



e-TechNotes

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Best of September 2012

This month, we have selected the following dozen questions as the “Best of September 2012” answered by the engineering staff as part of the NFSA’s EOD member assistance program. 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. These 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 – Abandoned Equipment

In the “Best of August” issue (September 18, 2012), Question 10 addressed the need to remove old equipment once a new system has been installed. As a portion of that response, you indicated, “There is no requirement in the NFPA or ICC codes and standards to remove old components.” Have you seen sections 26.2.1 through 26.2.3 in the 2010 edition of NFPA 13 and have you seen section 901.4.4 of the International Fire Code?

Answer: One of the dangers of sending out these compilations is that the questions are always asked regarding a specific edition of a standard, and we try and make them more generic for the compilations. This is a situation where the question was asked and answered (correctly) regarding an older edition of the standard, but the situation changed with the publication of the 2010 edition and we missed that when we added it to the “Best of August” issue.

In the 2010 edition of NFPA 13, section 26.2 was added with three subsections and an annex note. The three subsections basically say that abandoned sprinklers, hose valves, hose and alarm devices need to be removed. Abandoned control valves are allowed to stay in place as long as the operating mechanisms are removed. Abandoned pipe and other valves are permitted to stay in place as long as they are “uniquely identified to differentiate them from active system piping and valves.” The annex note goes on to give the justification for this position, which is consistent with the theme of our original response.

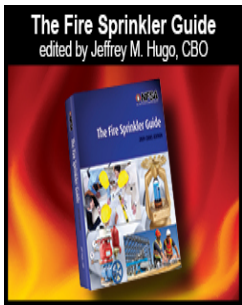
Section 901.4.4 of the International Fire Code (IFC) is interesting to bring into this discussion. This section states that the owner is prohibited from having any device that looks like a fire protection device that does not perform the function of a fire protection device. This section was originally written to outlaw the use of products such as security cameras that look like sprinklers. We had never thought about using this section of the IFC to require the removal of equipment from abandoned fire sprinkler systems, but we have heard from a number of fire protection officials that they do exactly that. If people follow the rules of NFPA 13 as discussed above and remove the sprinklers, hoses, and operating mechanisms of control valves, the resulting pipe and other valves (uniquely identified as different from the operational sprinkler system) would no longer look like a fire sprinkler system, and would presumably be in conformance with the IFC.

Question 2 – Sprinklers at the Bottom of Stairwells



NFPA 13 (section 8.15.3.2.1 in the 2010 edition with similar language in most previous editions) requires a sprinkler to be installed under the “first accessible landing above the bottom of the shaft” where the stairs and shaft are of noncombustible construction. What does this language in quotes really mean? In a stairwell with intermediate landings, is the sprinkler required below the intermediate landing or below the landing at the second level?

Answer: The intent of the section is that the sprinkler be under the first landing up from the bottom. Depending on the arrangement of the stairs, this may be the landing at the second floor level from the bottom (where the stairs run straight from floor to floor with no change in direction) or it may be an intermediate landing (where the stairs change direction so that the stairway has a smaller footprint). As the NFPA’s Automatic Sprinkler System Handbook indicates, “if there is an open space under the first landing or a large landing at the top of the stairs it is often an irresistible location for transient storage.” Therefore, in a stairwell with intermediate landings, the sprinkler would be required below the intermediate landing between the bottom floor and the next floor up. The committee did recently add the word “accessible” to this language to clarify what has always been their intent; if the space under the landing is sealed off with limited combustible or noncombustible construction to form a concealed space, then sprinklers are not required under the landing (which is consistent with the concealed space requirements elsewhere in section 8.15).



Question 3 – Openings in Concealed Spaces

Section 8.15.1.2 in the 2010 edition of NFPA 13 (similar sections in previous editions) allows sprinklers to be omitted from concealed spaces of noncombustible and limited combustible construction. This section goes on to say that these concealed spaces are allowed to have “small openings”. If we have a situation where we have a drop ceiling across most of a room with a small gap where a person standing on the floor can see the floor/ceiling assembly above the drop ceiling, can the space above the drop ceiling be considered a “concealed space” and can sprinklers be omitted from it?

Answer: NFPA 13 does not have a definition of a “concealed space”. When the NFPA does not have a definition for a word, the generally accepted English definitions apply. In general, the concept of “concealed” is defined as being “hidden” or “out of sight”. When you apply this concept to construction spaces, we believe that the term “concealed” should be considered as, “out of sight when viewed from all angles”. Using this philosophy, a definition for a “concealed space” that would be appropriate for use in NFPA 13 and building/fire codes could be developed as follows:

“An area with limited or no access, not intended for building occupant use or storage, that is enclosed on all sides.”

A space that you can see into from the floor is not “concealed” and cannot be considered a “concealed space”. This does not mean that sprinklers are required in the space. The sprinklers can be left out if a calculation or test shows that they will not be needed (see section 8.1.1(6) of NFPA 13). Obviously, this would require a fairly intense engineering evaluation or a significant fire test, but it might be possible. See the article on this subject that appears in the Spring 2002 edition of Sprinkler Quarterly for more information on this subject.

Question 4 – Ceiling Pockets and Residential Sprinklers

We are designing a sprinkler system in accordance with NFPA 13 and protecting a dwelling unit with residential sprinklers (as permitted by section 8.4.5). There are ceiling pockets within the dwelling unit? Are we required to put sprinklers up in the pockets? NFPA 13D and NFPA 13R allow pockets of 100 cubic feet or less to be unsprinklered, what about NFPA 13? Can we use the pocket rules of 8.6.7 or 8.8.7 to omit sprinklers from the pockets?

Answer: In the past, NFPA 13D and NFPA 13R have differed from NFPA 13 in the answer to this question. Starting with the 2010 edition of NFPA 13, section 8.10.8 was added, copying the 100 cubic foot pocket rule from NFPA 13D and NFPA 13R (with the five conditions that need to be met in order to leave the pocket

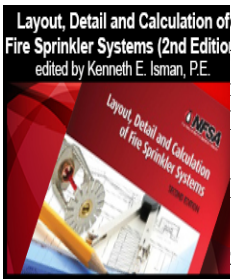
unprotected). The way that this rule is placed in NFPA 13, it applies to both pendent and sidewall residential sprinklers, which makes this the first time that NFPA 13 has allowed a pocket to be unprotected in a room that is protected with any kind of sidewall sprinkler.

In addition to the 100 cubic foot pocket rule discussed above, section 8.5.7 of NFPA 13 allows sprinklers to be omitted from skylights that are up to 32 sq ft in area (even where the skylight has a plastic cover) regardless of the depth of the skylight. Since everything in section 8.5.7 applies to all kinds of sprinklers, this would be applicable to residential sprinklers installed under NFPA 13 as well.

Question 5 – Pipe Extensions

Are pipe extensions (also known as “dog-robbers” and “nipple extensions”) allowed by the NFPA sprinkler standards? If so, are they required to be listed?

Answer: Any device inserted between a fitting and a sprinkler is technically an extension of the piping system and needs to meet the rules for acceptable piping and fittings in the applicable sprinkler standard (Chapter 6 of NFPA 13 and similar sections in NFPA 13R and NFPA 13D). These standards require the extension to be made from specific materials meeting specific national standards. As long as the pipe extension meets or exceeds one of the materials standards contained in NFPA 13 (or NFPA 13R or NFPA 13D), it is not required to be listed. In addition, section 22.4.1.2 of NFPA 13 (similar sections in the other standards) requires that the minimum pipe size be 1-inch nominal for steel pipe and fittings and ¾-inch nominal for copper and plastic. Pipe extensions used between fittings and sprinklers would need to conform to these size restrictions.



In the case where an existing system is being revamped, section 8.15.19.5 allows a piece of steel pipe less than 1-inch in nominal diameter between the sprinkler and the fitting as long as the system is not installed in a seismic zone and the small diameter pipe does not exceed 4 inches in length. Hydraulic calculations need to be performed to make sure that the sprinkler will still flow the correct amount of water at the correct pressure. Equivalent lengths for ½-inch and ¾-inch steel fittings were added to Table 22.4.3.1.1 to make this calculation possible. Pipe extensions that are less than 1-inch in diameter could be permitted by AHJ's in conformance with this set of rules.

Question 6 – Interconnection of Standpipes

Section 7.5.1 of NFPA 14 requires standpipes installed in the same building to be interconnected. The associated annex note says that the interconnection should occur as close to the source of supply(ies) as possible. Is it the intent of NFPA 14 to require the interconnection to be on the same level as the water supply source?

Answer: No. As you point out, the word “should” and “as possible” are in the annex language, which gives the designer some flexibility in locating the interconnection. The intent of the interconnection is to ensure that water supply can service all portions of a system. The quickest and easiest path is usually best for fire protection. Older editions of NFPA 14 stated that the interconnection must be at the bottom of the system (unless the source was at the top and then the interconnection was also required at the top) and the standard was changed to accommodate all kinds of on-site conditions that would not allow for flexibility.

Question 7 – Multiple Adjacent Bathrooms

Each of the sprinkler standards (NFPA 13, NFPA 13R and NFPA 13D) allows sprinklers to be omitted from bathrooms under certain conditions including where the bathroom is 55 sq ft or less. Can a bathroom be divided into separate compartments so that each compartment is less than 55 sq ft and none of the compartments is sprinklered?

Answer: Yes. Each standard contains a definition of a “bathroom” that is sufficiently flexible to include just a

compartment with a toilet, just a compartment with a sink (dedicated to personal hygiene), or just a compartment with a tub or shower. The definition also allows for combinations of these fixtures. As long as each individual portion of the bathroom meets the definition for a “compartment”, then each individual piece is evaluated separately to determine whether it is below 55 sq ft and multiple compartments are permitted to be unsprinklered side-by-side.

Question 8 – Small Room Rule and Standard Response Sprinklers

In order to use the small room rule (sprinklers 9 ft from one wall and/or averaging the area in the room to determine the coverage area of the sprinklers), are quick response sprinklers required?

Answer: Not for renovations or modifications to existing systems. The small room rule is only allowed for light hazard occupancies. Since the 1999 edition of NFPA 13, all new sprinkler systems in light hazard occupancies have been required to have quick response or residential sprinklers. So, for new sprinkler systems, the small room rule only applies to quick response sprinklers (and in one small aspect to residential sprinklers, which is a whole different story). But for renovations or modifications to existing systems, NFPA 13 allows standard response sprinklers to stay in the system, so the small room rule is permitted for these systems. The small room rule has been in NFPA 13 for many more years than the quick response rule and was successfully used with standard response sprinklers for many years prior to 1999 and is permitted to still be used under more recent editions of the standard when those older systems are renovated or modified.

Question 9 – Rods in Seismic Restraint Assemblies

Is a hanger rod used in a seismic restraint assembly in accordance with Section 9.3.6.1(5) limited to a slenderness ratio (l/r) of 300?

Answer: No. Seismic restraint requirements are not intended to be as strict as the bracing requirements. In the 2010 Edition of NFPA 13, the rules were clarified to allow a slenderness ratio up to 400. However, the Committee also discussed that longer lengths could be used if the 45-degree installation of hangers was to both sides of the piping. The issue is that the rod will still exhibit great strength in tension but not in compression. As the length increases the ease of buckling under the load also increases for members that are long and thin. Therefore, there is a limitation on the slenderness ratio for this option, where a hanger is installed to one side of the sprinkler piping.

Question 10 – Water Delivery for Dry Systems and Quick Response Sprinklers in Dwelling Units

We are protecting a dwelling unit in accordance with NFPA 13 using quick response sprinklers in a dry-pipe system. We believe that our water delivery time is permitted to be 60 seconds. The AHJ insists that the water delivery time is 15 seconds. We believe that the 15 second delivery time only applies to residential sprinklers and that it should not apply to us since we are using quick response sprinklers. Who is correct?

Answer: The water delivery time for a dry-pipe system protecting areas within a dwelling unit in accordance with NFPA 13 is 15 seconds regardless of which type of sprinklers are being used (quick response or standard response). Section 7.2.3.6.3 of NFPA 13 does not differentiate between the type of sprinkler.

The goal of building codes that require sprinkler protection in dwelling units is to provide fire protection for the person in the room of fire origin, as long as the person is not intimate with ignition. The use of fire sprinklers is a large part of how the codes meet this level of protection. Consider the person in the room of fire origin (especially if that person is incapable of self-preservation). Given the rapid growth rate of fires in residential occupancies (the heat release rate of a fire increases in relation to time squared), we don't want to expose a person to too large a fire before water arrives. In commercial occupancies, multiple sprinklers can open to speed up water delivery. But in dwelling units, it is common to protect most rooms with a single sprinkler, making it more difficult to get water to the most remote portion of the system quickly. The water delivery time

of the system is not significantly different whether quick response or residential sprinklers are used. The 15 second water delivery time applies to all systems, regardless of the type of sprinkler.

Question 11 – Single-Interlock Preaction Systems and the Quick Response Reduction

We are protecting a light hazard occupancy with a single-interlock preaction system using quick response sprinklers. Can we take the reduction in the design area in accordance with section 11.2.3.2.3 of NFPA 13?

Answer: No. Section 11.2.3.2.3 only allows the reduction in the design area for quick response sprinklers when the sprinkler system is a wet pipe system. A single-interlock preaction system is not a wet pipe system. The two types of systems are defined differently in sections 3.4.9 and 3.4.10 of NFPA 13 (2010 edition, similar definitions in previous editions).

Question 12 – Anchors in Concrete

We are reviewing the recently published 2013 edition of NFPA 13 and we note that the new section 9.3.7.8 requires prequalification for anchors fastening hangers into concrete in seismic areas. Is it the intent to include cast-in-place anchors with the requirements for seismic prequalification?

Answer: No, the Committee has only addressed post-installed anchors because there is a greater potential for loss of strength after an earthquake event due to cracked concrete. Although Section 9.3.7.8 uses the term "concrete anchors", the standard that NFPA 13 refers to specifically includes "post-installed" in the title.

Upcoming NFSA "Technical Tuesday" Seminar – October 23

Topic: *Walkways and Catwalks*
Instructors: *Karl Wiegand E.I.T.*
Date: *Tuesday, October 23, 2012- 10:30 am EST*

Storage facilities can have walkways or catwalks at different elevations throughout the arrangement. There are variations in the field as to the configuration of the walkways and their construction. Sprinkler location around these walkways will be discussed. Also, the hydraulic information for the sprinklers protecting catwalks and walkways will be reviewed.

To register or for more information, click [HERE](#) or contact Michael Repko at (845) 878-4207 or e-mail to seminars@nfsa.org.

Upcoming In-Class Training Seminars

The NFSA training department also offers in-class training on a variety of subjects at locations across the country, and in recognition of the current recession has adopted a new reduced fee structure. Here are some upcoming seminars:

Oct 16-17	Brea, CA	2-Day NFPA 13 Overview
Oct 18	Brea, CA	Plan Review Procedures & Policies
Nov 5-7	Libertyville, IL	3-Day Inspection & Testing for the Sprinkler Industry
Nov 7	Indianapolis, IN	Inspection, Testing & Maintenance for the AHJ
Nov 13-15	Westbury, NY	3-Day Inspection & Testing for the Sprinkler Industry

These seminars qualify for continuing education as required by NICET, and meet mandatory Continuing Education

TECHNICAL TUESDAYS
for the 2nd half of 2012 have been announced

Click to view course descriptions, dates and times and to sign up!

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Requirements for Businesses and Authorities Having Jurisdiction.

To register for these in-class seminars, click [HERE](#). Or contact Michael Repko at (845) 878-4207 or e-mail to seminars@nfsa.org for more information.

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About the National Fire Sprinkler Association

Established in 1905, the National Fire Sprinkler Association (NFSA) is the voice of the fire sprinkler industry. NFSA leads the drive to get life-saving and property protecting fire sprinklers into all buildings; provides support and resources for its members – fire sprinkler contractors, manufacturers and suppliers; and educates authorities having jurisdiction on fire protection issues. Headquartered in Paterson, N.Y., NFSA has regional operations offices throughout the country. www.nfsa.org.

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