change "...more clearly defines small openings in concealed spaces. It defines the maximum sizes of small openings through maximum dimensions and overall percentages of open ceiling area."

Question #10 – Sprinkler Omission for Exterior Glass Vestibule

Can sprinklers be omitted from a small exterior glass entrance vestibule?

No, the entry vestibule does not meet the Section 8.15.7.4 for an open corridor. No, NFPA 13 does not provide a provision to allow sprinkler protection to be omitted based on an engineering evaluation. This would be a building code issue and require a compliance alternative.

There are no provisions in the NFPA 13, 2013 edition, to omit sprinkler protection from a glass entrance vestibule.

There was a second revision (SR-429) accepted to the 2019 edition of NFPA 13 that would

have allowed sprinklers to be omitted in noncombustible or limited combustible vestibules that do not contain combustibles and were 150 square feet or less in area. However, this concept was rejected during a vote at the technical session by a wide majority (427-96) of the NFPA membership who voted at his session. This motion was Certified Amending Motion #13-8. The argument to require sprinkler protection for these vestibules was due to the fact that these vestibules are often in the path of egress, and it would not be possible to keep these spaces clear of combustibles and that these spaces need to be protected.

Question #11 – Hotel Bathroom Sprinkler Omission

Can sprinklers be omitted in hotel bathroom under 55 square feet that is utilizing wood frame construction?

Yes. The consideration of omitting sprinklers in this scenario is contingent upon the type of construction as defined in NFPA 13, which diverges from the classification used in the International Building Code (IBC). NFPA 13 classifies construction types based on the combustibility of the protected space's exposed coverings, denoted as combustible, noncombustible, or limited-combustible, while the IBC classification pertains to the combustibility of the structural components as combustible or noncombustible.

In the case of a Type V (wood-framed) building with gypsum coverings (classified as limited-combustible in NFPA 13) in the bathroom, and with the bathroom being under 55 square feet, an exemption from sprinkler installation applies. A similar provision exists in the IBC under Section 903.3.1.1.2, although it may undergo changes for the 2027 edition.

Question #12 – Basements Without Ceilings

Section 8.2.4 of the 2016 edition of NFPA 13D is titled “Basements Without Ceilings.”

Does this section mean that in basements without finished ceilings (example: a small utility room, laundry room) that residential sprinklers can be installed without regard to "ceiling distance"...within reason.

Section 8.2.4 of the 2016 edition of NFPA 13D is titled “Basements Without Ceilings.”
Does this section mean that in basements without finished ceilings (example: a small utility room, laundry room) that residential sprinklers can be installed without regard to "ceiling distance"...within reason.

Training and Education

Are you interested in presenting at a NFSA conference? The NFSA has one annual conference and several regional conferences a year. This call for presentations will serve as a one-stop shop to fill these conferences. We are looking for speakers who are passionate and knowledgeable about fire sprinklers! The NFSA is seeking individual and panel presentations for fire sprinkler contractors, designers, inspectors, AHJs on:

1. Advocacy and successful solutions for local adoption
2. Solutions for protecting new technologies
3. Research and testing reports
4. Updates on codes and standards

Sign-Up for one of our Layout Technician Pathway Courses

NFSA's newly updated fire sprinkler Layout Technician Pathway (LTP) prepares fire sprinkler layout and design professionals for NICET Levels I & II certifications. It also provides a great refresher for those who have been designing systems but need a comprehensive refresher. Students will receive a hard copy of the recently updated and revised "Layout Book" as well as a copy of the 2022 edition of the NFPA 13 standard.

The LTP consists of two parts. Students must first complete the on-line Part 1: Fundamentals before attending the in-person Part 2: Application session. The 25 self-paced online modules cover everything from "Parts of a Sprinkler" to "Introduction to Fire Sprinkler Calculations." The 3-day in-person instructor-led Part 2: Application class applies the content learned in the previous Fundamentals course. There are four in-person and one virtual session offered in 2023.

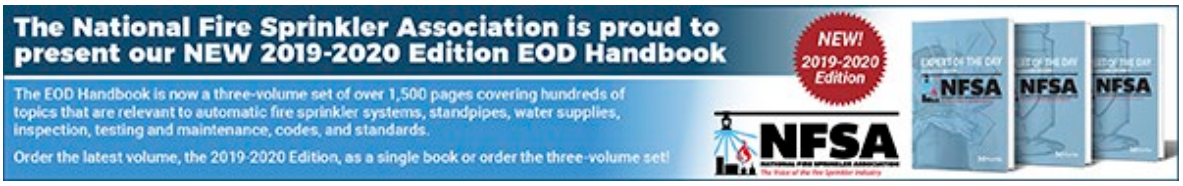
NOTE: Students must register for Part 1: Application at least one month before the start of in-person Part 2: session in order to allow enough time to complete the on-line modules.

Layout Technician Pathway cost:
Members: $2,200.00
Non-members: $4,400.00 – **Join here** to save 50%!

Registration Deadline for Fundamental & Application	Layout Technician: Fundamentals Completion Deadline	Layout Technician: Application Class Dates	Location
23-Apr-24	20-May-24	May 21-23, 2024	TX
1-Jul-24	28-Jul-24	July 29-31, 2024	CO
23-Sep-24	11-Oct-24	October 12-24, 2024	Virtual

Check Out All Options Here

Click Here to See All Learning & Development Opportunities



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

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

National Fire Sprinkler Association
514 Progress Dr. Ste A Linthicum Hts, MD 21090
1-800-683-NFSA (6372)
Manage my Preferences