



**Tuesday e-Tech Alert**  
**March 4, 2008**  
**Number 109**

**Best Questions of February 2008**

We have selected the following questions as the “Best of February 2008” answered by the engineering staff as part of the NFSA’s EOD member assistance program:

**Question 1 – Defining a System for NFPA 25 Obstruction Inspections**

I need some help in clarifying what is required to comply with the code’s intent for an obstruction investigation for a multi-story building with standpipes and floor zone connections. Section 14.2.1 of NFPA 25 requires an inspection of piping and branch line conditions to be conducted every 5 years by opening a flushing connection at the end of one main and by removing a sprinkler toward the end of one branch line for the purpose of inspecting for the presence of foreign organic and inorganic material. Is it required to do the above inspection on every floor zone connection? Is each floor a separate system?

**Answer:** The correct answer is that the floor zones “can be” separate systems, but they don’t have to be. In most cases in which individual floor have a flow alarm and shut-off valve, they can be considered separate systems. Many high rise buildings are retrofitted a floor at a time, which indicates that some floors have a sprinkler system and some do not. However, even with floor control valves and alarms, if the common piping has a control valve and flow alarm then the floor alarms and valves could technically be considered sectional in nature. Ultimately the Authority Having Jurisdiction (AHJ) would decide for purposes of applying the NFPA 25 5-year inspection and similar requirements.

**Question 2 – Pressure Drops in Hydrostatic Test with No Leaks**

We are having a problem with a 200 psi hydrostatic test on a condo project. The problem is that we are losing about 5 psi even though there are no visible leaks. We think the pressure losses are due to fluctuations in temperature on the floors, like when someone opens the corridor doors and lets the cold air in from the from outside. Is there any fluctuation allowance in NFPA 13 that takes this into account?

**Answer:** The purpose of the hydrostatic test is to guarantee the integrity of the system. In other words, the purpose is to find leaks if they exist, not to make sure that a needle on a gauge stays in one place for two hours. The laws of physics cannot be suspended for those two hours. Both water and air change density with temperature, which affects system pressure in a closed system. Also, some pipe and fitting materials will slightly expand under pressure. This expansion will also result in a small drop in pressure. With large systems, a tiny expansion across the entire surface area of the pipe will cause a noticeable drop in pressure. This does not mean that

anything is wrong or that the pipe is leaking. The AHJ needs to be reasonable in the application of the hydrostatic test rules. Ultimately, the purpose of the test is to prove that there are no leaks. If the pressure drops 5 psi during the first part of a 2-hour test and then remains constant after that, you can be assured that there are no leaks, since the pressure would continue to drop if there was a leak. The entire piping system may need to be inspected with the AHJ to verify that there are no leaks.

### **Question 3 – Multiple-Orifice Test Manifolds for Calculated Dry Pipe Systems**

Now that NFPA 13 - 2007 allows either the use of a listed calculation program or the physical construction of a multiple-orifice test manifold using the same criteria of Table 7.2.3.6.1, is it appropriate to construct the multiple-orifice test manifold when multiple-orifice activation criteria are used? For example, if the 40-second limit is used to simulate 4 sprinklers initially opening with high-piled storage, should a 4-sprinkler test manifold be built at the most remote point of the system?

**Answer:** There is no requirement that the multiple-orifice test manifold be constructed. A regular test connection is needed per Section 8.17.4.3. This permits observation of any changes in the time needed to deliver water to the inspector's test connection, as would be used to trigger an obstruction investigation in accordance with NFPA 25. However, it should be recognized that an AHJ intent on obtaining physical confirmation of the calculation may be able to insist on the construction of the multiple orifice test manifold. In this regard the situation is similar to the "bucket test" required by some AHJs during commissioning of an NFPA 13D system. Since NFPA 13D requires a single-sprinkler calculation, these AHJs require that the flow be collected from the most remote sprinkler on the system for a certain period of time, and checked against the calculations. It is not a requirement of NFPA 13D, but has become standard practice in some jurisdictions.

### **Question 4 – Seismic Bracing for Pipe Stands**

Is there any guidance or direction for seismic consideration of pipe stands? We have a job in California where we will be utilizing pipe stands to support the sprinkler pipe protecting transformers and other outside equipment. These pipe stands may be 6 to 12 feet high.

**Answer:** There are no specific guidelines for seismic bracing of pipe stands. NFPA 15 does have some guidance on sizing of pipe stands, but refers the user to NFPA 13 for all seismic requirements. The procedures involved would be similar to those used for sprinkler mains in NFPA 13. However, instead of braces extending at angles greater than 30 degrees from vertical toward the roof structure, they would likely extend at angles greater than 30 degrees from vertical toward anchorage points at ground level. The fastener load tables from NFPA 13 would be applicable to points of anchorage. Another resource would be to check with the insurance carrier for the project. They may have dealt with this situation before and have more specific guidelines to follow.

### **Question 5 – Piping Hung from Piping**

We have a situation where we want to hang 1-inch pipe under our own 2-inch Schedule 10 pipe. Can we use swivel ring to swivel ring hangers to hang the 1-inch pipe from the 2-inch pipe?

**Answer:** Yes, piping can be hung from other sprinkler system piping. Annex section A.9.1.1.7 of NFPA 13 (2007 edition) states "...NFPA 13 provides the option to support sprinkler piping from other sprinkler piping where the requirements of 9.1.1.2 are met." Section 9.1.1.2 contains the performance requirements for a hanger. Therefore it must be verified that the structure and the hangers can support the weight of both piping runs. If traditional ring (as noted in your description) to not meet the necessary loads for your scenario, then you may want to look into "heavy duty rings" that are produced by a couple of the manufacturers so that the ring size fits appropriately on the pipe but can suspend heavier loads.

### **Question 6 – Small Areas of Higher Hazard**

We are concerned with the protection of "overstuff" couches and chairs at our moving and storage warehouse. The fire department has indicated they want us to store these items in a cartoned condition. As you can imagine, it is not possible or logical for a moving and storage company to stock the wide variety of shapes and sizes of cartons that would be needed to accommodate every type of couch or chair coming in the door with our household storage shipments. None of the carton suppliers we contacted stock these kinds of items in our area. We had pad-wrapped the overstuff as an alternative. It is standard industry practice to store the overstuff that comes with each customer's household shipment in a stretch-wrapped condition on what is called the overstuff rack. The overstuff in our warehouse is a very small percentage of the overall square footage and volume. When one considers it is usually only the cushion part of an overstuff article that contains the foam and thus warrants the hazardous classification, that percentage of a percentage gets smaller yet. Our question has to do with interpretation of the code when these articles occupy such a small part of the overall storage shipments in our warehouse. By square footage, overstuff items occupy less than three percent of our total space. If we look at volume, the cushion part of the overstuff storage is under one percent of the total space. Does an item occupying such a small percentage govern the total sprinkler requirements and manner in which they are stored? Are we allowed any flexibility in how we handle and store these items when they are not the dominant storage article?

**Answer:** It is always difficult to deal with a small quantity of a hazardous commodity. While you may feel that this is a small percentage of your total warehouse, the reality is that a fire in this area has the potential to spread heat throughout your facility and do tremendous damage. If the sprinkler system can't put out enough water to absorb the heat, the fire will damage the structural members and potentially collapse the building. Chapter 5 of NFPA 13 gives three options for dealing with situations where there is a small quantity of a more hazardous commodity:

- 1) You can protect the whole building for the more hazardous commodity.
- 2) You can segregate the building and protect the area over the more hazardous commodity for that commodity and protect the rest of the building for the less hazardous commodity. There is no physical separation required for this segregation. However, if there is no physical separation, you need to extend the higher hazard protection at least 15 ft into the area of the lower hazard.
- 3) You are allowed to have a few pallet loads of the higher hazard commodity (5 or 10 in each 40,000 sq ft of warehouse depending on what the commodity is and how the sprinkler system is designed) in a space protected for a lower hazard if you randomly space the pallet loads around the building so that no two higher hazard pallet loads are next to each other.

For your situation, option 2 is probably the best choice. Keep your overstuff racks close to the water supply (system riser) where the sprinklers can discharge more water at higher pressures. Either put a wall up around the overstuff racks or design the sprinkler system to discharge the higher densities for 15 ft into the rest of the warehouse.

Option 3 might also work if you consider a single piece of furniture like a pallet load, but you would not be able to put any of those pieces next to each other. You would need to spread them around the warehouse so that if a fire started with one, it would not directly spread to an adjacent one.

### **Question 7 – Extended Spacing for Aircraft Hangars in NFPA 409**

NFPA 409 (2004) 6.2.2.3 states... "The maximum distance between sprinklers either on branch lines or between branch lines shall be 3.7 m (12 ft). Is it reasonable to assume that in bays 25 ft wide that a spacing of 12 ft 6 in would be allowed as it is for Extra Hazard and High Piled storage in NFPA 13?"

**Answer:** No. To begin with, Section 6.2.2.1 of NFPA 409 states that the installation must be in accordance with the applicable sections of NFPA 13 and NFPA 16 AND this standard. This indicates that the spacing requirements are an override of NFPA 13. Also, the maximum spacing per sprinkler is different. NFPA 409 allows 130 sq ft per sprinkler but NFPA 13 only permits 100 sq ft per sprinkler for extra hazard.

However, we should also point out that all the NFPA standards allow for equivalent safety levels to be employed as long as the authority having jurisdiction approves the arrangement or a registered professional engineer deems the fire protection scheme equivalent. In other words, it may be judged a reasonable arrangement depending on the use of the space and protection levels provided.

### **Question 8 – Spare Dry Sprinklers**

We are having issues with the intention of NFPA 13 spare heads in respect to dry sprinklers. We have several projects for which the local authorities have been requiring a spare of each type of dry sprinkler based on temperature rating and length. We understand that it is very important to have spare sprinklers to put the system back into service quickly but this requirement has some far reaching implications for area that install a lot of dry sprinklers. On some projects we have 10 or more dry sprinklers. To have a spare of each length at a cost of about \$50 each seems a bit extreme. Most owners do not even want 10 spare dry sprinklers in their way. Of course we want to be in compliance with NFPA but wonder if this is truly the intention of NFPA's spare sprinkler rules. Is this necessary?

**Answer:** No. Section 6.2.9.4 of NFPA 13, 2007 Edition (similar text is in previous editions) states, "Where dry sprinkler of different lengths are installed, spare dry sprinklers shall not be required, provided that a means of returning the system to service is furnished." This means that exact replacements do not need to be kept on the premises, but there needs to be a plan for replacing the sprinklers so that the system is not impaired longer than necessary in the event of sprinkler activation or damage.

### **Question 9 – Public Water Supply vs. Unlisted Pumps**

If a water supply is considered "public" and meets the requirements of federal and state government but happens to be a well, does the well pump then have to comply with NFPA 20? The well is question is actually (2) wells that combine to provide water for both domestic service and fire protection. The water supply is adequate in both flow and pressure to supply both.

**Answer:** No. NFPA 13 describes the different types of acceptable water supplies in Section 23.2 of the 2007 edition. Section 23.2.1 notes that the waterworks system (public supply) must be reliable, and the annex adds that, when testing the amount of flow and pressure available, reasonable worst case scenarios should be examined. However, under this arrangement the pumps that are used are under the control of the public water authority and the sprinkler system is a user of that supply.

Another acceptable type of water supply for a fire sprinkler system is a fire pump, as stated in Section 23.2.2. In order to comply with this section the fire pump must meet the requirements of NFPA 20. Other acceptable water supplies include pressure tanks, gravity tanks and penstocks of water.

### **Question 10 - Sealants for CPVC Piping Penetrations in NFPA 13R Systems**

I have a 13R sprinkler system being installed in a 6 unit apartment / group home. Do the penetrations created by running the CPVC piping through the floor need to be protected with a protective collar or expanding fire corking? Currently they used just basic red fire corking to fill the voids. We do not see a lot of CPVC and any enlightenment on this subject would be helpful.

**Answer:** It is standard industry practice to use sealants around piping that penetrate a wall assembly or a floor/ceiling assembly in a building. However, there is no specific requirement in NFPA 13R. The building code would typically regulate the types of sealants necessary for a penetration. The regulations are usually applicable to fire-rated assemblies so that the rating is maintained.

The main precaution with CPVC or any non-metallic piping is the compatibility of the sealant or mastic so that there is no chemical reaction between the two items. The CPVC manufacturer's installation instructions should have more guidance on which type of sealants can be safely used.

### **Question 11 – Standpipe Outlets on Sloped Roofs**

I have a question about the requirement for a hose connection on a roof that provides no access. We have a project here that is a powdered milk production building. These buildings do not have a large footprint but are tall, about 130 feet high with a footprint of 50 ft x 50 ft. The stairwell has no access to the 2 in 12 pitched roof, but it seems a hose connection is required by NFPA 14. With no equipment located on the roof and no access shouldn't the connection be eliminated?

**Answer:** NFPA 14 wants the connection on the roof even if there is no access so that fire fighters can fight a fire on the roof or use the roof to fight a fire in a nearby building. The fire department has some pretty long ladders to get people to a roof in these situations.

The slope, however, can create another issue. It does not make sense to require an outlet on a steeply sloped roof because fire fighters are not going to be able to work on such a structure. In the 2007 edition of NFPA 14, the committee changed the rule to allow roof outlets to be omitted if the roof has a slope of 3 in 12 or more. Since your roof has a slope of less than 2 in 12, you should still provide a roof outlet unless you want to apply for a variance from the standard based on the small footprint.

### **Question 12 – Questioning the 15-Minute Barrier in Bathroom Ceilings**

Is it acceptable to have a recessed light fixture or a ventilation grill in a non combustibile bath room ceiling? The concern is being raised that with these items we would no longer have a 15 minute thermal barrier. What we have is a bathroom with an area less than 55 sq. ft. with drywall fastened to metal studs that are framed into a concrete floor. But the drywall ceiling does have a recessed light fixture and an air vent for ventilation. We have an AHJ who wants us to add sprinklers in a 10-story hotel because of the vents and recessed light fixtures in the ceiling. Because of these items, they are stating that we no longer have the required 15 minute thermal barrier.

**Answer:** As participants in the NFPA sprinkler committee when this rule was written, we can confirm that the issue was not with the ceiling at all. The concern was to have the barrier behind the tub, sink and toilet. That's what is meant by "including behind fixtures". Since plumbing codes require bathrooms to be vented, we fully expect a bathroom to have a vent in the ceiling. The situation that you have described follows the situation where the committee expected to allow sprinklers to be omitted.

The provision in the standard for sprinklers to be omitted from bathrooms goes back to the 1985 edition of NFPA 13. A representative of a fire protection consulting firm proposed a change to NFPA 13 to allow sprinklers to be omitted from small bathrooms in hotels (proposal 13-95 from the Fall 1984 Technical Committee Report). The committee agreed and placed two conditions on omitting the sprinklers:

- 1) The plumbing fixtures needed to be non-combustible (because the committee was concerned that fixtures were regularly affixed to the studs and if the fixtures were combustible, a fire in an unsprinklered bathroom might get into the stud space and spread up to the next bathroom before breaking into a sprinklered space and starting the flow of water). Note that the emphasis was on plumbing fixtures, not lights or vents.
- 2) The walls and ceilings needed to be non-combustible material (back then, this was intended to include gypsum wallboard). The requirement for non-combustible material is important because the committee did not want to omit sprinklers from bathrooms made of plywood or particle board. The "committee comment" specifically stated that their concern was for the room to be surfaced with non-combustible materials. Certainly they understood that the bathroom would have lights and vents, but that these items were not a part of the wall or ceiling "surface".

The rules remained the same for bathrooms in the 1987 and 1989 editions of NFPA 13. For the 1991 edition of the standard, the committee received a number of complaints about this section from the plumbing industry (proposals 13-53 and 13-54 in the Technical Committee Report). Proposal 13-53 clearly indicated that the concerns were “plumbing fixtures (bathtubs; shower stalls; tub/shower combinations; lavatories and sinks with a top surface area of 8 sq ft or more)”. Nowhere in this list did the proponent mention light fixtures or vents.

The committee agreed with the proponent that the mention of non-combustible fixtures was not appropriate, but retained its concern about fixtures directly attached to the wall studs. They ended up changing the rule to read that sprinklers could be omitted from bathrooms where there are “noncombustible or limited combustible materials with a 15 minute thermal barrier including the walls and ceilings behind fixtures.” This language replaced the language on noncombustible plumbing fixtures and was focused on helping the plumbing industry sell their combustible fixtures without putting the building owner in the position of having to put in sprinklers just because they selected a certain toilet or tub/shower enclosure. As such, it is reasonable to conclude that the term “fixture” in this context was not meant to apply to lights or vents. The final language for the 1991 edition was formulated in response to public comment 13-155 published as part of the Technical Committee Documentation for the 1991 Annual meeting of the NFPA.

The standard basically remained unchanged on this issue through the 1996, 1999 and 2002 editions. In preparing the 2007 edition of NFPA 13, the committee was asked to readdress the issue of what constituted a “fixture”. A Florida contractor was experiencing problems with AHJ’s applying the word “fixture” to all kinds of devices in the bathroom, including soap dishes and blow dryers. He simply asked the committee to insert the word “plumbing” in front of “fixtures”, intending the 15 minute thermal barrier to go behind sinks, cabinets, toilets, tubs and shower enclosures. The committee agreed and went a step further. Rather than limit their concern to all plumbing fixtures, the committee narrowed their scope of concern to tub and shower enclosures. In accepting Proposal 13-311 in the Report on Proposals for the 2006 Annual Meeting, the committee rewrote the section to allow sprinklers to be omitted as long as the 15 minute thermal barrier was extended behind the tub and shower enclosure. All other mention of any other kind of fixture was eliminated in the 2007 edition of the standard.

In summary, the committee has always only been concerned with the plumbing fixtures in bathrooms. There has been no requirement for lights or fans or vents to have any requirements in order to omit the sprinklers.

## **Upcoming NFSA “Technical Tuesday” Seminar – March 11th**

*Topic: NFPA 13R Systems – Outside the Dwelling Unit*

*Instructor: Cecil Bilbo, Jr., NFSA Director of Technical Services*

*Date: March 11, 2008*

NFPA 13R, *Standard for the Installation of Sprinkler Systems in Residential Occupancies up to and Including Four Stories in Height*, has two different levels of protection required. The protection requirements “inside the dwelling” can be less demanding than “areas outside the dwelling.” Participants will learn what portions of a building need to follow the rules for areas outside of the dwelling. The correct type of sprinkler for these applications will be identified, as will the density and area requirements. There will be references to both NFPA 13 and NFPA 13R.

Participants should be ready to move back-and-forth between these standards to gain a thorough understanding on when and how to identify these areas.

### **Upcoming NFSA “Business Thursday” Seminar – March 20th**

*Topic: Strategic Planning for Contractors*

*Instructor: Don Pamplin, NFSA Pacific Northwest Regional Manager*

*Date: March 20, 2008*

The majority of public and private sector organizations do not perform effective strategic planning. They think they do and in some situations, they even call it “strategic planning” but the planning model that they use is really not strategic. In the business world, the absolute bottom line is to make a profit and the more profit you consistently make, the better insulated you are from the disastrous effects of economic and social change. By practicing effective and efficient strategic planning, you can be better prepared to change direction to meet new markets demands and technology shifts. All business organizations within the Fire Sprinkler Industry need to use effective strategic planning to create a realistic and achievable road map to lead them to where they want to be in five or ten years.

Information and registration for the above “Technical Tuesday” and “Business Thursday” seminars are available at [www.nfsa.org](http://www.nfsa.org) or by calling Dawn Fitzmaurice at 845-878-4200 ext. 133 or email: [dawn@nfsa.org](mailto:dawn@nfsa.org).

*Additional NFSA training opportunities include...*

### **NFSA Two-Week Technician Training Classes**

April 7-18, 2008	Orlando, FL
August 4-15, 2008	Providence, RI
October 13-24, 2008	Chicago, IL
November 10-21, 2008	Houston, TX

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

### **In-Class Training Seminars**

The NFSA training department also offers in-class training on a variety of subjects at locations across the country. Here are some seminars scheduled for 2008:

Mar 5	Murfreesboro, TN	Hydraulics for Fire Protection
Mar 6	Murfreesboro, TN	Residential Homes to High Rise
Mar 10	Winston-Salem, NC	Sprinklers for Dwellings
Mar 11	Winston-Salem, NC	Plan Review Policies & Procedures
Mar 12	Winston-Salem, NC	NFPA 13 Update 2002
Mar 25	Jacksonville, FL	Pumps for Fire Protection
Mar 26	Jacksonville, FL	Hydraulics for Fire Protection



Mar 27	Jacksonville, FL	Sprinkler Protection for General Storage
Mar 28	Jacksonville, FL	Sprinklers for Dwellings
Apr 22	Richmond, CA	Pumps for Fire Protection
Apr 23	Richmond, CA	Fire Pump Layout & Sizing (a.m.)
Apr 23	Richmond, CA	Commissioning & Acceptance Testing (p.m.)
Apr 24	Richmond, CA	Inspection, Testing & Maintenance (CA Edition)
Apr 29	McFarland, WI	Plan Review Policies & Procedures
Apr 30	McFarland, WI	Pumps for Fire Protection
May 1	McFarland, WI	Commissioning & Acceptance Testing (a.m.)
May 1	McFarland, WI	Fire Pump Layout & Sizing (p.m.)
May 6-7	Colorado Springs, CO	NFPA 13 Overview & Intro to Plan Review
May 8	Colorado Springs, CO	Sprinklers for Dwellings

For more information on these seminars, or to register, please visit [www.nfsa.org](http://www.nfsa.org) or call Dawn Fitzmaurice at 845-878-4207 or email [seminars@nfsa.org](mailto:seminars@nfsa.org).

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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).*