



## **Tuesday e-Tech Alert**

**June 3, 2008**

**Number 117**

***Russell P. Fleming, P.E. – Editor***

### **Best Questions of May 2008**

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

#### **Question 1 – Bird Spikes on Sprinklers**

We have small birds nesting in sidewall sprinklers mounted high on the exterior hallway walls of buildings. They make a mess and obstruct the sprinklers. We need some guidance in applying bird spikes (metal) to discourage the birds from nesting.

**Answer:** There is no “standard” answer to this question. There are hundreds of thousands of sprinklers installed in exterior locations and bird nesting has never been raised as a major problem. There are no “listed” products that will deter a bird from nesting on a sidewall sprinkler.

There are listed sprinkler guards, but these might actually assist the bird in building a nest. As long as the metal spikes that you mentioned are behind and/or above the sidewall sprinkler, it shouldn’t be a problem for the sprinkler. The concern with any sidewall sprinkler is avoiding obstructions to response and to discharge in front, to the side, and below. A spike or series of spikes above and/or behind the sprinkler shouldn’t adversely affect either response or discharge. NFPA sprinkler installation standards allow a soffit of unlisted materials behind sidewall sprinklers. The standards also allow unlisted decorative items on the soffits as long as they are behind or above the sprinklers. There is no reason to treat these spikes differently from any unlisted soffit decoration.

#### **Question 9 – Louver Interlock with Fire Pump Operation**

I have a job where the louvers (needed for diesel pump operation ventilation) open up via a signal from the fire pump controller. The louvers have an "end switch" that verifies the louvers have opened. Does NFPA 20 permit the fire pump NOT to start if the louvers do not fully open, i.e. the fire pump controller does not get a signal that the louvers are fully open? Or, does NFPA 20 require the fire pump to start regardless if the louvers open up? If NFPA 20 requires the fire pump to start regardless of the louver operation, do you know if this is in conflict with the fuel code or if this issue has been raised before?

**Answer:** NFPA 20 requires the fire pump to start regardless of whether the louvers are open or not. Section 12.3.5.3.2 prohibits any sensor or signal from preventing the starting of the pump.

In other words, the committee wants the pump to try and start regardless of whether or not all conditions are optimal. Section A.11.3.2.4 of NFPA 20 speaks to the concept of motorized

louvers. It recommends louvers that spring open and are motored closed so that you do not have to worry so much about whether the louvers will open. If the motor fails to hold the louvers closed, they will open. This is not in conflict with any other codes or standards of which we are aware. Fire pumps are special exceptions to many of the rules that people normally use for the protection of other types of equipment. We want the fire pump to try and run for as long as it can, even if the louvers don't open all the way. Even without the full amount of fresh air, the fire pump will run and it will produce water pressure. Without the correct amount of fresh air, it will not run at the proper horsepower and may not produce enough pressure, but whatever pressure it can produce might make the difference between saving a life and losing a life in the early stages of a fire. The pump and its engine are considered sacrificial in the attempt to provide whatever small amount of protection that they can before they burn themselves out during a fire.

### **Question 3 – Doorless Corridor Design Area**

We have a series of individual clean rooms being supplied from above with individual feeds all coming off the same system. These rooms have poured concrete walls and ceilings but the doors do not have any official fire rating since they are special stainless doors just made for this project. Even though the doors are not rated and this is considered ordinary hazard by contract, they do have door closers. Can Section 11.2.3.4.2 of NFPA 13 (2007 edition) apply or does it need to apply? The 7-sprinkler requirement would exceed the 1.2 x remote area requirement for the number of sprinklers to flow on a line.

11.2.3.4.2\* Where an area is to be protected by a single line of sprinklers, the design area shall include all sprinklers on the line up to a maximum of seven.

A.11.2.3.4.2 This section is intended to apply to all types of systems including dry pipe and preaction systems.

**Answer:** Yes, you can use a maximum 7 sprinkler design for the corridor that you have described, but you are not required to use this design area. The hydraulic calculations start with section 11.2.3.1.1, which allow the user to pick from three different methods to determine how many sprinklers will be in the design area: the density/area method, the room design method and the special design area method. Each of these three methods is independent and does not rely on the other for decisions regarding operating areas. Since the special design method of 11.2.3.4 is separate from the room design method of 11.2.3.3, none of the wall rating requirements or door closer requirements of 11.2.3.3 are applicable when using 11.2.3.4. It can also be noted that the language of 11.2.3.4.2 specifically mentions an “area” being protected by a single row of sprinklers. The committee did not use the terms “room” or “compartment” to describe the space, so there is no definitive requirement for walls or doors to be rated.

### **Question 4 – Sizing of Looped Underground and Hydrant Piping**

Included in the plan review comments for a recent project was a request that we ignore the short leg of a looped underground main that supplies the plant and use only the longer leg to feed the base of the riser. The reviewer stated that this is per NFPA 13. Your thoughts?

Also, a related question: I have to run pipe for three fire hydrants and the civil drawings call out 6-inch pipe. Is there any schedule as to size of main based on number of hydrants? I thought that 8-inch was required if you are supplying two or more hydrants.

**Answer:** We are not aware of any NFPA requirement to calculate water supplies using only the longer leg of a looped main. Looped underground mains are commonly used as efficient mechanisms for delivering large quantities of water with minimal pressure loss. When such loops are used, NFPA 13 and NFPA 24 allow both sides of the loop to be used for hydraulic calculations.

With regard to the number of hydrants served, there is no “schedule” for sizing pipes based on the number of hydrants. Section 5.2.1 of NFPA 24 requires the pipe to be at least 6 inch in diameter when supplying any hydrant or hydrants. Other than this one rule, there is no other written rule for sizing pipe feeding hydrants. When determining pipe size, you need to have some understanding of the fire flow requirements and you need to perform hydraulic calculations to prove that the fire flow requirements can be met with the pipe size that you have selected.

### **Question 5 – Dry Pipe System Pitch in Heated Areas**

NFPA #13 (2007 edition) Section 8.16.2.3.1 states that dry pipe sprinkler systems installed in non-refrigerated areas be pitched a minimum of ½-inch per 10 ft. of line piping, and ¼-inch per 10 ft. of main piping. The code does not address the pitching requirement separately for dry systems in heated and unheated areas. Section 8.16.2.2.1 indicates that wet systems shall be permitted to be installed level. Taking these (2) sections into consideration my question is as follows: Is it acceptable to install dry pipe sprinkler mains and lines level in heated portions of a building?

**Answer:** No, it is not acceptable to install dry pipe sprinkler mains and lines level in heated portions of a building. The system needs to be installed according to the pitching requirements of Section 8.16.2.3. The reason for this is any stagnant water remaining in the system, due to the lack of draining ability, will combine with the pressurized air to corrode the pipe. There is also a concern that any remaining moisture in the system will be absorbed by the compressed air and transported to the colder sections of pipe where it will be deposited as ice and potentially plug up the system. As you noted, the piping is required to be pitched for all non-refrigerated portions of the system. This includes the whole system, not just the portions subject to freezing. It should also be noted that the 2007 edition of NFPA 13 was changed to clarify that pitching is required for all preaction systems as well, not only those portions installed in areas subject to freezing.

### **Question 6 – Seismic Protection of Drain Lines**

For a high-rise in an earthquake area, what are the requirements for hangers and flexible couplings on vertical and horizontal runs of main drain piping? I know that it doesn't have to remain in service during an earthquake but are there any other concerns or requirements for this piping?

**Answer:** You are correct that the drain piping does not require bracing or other special earthquake protection. There are a couple of sections that support this position. First, Section 9.3.1.1 states, "Where water-based fire protection systems are required to be protected...the requirements of Section 9.3 shall apply..."

At first glance this may appear to include the drain piping. However, the intent of the Committee is to protect the fire protection systems, not the piping that allows for draining and maintaining

that system. In addition, it is the main goal of the fire sprinkler system to be operational after an earthquake. This is evident both in the sprinkler standard and other national regulations for mechanical systems dealing with seismic forces. There is an understanding that some minor repairs may be necessary after the earthquake in order to have all components back up to their appropriate status. For example, a hanger may be pulled out or bent and need to be replaced after enduring an earthquake, but the system can still function should there be a fire following the earthquake. The same thought is applied to the drain piping. There may be minor fixes necessary in order to use the drain piping, but the system will function after an earthquake as it was intended.

The clearance requirement is noted to include drain piping (Section 9.3.4.1) as well as "other auxiliary piping." This is stated in the paragraph because drain piping would otherwise not need the clearance called for in Section 9.3.4. This space also allows for the drain piping to move as needed and place less stress on any joints between the system and the drain piping. In other words, the clearance provides enough space for movement that the drain piping can avoid major damage and any minor damage can be attended to after the earthquake.

### **Question 7 – Soldered Copper Pump Sensing Lines**

Are there any requirements for connections used on the installation of a fire pump pressure sensing line? NFPA 20 indicates acceptable materials but what about acceptable connections or joints? I have a contractor who says that all copper piping must be brazed for the sensing line. Is soldering copper piping acceptable for a pressure sensing line for a fire pump?

**Answer:** You have referenced NFPA 20 and the requirements for fire pump sensing lines (Section 5.29, 2007 Edition). You have asked if it is acceptable to solder copper piping used for the sensing line in accordance with NFPA 20, and the answer is yes. However, there are some conditions to consider. First, the sensing lines are often part of the listed controller. This would mean that the manufacturer's installation instructions need to be followed in order to comply with the listing. Next, the temperature of the room should be considered. This is because the solder could melt if very high temperatures are achieved wherever the sensing line is located. NFPA 13 (section 6.5.4) only allows exposed copper tube to be soldered if the room is a light hazard occupancy. Some authorities use this section to prohibit soldering of sensing lines because the pump room is generally not considered a light hazard occupancy. However, this section limits the use of soldering exposed copper tube to avoid concern about the solder coming apart during a fire and the tube being unable to feed sprinklers in the room of fire origin. This line of reasoning is fine for sprinkler systems, but the purpose of the sensing line is different. The sensing line is not carrying water to the controller to make the controller work. In fact, the loss of the sensing line during a fire would be no problem and might actually speed up the response of the pump to the fire, since the pressure in the sensing line would drop and cause the pump to start even before other starting mechanisms.

### **Question 8 – Kiosks in an Open-Air Mall**

I have a plans reviewer asking for my input on the sprinkler protection of some kiosks in an open-air outlet mall here in St. Augustine. I'm unsure whether or not the kiosks are a permanent fixture. I'm almost certain they are not a permanent fixture and should be treated as furniture, not requiring additional sprinkler protection. Please offer any additional information you may have on this.

**Answer:** No, such kiosks are not specifically required to be sprinklered by NFPA 13, but you must refer to your building code and project requirements. For example, in the 2006 edition of the International Building Code (IBC), this type of outlet would be a Group M. Section 903.2.6 (1) indicates that an automatic sprinkler system would be only needed when the fire area exceeds 12,000 square feet, so kiosks individually would fall under this threshold. However, codes might require the kiosks to be sprinklered on the basis of exposure protection, or the project specifications might address the issue due to owner or insurer interests. If the outlet is not open-air but is planned to be covered, then the need for sprinklers within the kiosks will depend on if they are "fixed" as noted in Sections 8.5.5.3.1 and 8.5.5.3.2 of NFPA 13 (2007 edition). If they are fixed then sprinklers are required if the obstructions from kiosk roofs exceed 4 ft in width.

### **Question 9 – Age of Water Supply Test Data**

Can you please confirm the maximum time frame allowed for water supply data to use on submitted sprinkler and/or standpipe drawings? I remember something about 9 months but cannot remember which document.

**Answer:** There is no hard and fast rule regarding how recent the test data needs to be. The decision is up to the AHJ. In a community where the population has not significantly changed and the businesses are doing what they always used to do, data that is a year or two old might still be acceptable. In a community where the population is growing quickly and new businesses are moving into town, data that is 9 to 12 months old might not be good enough, although there are ways of incorporating safety factors into such data so that it can still be used.

### **Question 10 – Pressure Gauges at Pressure Regulating Hose Valves**

In NFPA 14 (2007 edition) Section 5.5.2 states "A valved outlet for a pressure gauge shall be installed on the upstream side of every pressure-regulating device." Section 11.5.4.1 states "Each pressure-regulating device shall be tested to verify that the installation is correct, that the device is operating, and that the inlet and outlet pressures and flow at the device are in accordance with the design." 11.5.4.2 states "Static and residual inlet pressure and static and residual outlet pressure and flow shall be recorded on the contractor's test certificate." In a high pressure standpipe system, 2-1/2-inch pressure-regulating hose valve connections are used to limit the outlet pressure to 175psi while maintaining a minimum pressure of 100 psi at the outlet. To satisfy NFPA 14 - 11.5.4, flow meters will be used to verify the outlet pressures and flows of each pressure-regulating hose valve. To verify and record the inlet pressure upstream of the outlet, would a pressure gauge located at the base of each standpipe, downstream of its control valve be sufficient to record inlet static and residual pressures? Or would a pressure gauge be required at each pressure regulating hose valve outlet at every intermediate landing? Are there any other locations a gauge could be located upstream of the pressure regulating hose valve outlet that would fulfill the intent of NFPA 14?

**Answer:** Pressure gauges should not technically be required at each hose connection. A single pressure gauge on a riser can serve as the gauge upstream for all of the hose connections on that riser. Of course, adjustments will need to be made for the changes in pressure due to elevation and friction loss during the test, but there is no requirement for the upstream gauge to be immediately at the hose connection. There is a convenience factor involved, but it does not matter

where this gage is located on the riser as long as there are no control valves or check valves between the gage and the hose connections with the pressure reducing valves,, and adjustments can be made for elevation. The purpose of the test is to make sure that the valve is working within a reasonable range, not to know the pressure on the upstream side to a tenth or a hundredth of a psi. A single gage on the upstream side can provide all of the information that you need during the test.

### **Question 11 – Running Fire Lines Under Docks and Ramps**

On a current job, the contract drawings show a proposed fire line routing running under a concrete loading dock ramp and a concrete service ramp before entering the building. Approximately 17 ft will be running under the concrete service ramp and building. Is routing the supply piping under the concrete loading dock ramp and concrete service ramp before entering the building an acceptable installation?

**Answer:** There is no prohibition in NFPA 13 or NFPA 24 from running pipe under loading docks or ramps. NFPA 13 and NFPA 24 allow you to run the pipe pretty much wherever you need to in order to get the water into the building in a logical manner. There are provisions in Section 10.6.6 which need to be taken if the pipe is going to be under areas where vehicles will carry heavy loads. There are even provisions in Section 10.6.2 for running the pipe under the building.

### **Question 12 – Upright Sprinklers in Pendent Position in a Trash Chute**

Question 12 of NFSA's *Tuesday e-Tech Alert* #115 dated May 13, 2008 concerned the use of pendent sprinklers where uprights are typical. We ordered pendent sprinklers for a trash chute and had them shipped to the chute manufacturer to install. By mistake, upright sprinklers were shipped and then installed in the pendent position. Since the answer to Question 12 was that pendants can be installed in the upright position, is the opposite true? We wouldn't think it would matter in this case since the sprinkler would flood the trash chute in either position.

**Answer:** Question 12 of the #115 *eTechAlert* did NOT say that you can install pendent sprinklers in the upright position. The installation of pendent sprinklers in the upright position is generally prohibited by NFPA 13. The question in the *eTechAlert* was asking if pendent sprinklers were limited to use under suspended ceilings. The person asking the question was an AHJ inspecting a job where sprinklers were installed under a metal deck with exposed structural members. Since he had previously always seen upright sprinklers in this kind of situation, he was asking if pendent sprinklers could be installed so long as they were in the pendent position. We answered that they could be installed provided the deflector was positioned within the allowable range of distance from the ceiling. This was a case of a pendent sprinkler in the pendent position.

Your situation is quite different, since you are asking if upright sprinklers are allowed in a pendent position in a vertical trash chute. NFPA 13 requires that upright sprinklers be installed in the upright position, since Section 8.3.1.1 of NFPA 13 states that sprinklers need to be installed in accordance with their listing, which includes the orientation of the sprinkler. Section 8.3.1.2 does give the user permission to install sprinklers in orientations other than what they are listed for in order to achieve "specific results." For you to use this section, I think that you would need to convince the AHJ that you had intentionally put the upright sprinklers in the pendent position to achieve some desired level of protection. You would probably need test data to back up the fact that you were trying to achieve some special distribution pattern.

## **Upcoming NFSA “Technical Tuesday” Seminar – June 10<sup>th</sup>**

*Topic: Exposure Protection Systems*

*Instructor: Russell P. Fleming, P.E., NFSA Executive Vice President*

*Date: June 10, 2008*

Changes to the 2007 edition of NFPA 13 restored long-lost criteria to the standard that is necessary for proper installation of an exposure protection system. This seminar will not only review how that criteria is applied, but review the use of exposure protection systems in the context of the entire need for exposure protection based on the principles of NFPA 80A exposure protection recommended practice and corresponding provisions of model building codes in the United States and Canada.

*NOTE: This seminar was originally scheduled for May 6, 2008, but the date was switched with the “Standpipes, Pressures and Pumps” online seminar due to instructor scheduling conflicts.*

## **Upcoming NFSA “Business Thursday” Seminar – June 19<sup>th</sup>**

*Topic: Safety for Contractors*

*Instructor: Ray Lonabaugh, NFSA Mid-Atlantic Regional Manager*

*Date: June 19, 2008*

As virtually every employer in the country is aware, the health, safety and welfare of a company’s workforce are major concerns. An effective and comprehensive safety program can reduce risk to the company and help bring workers compensation costs down. This presentation will review some of the important aspects of an effective safety program and examine why it should be a high priority for every fire sprinkler contractor.

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.

Additional NFSA training opportunities include...

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

**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 upcoming seminars:

June 3 Albany, NY	Inspection, Testing & Maintenance
June 4 Albany, NY	Standpipe Systems (a.m.)
June 4 Albany, NY	Fire Pump Layout & Sizing (p.m.)
June 5 Albany, NY	Plan Review Policies & Procedures
June 10 Oak Creek, WI	Introduction to Sprinklers (a.m.)
June 11 Oak Creek, WI	Plan Review Policies & Procedures
June 12 Oak Creek, WI	Commissioning & Acceptance Testing (a.m.)
June 12 Oak Creek, WI	Underground Piping (p.m.)
June 17 Centennial, CO	Sprinkler Protection for General Storage
June 17 Seattle, WA	Plan Review Policies & Procedures
June 18 Centennial, CO	Sprinkler Protection for Rack Storage
June 18 Seattle, WA	Commissioning & Acceptance Testing (a.m.)
June 18 Seattle, WA	Fire Pump Layout & Sizing (p.m.)
June 19 Centennial, CO	Sprinkler Protection for Special Storage
June 19 Seattle, WA	Sprinkler Protection for Special Storage
June 24 Cheyenne, WY	Plan Review Policies & Procedures
June 25 Cheyenne, WY	CPVC Piping (a.m.)
June 26 Cheyenne, WY	Low, Medium and High Expansion (NFPA 11) (a.m.)

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).

*NFSA Tuesday eTechAlert is c. 2008 National Fire Sprinkler Association, and is distributed to NFSA members on Tuesdays for which no NFSA Technical Tuesday Online Seminar is scheduled. Statements and conclusions are based on the best judgment of the NFSA Engineering staff, and are not the official position of the NFPA or its technical committees or those of other organizations except as noted. Opinions expressed herein are not intended, and should not be relied upon, to provide professional consultation or services. Please send comments to Russell P. Fleming, P.E. [fleming@nfsa.org](mailto:fleming@nfsa.org).*

***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).*