

Best of October 2021

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 October 2021. This information is being brought forward as the "Best of October 2021." 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.

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Question #1 – Intermediate Sprinklers Throughout a Building

An office building with drop ceilings with horizontal diffusers in the ceilings is to be equipped with a sprinkler system installed in accordance with the 2010 edition of NFPA 13. Section 8.3.2.1. states that ordinary- and intermediate-rated sprinklers must be used throughout. Intermediate sprinklers throughout the building are preferred because if ordinary temperature sprinklers are installed, they may need to be replaced after the duct work goes in creating greater cost.

Can intermediate temp sprinklers be used in place of ordinary sprinkler heads without any reason or justification for a needed temperature increase?

Yes, Intermediate-temperature sprinklers can be used throughout a building (instead of ordinary-temperature sprinklers) without a justification for a needed temperature increase. This is made clear by Section 8.3.2.1 which specifically states that ordinary-and intermediate-temperature

sprinklers must be used throughout buildings.

This section also states that Sections 8.3.2.2, 8.3.2.3, 8.3.2.4 or 8.3.2.5 may require a sprinkler with a higher temperature rating (higher than intermediate).

This allowance has been frequently misunderstood with people believing that ordinary temperature sprinkler must be used unless there was a specific reason to use a higher temperature sprinkler. This is not true and to try to clarify this concept the committee added an annex note (A.9.4.2.1) to the 2019 edition of NFPA 13 which clearly explains that it is acceptable to install the following throughout a building:

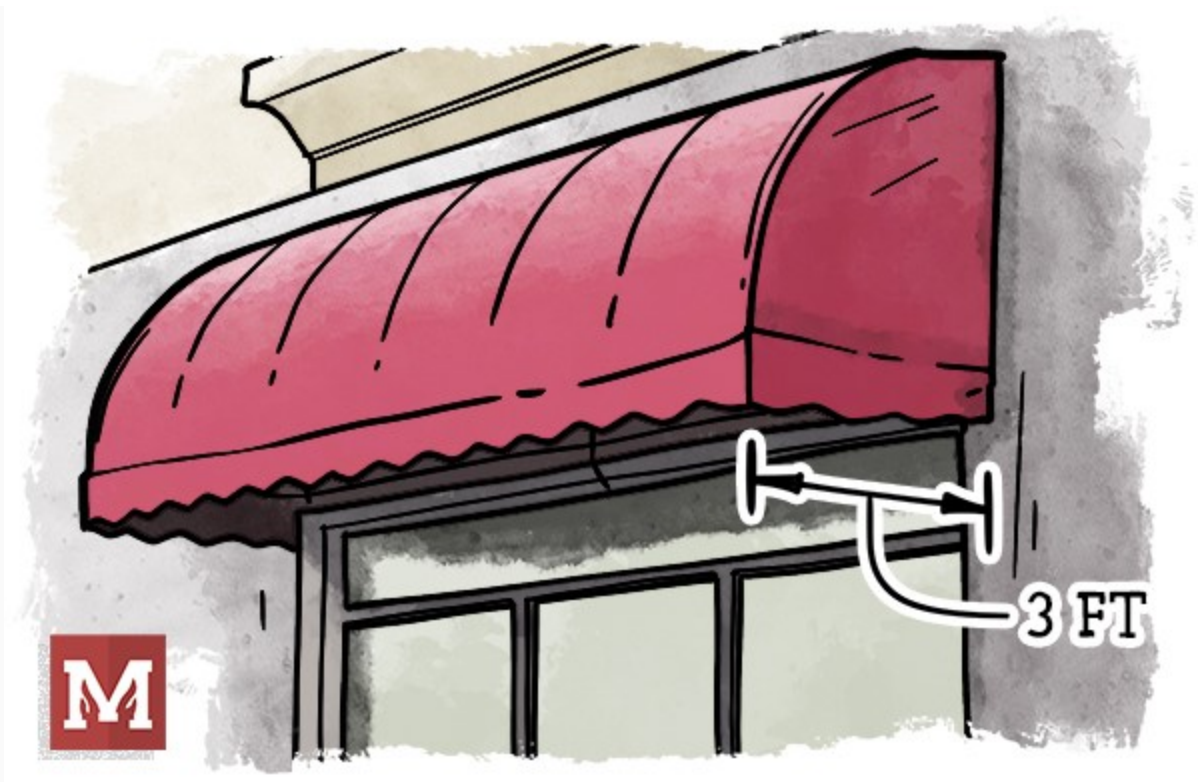
- Ordinary-temperature sprinklers
- Intermediate-temperature sprinklers
- Or a mix of Ordinary-and Intermediate-temperature sprinklers

Question #2 – Combustible Canopy

Can sprinklers be omitted below a combustible fabric canopy that extends 3-ft from the building in accordance with the 2016 edition of NFPA 13?

Yes, sprinklers are not required under a 3-ft wide combustible canopy as long as there is not combustible storage below the canopy. As stated in Section 8.15.7,? sprinkler protection below exterior projections, such as canopies, is only required when the canopy extends more than 4 feet from the building. This requirement is amended however, if there is combustible storage below. In this case, Section 8.15.7.5 states that sprinklers must be installed where there is combustible storage below canopies that extend more than 2-ft.?

As stated in Section 8.15.7.2, if the canopy is wider than 4-ft, sprinklers may be omitted if the exterior canopies is constructed with noncombustible, limited combustible, or fire-retardant treated wood materials. Additionally, this sections also allows sprinklers to be omitted from under projections with a noncombustible, limited-combustible, or fire retardant-treated wood frame with a flame-resistant fabric overlay (meeting test method 2 of NFPA 701).



Question #3 – Obstruction Investigation

During recent 5-year obstruction investigations, scale and/or slime was found in 20% to 30% of the pipe.

At what percentage of scale and/or slime does the 2020 edition of NFPA 25 require flushing of the system?

In accordance with NFPA 25, Section 14.3.3, if enough material is found to obstruct pipe or sprinklers a complete flushing program shall be conducted.

The standard does not specifically say what that amount is; however, annex Section D.3.2 states that more than ½ cup of scale is enough to warrant a flushing program. Note the annex is not enforceable and only provides clarification and additional information. Also Annex D provides great information on how to conduct an obstruction investigation as well as providing information on how to implement a flushing program.

Question #4 – Combination Standpipe – Minimum Size

Section 7.6.2 of the 2016 edition of NFPA 14 states that the minimum size for a standpipe that is part of a combined system in a partially sprinklered building is 6-inches.

Does this mean that a 4-inch standpipe is acceptable for a hydraulically designed combination sprinkler/standpipe system in a fully sprinklered building?

Yes, a 4-in. minimum standpipe pipe is acceptable in fully protected buildings. Section 7.6.2 would not apply to buildings protected throughout by an automatic fire sprinkler system. Minimum standpipe pipe size is 4 in. as stated in Section 7.6.1, and all standpipes that are part of a combined system in partially sprinklered buildings must have a minimum 6 in.

Further, Section 7.6.2.1 allows buildings protected throughout by an approved automatic sprinkler system in accordance with NFPA 13 or NFPA 13R to have a minimum standpipe size of be 4 in. for systems hydraulically designed in accordance with 7.8.1.

The technical committee attempted to better address this in the 2016 edition by adding “where only a portion of the building has sprinkler protection” to Section 7.6.2 and clarifying the exception in Section 7.6.2.1, allowing the 4 in. pipe for systems hydraulically designed in accordance with Section 7.8.1. The substantiation for this public comment was that it reduces confusion on when a riser must be 6 in., and better correlate the relationship between Sections 7.6.2 and 7.6.3.

In the 2019 edition of the standard, the technical committee continued to try to clarify this issue further by again making Sub-Section 7.6.2.1 a stand-alone requirement Section 7.6.3. The committee statement justifying the change was that “AHJs still don’t believe that a standpipe can be 4 in. when the building is sprinklered throughout. Since this is subset under 7.6.2.1, AHJs are not allowing the standpipe to be 4 in. even though the building is sprinklered throughout”. This change was a unanimous decision by the committee.

The standard also allows the water supplies of combined systems in buildings protected throughout in accordance with NFPA 13 and NFPA 13R to be based on the sprinkler demand including hose stream demand or the standpipe demand, whichever is greater (Section 7.10.1.3.1.1). However, in buildings with combined systems and partial sprinkler protection, the flow rates of Section 7.10.1 must be increased by an amount equal to the sprinkler demand or 150gpm for light hazard, or by 500gpm for ordinary hazard occupancies, whichever is less (Section 7.10.1.3.2)



Question #5 - Drain Sizes

Do the drain sizes shown in Table 16.10.4.2 of the 2019 edition of NFPA 13 apply to just system riser and supply mains, or do they apply to feed mains, cross mains, and gridded mains that are not controlled by a sectional valve?

We have always assumed drains for trapped feed, cross and gridded mains shall be sized in accordance with 16.10.5 (auxiliary drains).

Yes, NFPA 13, 2019 edition, Section 16.10.4 applies to the minimum required drain size for sprinkler system main drains or sectional connections associated with a sprinkler system control valve. As noted in Section 16.10.4.2, drain connections for system supply risers and mains shall be sized as shown in Table 16.10.4.2. Section 16.10.4.3 also indicates where an interior sectional or floor control valve(s) are provided, they shall be provided with a drain connection having a minimum size as shown in Table 16.10.4.2 to drain that portion of the system controlled by the sectional valve.

Drains for trapped sections of piping that cannot be drained through the Section 16.10.4 required main drain must be sized in accordance with Section 16.10.5. This is for all types on trapped piping that cannot be drained back to the main drain including feed mains, cross mains, and/or branch lines. Section 16.10.5 is specific to the minimum drain size for auxiliary drains only. Section 16.10.5.1 indicates auxiliary drains are provided where a change in piping direction prevents drainage of system piping through the main drain valve.

Question #6 – Corridor with Single Line of Sprinklers

A project includes a corridor with 10 standard spray sprinklers on a single branch line. It appears that the 2016 edition of NFPA 13 includes two differing sections that may apply to this situation. Section 11.2.3.3.7 states that the calculation must include “up to five sprinklers” and Section 11.2.3.4.2 states that the calculation must include “up to seven sprinklers.”

What is the difference between these sections?

The difference between Section 11.2.3.3.7 and 11.2.3.4.2 is that 11.2.3.3.7 is a subset of the room design method and 11.2.3.4.2 is a subset of a special design area.

Before the specifics of these two methods can be explained, Section 11.2.3.1.1 must be reviewed. This section gives the designer the option of calculated the system in accordance with one of three design approaches:

- Density Area Method per 11.2.3.2
- Room Design Method per 11.2.3.3
- Special Design Method per 11.2.3.4

This decision is at the discretion of the designer but must take into account site specific conditions and the method chosen must be appropriate to the system being designed.

As stated, Section 11.2.3.3.7 is a room design method specific to corridors that are protected by a single line of sprinklers. In order to use this system, the corridor in question must meet the requirements to use the room design method. Per Section 11.2.3.3.1, the corridor in question must be the room that creates the greatest demand. If other rooms in the building would result in a greater demand on the system, that room must be the one calculated. In some cases, the room that creates the greatest demand is so large that it would be advantageous to use the density/area method instead of the room design method. Also, in order to use the room design method, the walls must have a fire resistance rating equal to the required water supply duration (see Section 11.2.3.3.3). Additionally, the openings must be protected in accordance with Section 11.2.3.3.5. If the above criteria are met, then 5 sprinklers may be calculated per 11.2.3.3.7.

Section 11.2.3.4 is a special design method that is typically used for areas such as outside loading docks and certain interior corridors. If these types of areas do not meet the requirements of the room design method and are protected by a single line of sprinklers, then a maximum of seven sprinklers are required to be calculated.



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Question #7 – Two-Car Stacked Parking

The 2016 edition of NFPA 13 in Section A.5.3.1 includes automobile parking as an Ordinary Hazard Group 1 category. Section A.5.4.2 clearly identifies stacked parking (two car high) as an Extra Hazard Group 2 occupancy.

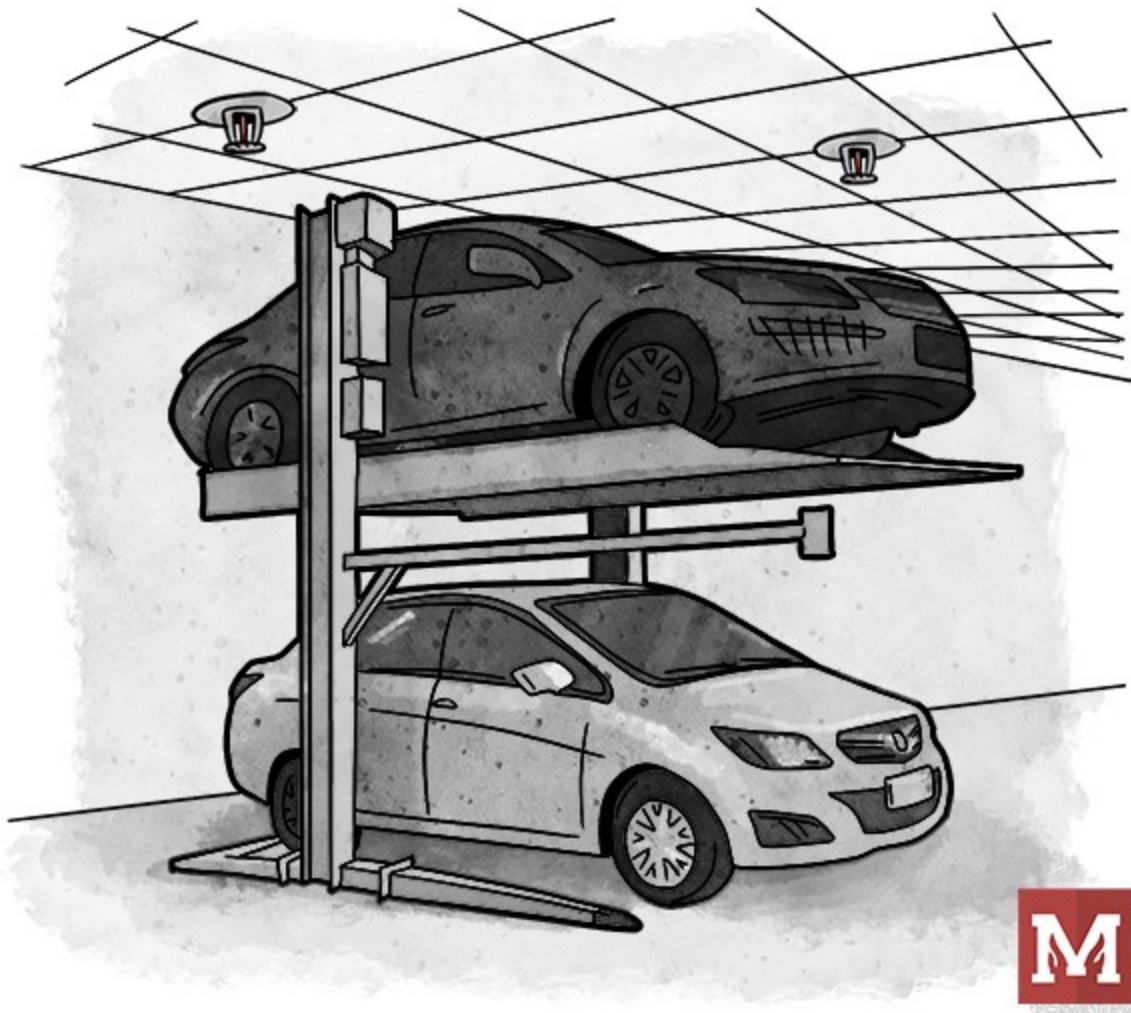
Does this mean that it is not permitted to install sidewall sprinklers under each car in the car stacker and use an Ordinary Hazard Group 1 density for the ceiling level sprinklers?

Not necessarily, but this is not clear in the 2016 edition of NFPA 13. The purpose of suggesting that parking garages with car stackers should be considered an Extra Hazard Group 2 (EH2) occupancy is due to the obstruction caused by the car in the stacker and as stated by Section 5.4.2, Extra Hazard Group 2 criteria is appropriate where “shielding of combustibles is extensive”. Installing sprinklers under the cars in the stacker will serve to avoid the obstructions to the ceiling level sprinklers. Based upon this it would be appropriate to use an Ordinary Hazard Group 1 density for the ceiling level sprinklers.

Although this concept is not clearly stated in the 2016 edition of NFPA 13, the current edition (2022) has clarified this concept.

It must also be noted that in the 2022 edition, the suggested occupancy classification for parking garages was changed from Ordinary Hazard Group 1 to Ordinary Hazard Group 2. This was because cars today are very different from cars in the past. They include much more plastics, plastic fuel tanks and in some cases, lithium-ion batteries. Based upon this, cars today pose a greater fire load than cars in the past and the committee responded by increasing the suggested hazard classification.

The 2022 edition retained the EH2 classification for car stackers (Section A.4.3.5(9) but clarified in Section 10.3.2(9) that sidewall sprinklers are permitted under each level of cars. This section allows sidewall sprinklers to be installed, “Under cars in car stackers...under each level of cars.” The big change here is in the annex note to this Section (A.10.3.2(9)). It allows an Ordinary Group 2 (OH2) for the ceiling system if sidewall sprinklers are installed under the cars, or EH2 at the ceiling without coverage under the cars.



Question #8 – Cloud Ceiling and Residential Sprinklers

In a residential high-rise condominium, the architect is proposing to install a cloud ceiling in a dwelling unit. This cloud ceiling meets the requirements of Section 8.15.24 which allows the sprinklers to be omitted above the cloud ceiling.

Can residential sprinklers be used below the cloud ceiling while omitting sprinklers above the cloud?

No, residential sprinklers are not allowed to be located below a cloud ceiling with no protection above. NFPA 13, 2016 edition, Section 8.15.24 for special situations and cloud ceilings is intended for quick response standard spray or extended coverage sprinklers only and is not applicable to the use of residential sprinklers.

This is noted in Section 8.15.24.2.1 which states that all sprinklers shall be quick response standard spray or extended coverage pendent or upright sprinklers when using the special

situation cloud ceiling rules of Section 8.15.24.? Please note this requirement remains in the 2019 and 2022 editions as well.?

As NFPA 13 does not require the use of residential sprinklers in dwelling units, quick response sprinklers may be used in accordance with Section 8.15.24 to allow sprinklers to be omitted above these clouds.



Question #9 – Seismic Separations for Drain Piping

Section 9.3.3.1 states that sprinkler piping crossing a seismic separation is required to have an approved assembly.

Do drain lines require a seismic separation assembly?

No, as long as the drain piping in question is downstream of the drain valve.

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?drainpipe passing across a seismic separation assembly.

The references used throughout the standard to sprinkler piping refer to pipe that supplies a sprinkler. As such, drain piping is not considered to be sprinkler piping.

In contrast is Section 9.3.4.1 which uses the term “all piping”. This section 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 for would be required to meet the requirements for the standard for clearance.

It should also be noted that Section 9.3.5.1.6 for sway bracing specifically exempts?drain?piping downstream of the?drain?valve.

Question #10 – Roof Above Balcony

Section 903.3.1.2.1 from IBC 2012 requires sprinkler protection above balconies where the building is Type V construction, provided there is a roof or deck above. Since a "roof" is not defined with specific dimensions in IBC, would it be appropriate to apply Section 6.6.5.1 from NFPA 13R 2022 that specifies a roof dimension as greater than 4 ft?

Yes. The change in the 2022 edition of NFPA 13R was made to provide a balcony and roof dimension (greater than 4-ft) for the exterior sprinkler application. When the requirement was first placed in the 2003 International Building Code (IBC) it was with the intent and backed by testing of having a full roof or balcony above.

The 2009 IBC attempted to clarify this with the "roof or deck above" language. However, without a dimension and without a definition of a roof, the application of balcony sprinklers is not uniform. The 2022 NFPA 13R, as well as the 2022 NFPA 13, Section 9.3.20 were changed and correlated for consistent application.



Question #11 – ESFR obstruction rules for Ordinary Hazard Occupancies

An ESFR system installed in an existing warehouse. A new tenant is taking over the building and the new occupancy will be considered to be an ordinary hazard occupancy. We are trying to determine if sprinklers are required beneath a 3 ft. wide solid conveyor installed more than 10 ft. below the overhead sprinklers.

Do the ESFR obstruction rules apply or the obstruction rules for standard systems?

The answer is the standard spray obstruction rules would apply if the AHJ will allow the current edition of NFPA 13 to apply.

This concept was specifically addressed in the 2022 edition of NFPA 13. Section 14.2.7.1.3 in this edition states that in light and ordinary hazard occupancies, ESFR sprinklers are permitted to "...meet the obstruction discharge requirements of 10.2.7.2."

Section 10.2.7.2 is the section for obstructions requirements for standard spray sprinklers. Based

upon this section in the 2022 edition of NFPA 13, sprinklers would not be required under the 3 ft wide conveyor that you have described.

This change to NFPA 13 was accepted by the committee as Second Revision No. 1129 and was based upon Public Comment No. 197 which was submitted by the NFSA.

Although the 2016 edition does not include a similar section, it is suggested that you have a conversation with the AHJ as this new section is considered the consensus of the technical committee that are responsible for NFPA 13.

Question #12 – Standpipe - Stairs vs. Ladder

The 2007 edition states in Section 7.3.2 that hose connections are required to be installed on the roof “where stairways do not access the roof.” In cases where there is stairway access to the roof, this section states that the hose connection may be located on the highest landing of the stairwell instead of the roof.

Can a reasonable argument be made that a permanent ladder constitutes "stair access."?

Yes, a permanent ladder is considered stair “access” to a roof.

NFPA 14 Standard for the Installation of Standpipes and Hose Systems, Section 7.3.2 (5) requires hose connections on the roof where stairways do not have “access” to the roof.

The standard clarified this in the 2013 edition annex explaining acceptable “access” to a roof is from a stairwell, permanent ladder, permanent ladder rungs or a pull-down stair with a roof hatch. (Section A.7.3.2.7)

The International Building Code also has an exception for the roof top hose connection requirement found in Section 1011.12 for buildings without an occupied roof, access shall be permitted to be from an alternate tread device, a ships ladder or permanent ladder.





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