NFSA The Voice of the Fire Sprinkler Industry

TechNotes

Editor-Kenneth E. Isman, P.E. Issue# 297 July 8, 2014

Best of June 2014

This month, we have selected the following “baker’s dozen” (13) questions as the “Best of June 2014” answered by the engineering staff as part of the NFSA’s EOD member assistance program. If you have a question (and you're a member of the NFSA), you can send your question to eod@nfsa.org and we'll answer it as soon as we can.

It should be noted that the following are the opinions of the NFSA Engineering Department staff, generated as members of the relevant NFPA technical committees and through our general experience in writing and interpreting codes and standards. They have not been processed as a formal interpretation in accordance with the NFPA Regulations Governing Committee Projects and should therefore not be considered, nor relied upon, as the official position of the NFPA or its Committees.

Question 1 – Manual Trip for Preaction System

We are installing a single-interlock preaction system with a detection system in the space. Are we also required to have a manual mechanism to trip the preaction valve?

Answer: Yes. Section 7.3.1.2 in NFPA 13, 2013 Edition (similar language in earlier editions) requires all types of preaction systems to have a "hydraulic, pneumatic, or mechanical manual means for operation." This needs to be independent from the detection devices used to automatically operate the system.

Question 2 – Drop Ceiling that Does Not Cover Room

We have a situation in a primarily light hazard building with drop ceilings in most of the rooms, but in some of the small spaces like an electrical room and a janitor’s closet, there is no drop ceiling and the walls don’t go all the way to the deck. So, in these small rooms, the room is open to the concealed space above the drop ceiling in the adjacent rooms. Do we need to sprinkler the whole concealed space or can we use section 8.15.23.3 to only sprinkler the concealed space around the room(s)? Also, if we can use 8.15.23.3, is the “area” for that calculation the area of the room?

Answer: Yes, you can use 8.15.23.3 to protect a portion of the concealed space as long as you extend the sprinkler protection into the concealed space in each direction from the room that creates the opening for the minimum required by that section. In essence, you have the same exact situation as the one shown in Figure A.8.15.23.3 with the right hand side being a mirror image and the same situation rotated 90 degrees. This does not change the logic of the discussion that led to section 8.15.23.3. The logic of the section is that we only expect a fire to grow in one direction for a limited distance. Beyond that, section 23.4.4.1.1.1 says that it is unreasonable to believe that sprinklers will continue to open that far from a

fire when the water from the closer sprinklers is discharging and absorbing the heat. Since it is unreasonable to believe that sprinklers would open from a fire, there is no reason to install the sprinklers. Note that section 8.15.23.3.1 does require that the sprinklers extend at least 24 ft into the concealed space to make sure that the protection does include several sprinklers into the concealed space.

I know that some AHJ's are going to get tripped up by the fact that section 8.15.23.3 talks about the openings only being on one side. But what we meant by that is from the perspective of the concealed space, we only wanted a single opening so that it is clear where the start and stop the measurement and so that it is clear that fire can't get in from another source. In each of the four directions from your room in question the opening to the room is a single opening, so the rule should be applicable. Fire is not going to be coming from another direction.

Once you decide to use section 8.15.23.3, you need to use the design area for the sprinkler system that covers the room (typically 1500 sq ft, but it might need to be modified if you have conditions like a dry-pipe system). You cannot use the area of the room itself since the room design method would be inappropriate with the walls not going all the way to the ceiling.

Question 3 – NFPA 25 and NFPA 13R and 13D Systems

Does NFPA 25 apply to NFPA 13R and NFPA 13D systems?

Answer: NFPA 25 is applicable to NFPA 13R as noted in Section 11.3 of the 2013 Edition (similar text exists in earlier editions). This would include all of the applicable inspections, testing and maintenance.

NFPA 13D does not reference users to NFPA 25. Instead NFPA 13D contains the requirements for inspection, testing and maintenance of this type of system within its own rules. These can be found in Chapter 12 of the 2013 Edition and in earlier chapters of earlier editions.

It should be noted that the scope of NFPA 25 also says that it does not apply to NFPA 13D systems. In the 2014 edition of NFPA 25, the scope was modified slightly to include a few requirements for NFPA 13D systems that have been installed in Board and Care Facilities. Usually, such facilities need system that comply with NFPA 13 or NFPA 13R, but a few small facilities are permitted to be protected with modified NFPA 13D systems in accordance with NFPA 101. For many years, NFPA 101 contained mandatory inspection and testing requirements for these few NFPA 13D systems. In the 2014 edition of NFPA 25, these rules were taken into NFPA 25.

Question 4 – Restraint of Branch Lines on Grids

Is there is any variation on the maximum spacing of restraints along the branch lines for a gridded system (opposed to a tree arrangement)?

Answer: No. The maximum permitted spacing for restraints in Table 9.3.6.4 (a) in NFPA 13, 2013 Edition (similar language in earlier editions) applies to the branch lines for all steel systems - grids, loops, and trees. The difference with a grid is that there are mains on each end of the branch lines. As the main will have sway bracing on it, it is acceptable to go from the main (on each end) up to the maximum distance permitted based on the diameter of pipe for the branch line.

Question 5 – Mechanical Piping in Pump Room

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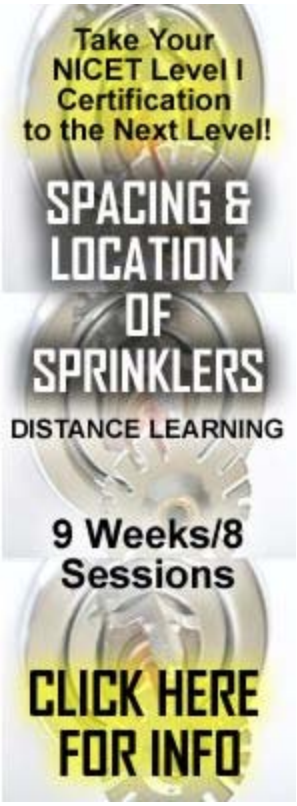

Is mechanical piping permitted to pass through a pump room? Does it make a difference if the piping is above a gypsum ceiling?

Answer: NFPA 20 does not allow any equipment in the pump room other domestic water equipment (see Section 4.12.1.1.4 and 4.12.1.1.5 in the 2013 Edition, similar sections in previous editions). The pump room is required to have either a 1 hour or 2-hour enclosure (depending on the type of building that the pump is installed in) that separates it from the rest of the building. Therefore, if you have met the required rating with the gypsum ceiling, then mechanical system piping could be run above the gypsum ceiling and it would technically not be in the pump room.

Question 6 – Sidewall Sprinklers and Walls

Is a sidewall sprinkler required to be installed on a wall?

Answer: No, not explicitly. However, it is generally implied with the exception of special cases such as under garage doors, installation in soffits, back-to-back sidewalls, under sloped ceilings, etc. The area of coverage of a sidewall sprinkler is defined in part by a hypothetical vertical plane behind the sprinkler. This entire plane need not be entirely coincident with a wall but it is the most typical installation.

Question 7 – Averaging Area Covered by Residential Sprinklers

In a building being protected by an NFPA 13 sprinkler system there is a room that is 26 feet x 12 feet. We propose to protect it with two residential sidewall sprinklers; each protecting 13 feet by 12 feet with the sprinklers each 8 ft from a wall (therefore the sprinklers are being used at their 16 ft x 16 ft spacing). The manufacturer's listed flow for 16 ft x 16 ft spacing is 16 gpm. Are we permitted to apply the "Small Room Rule" in order to calculate the minimum discharge to make the 0.1 gpm per sq ft density? This would create a flow requirement of 15.6 gpm to achieve the 0.10 gpm/sq-ft density (26 feet x 12 feet /2 sprinklers = 156 sq-ft / sprinkler x 0.10 gpm / sq-ft = 15.6 gpm). Since 15.6 gpm is less than the listed flow for the sprinkler, the required discharge for these sprinklers would be 16 gpm in accordance with NFPA 13. Is this correct?

Answer: Yes, you have calculated this correctly assuming that the room meets the definition of a small room.

Question 8 – Accessibility for Sprinklers

We are installing sprinklers in a closet where they will be very difficult to reach due to many obstructions. The AHJ wants us to move the sprinklers down to a much lower elevation where they will be easier to reach, but they will be farther down from the ceiling than allowed by NFPA 13. The AHJ is citing section 8.15.13.3, which requires all sprinklers to be accessible for inspection and maintenance as the reason we have to move our sprinklers. Is the AHJ correct?

Answer: No. Section 8.15.13.3 of NFPA 13 is a subsection of 8.15.13, which only applies to sprinklers inside ductwork and would not apply to a sprinkler installed in a closet. Although it's generally good practice to keep sprinklers accessible for inspection and maintenance, the standards recognize that some sprinklers will not be easy to access.

Question 9 – Obsolete Dry Pipe-Valve Allowed to Stay in Place

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In a situation where a dry-pipe system has been converted into a wet-pipe system, the dry-pipe valve was left in place (but the clapper was removed). Are we required to remove the dry-pipe valve and replace it with an identical length of regular pipe?

Answer: You are not required to remove the valve, but it is required to be identified in some way so that it is obvious that it is no longer functioning as a dry-pipe valve. See section 27.2.3 of NFPA 13. While this section was written for piping and valves that no longer have water flowing through them, the concept is still the same. If you can make the valve unique in some way so that it is obvious that it isn't a dry-pipe valve anymore, you have met the intent of this section. The City of New York used to require that abandoned pipe and valves be painted blue, but when Central started painting their valves blue, that was no longer a unique color.

Question 10 – Omitting Sprinklers from High Ceiling Area

Can section 8.8.4.1.1.4 be used to justify omitting sprinklers from a high ceiling space in a room with two different ceiling elevations?

Answer: No. Section 8.8.4.1.1.4 pertains to the spacing between sprinklers on two different ceiling levels. It does not permit the sprinkler on the upper level to be omitted. Sprinklers will need to be installed at both ceiling levels.

Question 11 – New Chapter 21, Alternative Designs

When using the new designs in Chapter 21, like Table 21.3.1, how do we figure out the number of sprinklers on a branch line? For the situation with six sprinklers, the AHJ is telling us that we have to calculate all six sprinklers on one branch line. Is that correct?

Answer: No. The title of Table 21.3.1 includes the term CMSA sprinklers. This is because all of the sprinklers in this table are CMSA sprinklers.

Section 23.4.4.2.1 provides the procedure for determining the number of CMSA sprinklers to calculate on a branch line. You establish your spacing and then determine 1.2 times the square root of the design area. For example, if you have 6 sprinklers at 14 ft x 14 ft, then your design area is 1176. So to figure out the number of sprinklers on the branch line, you take the square root of 1176 (which is 34.3) and multiply by 1.2, which gets you a distance of 41.2 ft. So, you would end up with 3 or 4 sprinklers on a branch line depending on how close to the wall your first sprinkler is.

Question 12 – Demand for Large Hose

In section 7-1.4 of NFPA 24 (2007 edition) there is a requirement to add "demand for large hose" to the sprinkler demand when a hydrant on a private main has a large (steamer) connection. How much flow is a "demand for large hose" in a light hazard system?

Answer: There really is no such thing as "demand for large hose" therefore, there is no real purpose to this section. This section has been deleted from NFPA 24 in more recent editions.

The original reason that it appeared was a concern that firefighters would take too much water if they had a big outlet, but that fear is not logical. After all, the presence of a large outlet makes no difference. If the fire department wanted to take more water, they could just as easily open two or three 2-1/2 inch outlets as they could one large outlet. The size of the outlet makes no difference.

Did You Know??

The NFSA keeps a member of the Engineering Department staff on duty every business day to answer your technical questions live. We call this the Expert of the Day (EOD) program and it is available to our members by phone, fax, or e-mail. Call us at (845) 878-4200 and press 5, or you can send a fax to (845) 878-4215, or you can e-mail us at eod@nfsa.org. Last year we answered more than 2600 requests for assistance.

All that matters is that NFPA 13 and NFPA 24 only require a set amount of flow as hose stream demand (100 gpm for light hazard). There is no additional hose demand that makes sense, even if the hydrant has large openings.