



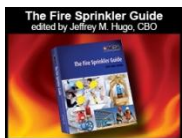
## Best of June 2012

This month, we have selected the following dozen questions as the “Best of June 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 – Internal Inspections

Are sprinkler systems still required to be internally inspected once every five years? If the answer to this question is “yes”, how are contractors in Colorado going to deal with the extra water discharged from the system every time this test occurs given that Colorado appears to be looking toward special rules for the capture and disposal of the water drained from a fire sprinkler system?

**Answer:** Internal inspections are required by NFPA 25 to take place once every five years (see section 14.2.1). Some systems were exempted in the 2011 edition from the requirement to be internally inspected (see section 14.2.1.4 for non-metallic pipe) and section 14.2.1.1 allows alternate methods to be used such as sonic examination, which would not require the system to be drained. The inspection only consists of removing a single sprinkler toward the end of a branch line and a single flushing connection on a main and looking inside to see if there are any obvious problems.



The requirement for the internal inspection should not be viewed as an added requirement for systems to be drained. Even without the internal inspection requirement, sprinkler systems already need to be drained every five years. Section 13.4.1.2 and section 13.4.2.1 each require the internal inspection of the alarm valves and check valves within the system. The only way to do this is to shut the system down and drain it so that the interior of the valves can be inspected. The internal inspections required by Chapter 14 were scheduled to coincide with this time period when the system was already shut down and drained. Therefore, no additional draining of the system is required to meet Chapter 14. If you got rid of Chapter 14, you would still have to shut every system down and drain it every five years to comply with the referenced sections in Chapter 13.

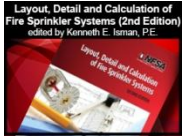
The internal inspection was discussed during the development of the 2011 edition of the standard and it was determined by the committee and the NFPA membership that there is significant value to the inspection due to the “stuff” that is being found when we open some sprinkler systems up. Rocks and all sorts of debris have been found during these internal inspections in fire sprinkler systems, and there is concern that if we don’t find this stuff and get it out, a sprinkler and/or piping will become clogged during a fire and significantly lessen the fire protection that the system will provide.

The NFPA Technical Committee on Inspection, Testing, and Maintenance of Water-Based Systems is already working on the 2014 edition of NFPA 25. At the moment, they have given some agreement to eliminating the internal inspection, but there are still two

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more steps in the revision process where the public can attempt to influence the committee and change what the future standard will say. We are sure that the issue of internal inspections will be addressed again and we anticipate significant justification for the need for this inspection.



We are aware of the difficult time that the fire protection community is having with the environmental enforcers in Colorado. We are opposed to what the environmental enforcers are attempting to do and we have filed comments with the state on the subject. Unfortunately, we have not been very successful in getting our points across. We certainly understand the need to protect our environment. At the same time, we recognize that we need to protect lives and property, while conserving natural resources and preventing the discharge of harsh polluting smoke into the atmosphere. Fire sprinklers save lives and property, conserve water as a resource, and prevent tons of harsh chemicals from being released into the air during a fire. The water in sprinkler systems is not harmful, and there are better ways of dealing with it than having to collect it. Keeping fire sprinkler systems in working order by performing the correct inspections and tests is very important to protecting people, their property, and the environment. We hope that all aspects of enforcement can reach a reasonable conclusion to this issue.

It is always efficient for building owners to minimize the number of times that they drain down a system. If a building owner needs to drain the system down to perform any sort of repair or renovation to the system, they should also think about conducting all of the internal inspection items (including the check valve, alarm valve and pipe inspections) at the time while the system is drained, even if it has been less than five years since the last time these inspections were performed. This moves the next time that these inspection need to be done further down the road and conserves time, effort and resources.

## **Question 2 – Sidewall Sprinklers and Obstructed Construction**

Are sidewall sprinklers permitted to protect a situation with obstructed construction?

**Answer:** No. Sidewall sprinklers are not permitted to be used under obstructed construction. However, there are two exceptions to the rule.

1. The International Building Code specifically overrides the NFPA standards and permits sidewall sprinklers to be installed outside of a building that is protected in accordance with NFPA 13R to protect a balcony or porch. That balcony or porch is allowed to have obstructed construction and the sprinklers are allowed to be installed 1 to 6 inches below the bottom of the structural members as long as they are not more than 14 inches below the deck. See section 903.3.1.2.1 in the International Building Code.
2. The second exception is if sidewall sprinklers are installed in each channel created by the obstructed construction. In this case, each sprinkler has a flat smooth ceiling over it.

## **Question 3 – ESFR Sprinklers and Open Top Containers**

Section 16.3.3.2 (Item 2) states that ESFR protection shall not apply to rack storage involving combustible, open-top cartons or containers. Is a metal or noncombustible container that has an open-top allowed to be protected by ESFR sprinklers?

**Answer:** ESFR sprinklers are not allowed to protect any commodity with open tops. It does not matter whether the commodity is in combustible containers or non-combustible containers. The problem is with the open tops. Regardless of what section 16.3.3.2(2) says about the combustibility of the product, you still have to follow the ESFR tables, and

all of the ESFR tables specifically say “no open top containers.”

The problem with open top containers is that they collect the water discharge from the sprinkler and prevent it from getting down through the storage array. The droplet momentum is completely eliminated as the containers fill up. Yes, eventually the water spills over the container, but then it is later in the fire scenario and the lower tiers are burning more intensely if the water has all been collected at the top.

The 2013 edition of NFPA 13 will clarify that ESFR sprinklers can be used with open top containers if the open top containers are limited to the bottom tier (4 ft high) of storage. That way, if the water collects in the open top containers, it will not be needed for a fire below the commodity, since the commodity is on the floor.

#### **Question 4 – The “Three-Times” Rule and Bar Joist Webs**

Referencing section 8.6.5.2.1.3 in NFPA 13, does the three-times rule apply to the web members of an open steel joist?

**Answer:** Yes, you are required to follow the 3-times rule for the web members of the bar joist or truss. The reason that the distance is not shown in the figure is that the flange tends to be the larger piece and the branch line is typically run through an open part of the “V” in the webbing, so the sprinkler tends to be very far from the web as long as it is spaced in accordance with the 3-times rule and the flange. However, if you have a situation where the sprinkler gets close to the webbing, you are required to follow the 3-times rule. With most webbing being 1-inch or 1.5-inch on most bar joists, keeping the sprinkler 3 inches or 4.5 inches from the webbing (measured in a straight line between the deflector and the actual webbing, not the centerline of the bar joist) is usually pretty easy to do.

#### **Question 5 – Sprinklers in Apartment Closets**

We are designing a sprinkler system for a new 5 story apartment building per NFPA 13-2007. The intent of our design is to eliminate sprinklers from small closets per 21.20.19.2.1, but this appears to contradict section 8.15.8.2, which appears to require sprinklers in small closets in apartments. Which section is correct?

Answer: We’ve addressed this issue a number of times in this “best of” series. All of section 21.20 in the 2007 edition of NFPA 13 was a mistake and should never have been put in the standard. Section 21.20 was not voted on by the NFPA Committee on Sprinkler System Installation Criteria, which is the official group that is supposed to be the group that makes this final decision. Section 21.20 was written by the NFPA Committee on Residential Occupancies for the Life Safety Code (NFPA 101), which has a different performance objective than NFPA 13. The official position of NFPA 13 is expressed by the Committee on Sprinkler System Installation Criteria in section 8.15.8.2, which only allows sprinklers to be omitted from small closets in hotels and motels. Since an apartment building is not a hotel or motel, sprinklers are required.

Since we have published this opinion, we have been challenged to support this position, which is easy to do. While preparing the 2007 edition of NFPA 13, the Committee on Sprinkler System Installation Criteria was specifically asked to expand section 8.15.8.2 to allow sprinklers to be omitted from all dwelling unit closets rather than just hotels and motels (see Proposal 13-316). The committee rejected this proposal with the following statement, “NFPA 13 only allows the omission of sprinklers in hotels and motels due to the transient nature of the occupancy and the limited amount of combustibles in these closets. For property protection purposes, closets in other dwelling units need sprinklers.” All 29 members of the committee responsible for the 2007 edition of the standard that

voted on this issue, agreed with the rejection of this proposal and therefore feel that sprinklers need to be installed in closets in apartments.

Section 21.20 was added to the 2007 edition of the standard by the NFPA Committee on Sprinkler System Discharge Criteria without coordination with the Committee on Sprinkler System Installation Criteria. The proposal that added this text was 13-602 and was six pages long, referencing changes to references to 38 NFPA codes and standards. All six pages of changes were substantiated with the single sentence, "To update the extracted materials from other NFPA documents."

Given the sheer volume of material, it is easy to see where people did not catch the fact that one section was being proposed by one committee that contradicted the work of another committee. Given the fact that the work in section 21.20 was only to "update extracted material", and given that NFPA 101 is not intended to override NFPA 13 when it comes to property protection and the use of NFPA 13 with building and fire codes, the concerns of the Committee on Sprinkler System Installation Committee should prevail and sprinklers should be installed in all closets in apartments.

### **Question 6 – Replacing Sprinklers After a Fire**

After a fire, which sprinklers should be replaced? Should we replace only those sprinklers that opened during the fire or are there others that should be replaced?

**Answer:** It's a good question that NFPA 25 does not answer very well. Section 5.2.1.1.2 of NFPA 25 requires the replacement of any sprinkler with loading or fluid missing from the bulb. So, if products of combustion (soot) have built up on the sprinklers, they will need to be replaced. If they are glass bulb sprinklers, and you notice fluid missing from any of the bulbs (which can happen during a fire, the bulb develops small cracks and the liquid leaks out, but what is left of the bulb has kept the sprinkler closed), then they need to be replaced.

If there is no soot build-up and no sign of fluid leakage, then there is nothing in writing that requires a sprinkler to be replaced. For solder link sprinklers, I'd be pretty comfortable with leaving sprinklers that did not activate. The solder is pretty strong and can handle being heated to a temperature close to its operating temperature without losing significant strength (that's the advantage of the eutectic solders that we use for sprinklers). But for glass bulb sprinklers, I would put in writing a recommendation to replace the sprinklers adjacent to the one that opened, or perhaps even in the compartment of the fire. Glass bulb sprinklers heated close to their operating temperature can develop small fractures in the glass that may go undetected for years, and then they will let go. For the relatively small expense of replacing these sprinklers while the system is already shut down and drained, it is not worth taking the risk that these sprinklers that made it through the fire can continue in service.

Ultimately, it is the owner that needs to make this decision. Whether or not they are willing to take the risk of a sprinkler opening on its own down the road is up to them. From a risk management perspective, it does not seem to be a good idea to leave all of the sprinklers around the one that opened in service, but the owner needs to make that call.

### **Question 7 – Jockey Pumps and Back-Up Power**

Are jockey pumps required to be provided with back-up power supplies when the main fire pump is provided with buck-up power?

**Answer:** There are two different answers to your question depending on which code is being enforced and what type of building the fire pump is installed in. Section 4.25.8 of

NFPA 20 specifically says that jockey pumps are not required to have back-up or standby power. The thought is that these pumps are not necessary for fire protection purposes. If a fire occurs during a power outage, the fire pump will work just fine without the jockey pump. If the power outage lasts a long time and a drop in pressure occurs that is not attributed to a fire, there is no harm done. The main fire pump will start, but that is not a problem from a fire protection perspective.

However, section 11.8.5.2.4 of NFPA 101 states that the standby power supply for a high-rise building has to be connected to the jockey pump (except for some special industrial applications). So, if the building needs to meet the Life Safety Code (NFPA 101) then this overrides NFPA 20 and you have to connect the jockey pump to the secondary power supply.

#### Question 8 – NFPA 24 and “Large Hose Demand”

Section 7.1.4 of the 2007 edition of NFPA 24 says that hydrants on private mains are not allowed to have pumper outlets unless the calculated demand for large hose is added to the attack hose and sprinkler system demands when determining the demand for the fire protection water supply. What are “pumper outlets” and what is the “large hose demand” supposed to be?

**Answer:** Pumper outlets are the outlets on fire hydrants that are bigger than the 2½ inch outlets. They are typically 5-inch in diameter although some are smaller.

The large hose demand is undefined. The concern is that the fire department will connect a large hose to the outlet and start taking more water than is accounted for in the hose stream demand requirements of NFPA 13. However, this concern is unfounded. Just because the outlet is there does not mean that the fire department will be using this outlet at the same time as a fire in a sprinklered building. The outlet might be there just so that the fire department can get a large amount of water when fighting a nearby car fire or brush fire that has nothing to do with the sprinkler demand in a nearby building.

The statement was removed from the 2010 edition of NFPA 24 since it has more to do with fire flow requirements than fire sprinkler system demand calculations.

#### Question 9 – Elevator Machine Rooms

Where sprinklers are being installed in elevator machine rooms, is there a requirement for a separate control valve?

**Answer:** No. It is becoming less and less popular to put sprinkler systems in elevator machine rooms. The 2013 edition of NFPA 13 will allow sprinklers to be omitted from such spaces. But where sprinklers are still being installed in elevator machine rooms, there is no requirement for them to have their own control valve that we are aware of, and we have looked in both NFPA 13 and the National Elevator Code.

#### Question 10: Soffits More Than 30 Inches Wide

Are sprinklers required under all soffits more than 30 inches wide since section 8.6.5.1.2(3) and Figure 8.6.5.1.2(b) are only applicable to soffits up to 30 inches wide?

**Answer:** No. Section 8.6.5.1.2(3) is one option for providing sprinkler protection. Another option is using section 8.6.5.1.2(1) and placing sprinklers with respect to the “beam rule”. If that does not work, then putting sprinklers under the soffit becomes an additional option.

## Question 11 – Pumps in Mechanical Rooms

Is a fire pump permitted to be installed in a basement or mechanical room with other mechanical equipment?

**Answer:** No. Section 4.12.1.1.4 of NFPA 20 prohibits the installation of the pump in a room with other mechanical equipment. The pump needs its own room. Section 4.12.1.1.5 allows some other domestic water stuff in the pump room due to the difficulty in separating that equipment out as the water supply is typically common coming into the building. But that is it. The only equipment in the pump room is supposed to be the equipment essential for the operation of the pump.

## Question 12 – Dry Sprinklers in Concealed Spaces

Are dry sprinklers in inaccessible concealed spaces required to be tested and/or replaced every 10 years?

Answer: Yes, there is no exception in NFPA 25 for sprinklers in inaccessible spaces. Due to the nature of the space, we can see where the sprinkler might not be exposed to a harsh environment, and a local authority might grant a variance that allows the owner to not test the sprinklers. But there is no specific exception in NFPA 25 other than the general equivalency statement that allows alternate maintenance schedules when evidence can be submitted showing that the level of safety envisioned by the standard is being met.

## Upcoming NFSA “Technical Tuesday” Seminar – July 10

*Topic: Protection of Vertical Spaces*

*Instructors: Karl Wiegand*

*Date: Tuesday, July 24, 2012- 10:30 am EST*

Many buildings have features that take up little floor area but would have significant impact on a fire due to their vertical alignment. Examples of these spaces are vertical shafts, stairways, and elevator hoistways. This seminar will discuss how those types of areas need to be protected, including where sprinklers are permitted to be omitted. In addition, how to handle vertical openings in a structure will be examined.

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

## Layout Technician Training Course (2-week course)

*Fishkill, NY – October 8-19, 2012*

For more information, contact Nicole Sprague using [Sprague@nfsa.org](mailto:Sprague@nfsa.org) or by calling 845-878-4200 ext. 149 or click [HERE](#).

## 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:

July 24	Mashantucket, CT	Plan Review Procedures & Policies
July 24	Westminster, CO	Sprinkler Installation Requirements
July 25	Westminster, CO	Fire Service Mains & Their Appurtenances

*These seminars qualify for continuing education as required by NICET, and meet mandatory Continuing Education 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](mailto: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 Patterson, N.Y., NFSA has regional operations offices throughout the country. [www.nfsa.org](http://www.nfsa.org).*

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