



Tuesday e-Tech Alert
July 24, 2007
Number 90

Follow-up Questions – A Mid-Year Review

Because eTechAlert publishes a dozen “Best of” questions each month, NFSA periodically receives follow-up questions from members, which are then handled as EOD inquiries. Here are some follow-up questions from the first half of 2007:

1. January 9, 2007 eTechAlert 73 - Question 12 - Variable Speed Pump Drivers

Follow-up Question: I would like to revisit the eTechAlert “Best of December” Question 12 and take issue to the response offered. The subject of variable speed pressure reducing controls is “new territory” so to speak for some fire sprinkler contractors and installers. The variable speed pressure reducing controls (VSD Electric and PLD for Diesel) are two excellent new tools available to manage excess or overpressure within fire sprinkler systems. Reference is made to adding another layer of complexity to an otherwise simple fire pump situation. That characterization is like declaring an automatic transmission to be an overly complex device versus a stick shift and clutch. They are both good tools and each should be evaluated based on the merits of the products and the planned application. You state that the electric version of the VSD is more questionable than a diesel; is it simply the use of decades old and proven technology used to manage the speed and pressure? The PLD for the diesel is much more restrictive than the electric. The technology used in the electric has been in use for many years and in fact, a very high percentage of all pump applications throughout the world uses Variable Frequency Drives. The "Soft Start Controller" that has been in use in the fire pump systems for several years, uses the basically the same technology. The electric VSD is actually the only true variable speed drive used on fire pump. The electric is field setup to maintain the exact system pressure needed for the project. During the startup the maximum pressure allowed is input to the controller and the unit will maintain that pressure even when a higher suction pressure is introduced. The diesel unit must be preset at the factory and the choice of pressure is only available at three levels. Both items are good products and each has an application in the market place. To say that the magic worked in the electric VSD makes the units complex is just plain false. Any engineer should know that you cannot vary the speed of an AC Motor without heating problems. An inverted rated electric motor must be used in conjunction with a VSD controller. Many standard off the shelf AC motors are inverter rated. The electric VSD is very reliable and uses the NFPA requirement for redundancy. When you purchase for installation an electric version of the variable speed electric controller you are getting two complete controllers in one cabinet. Very reliable. One thing must be noted concerning the Variable Speed Pressure Limiting Controls, they are custom built for each job. Just the same as you are required to calculate each sprinkler system, you are required to perform a system analysis when planning the use this tool. The statement about needing to exercise these units "once in a while" leads me to believe the writer wanted simply to alarm someone rather than offer a correct analysis. Ever hear of NFPA 25?

Answer: Yes we are familiar with NFPA 25. We do not disagree with the assertion that the variable speed drivers are “excellent new tools available to manage excess or overpressure within fire sprinkler systems”, and we have promoted the use of these devices in both NFSA and NFPA publications. However, the point we tried to make in our answer was that such devices add unnecessary complexity to any system for which overpressurization is not an issue. This is supported by your note that that variable speed pressure limiting controls are custom built for each job. We disagree with the analogy to automatic vs. standard transmissions due to the fact that we now have had decades of experience with automatic transmissions, to the point where they have become the norm. Perhaps variable speed drivers will also someday become the norm, but not yet. A better analogy today might be the continuously variable transmission (CVT) technology, which appears to be growing in popularity among automobile manufacturers but is still not the norm.

2. April 17, 2007 eTechAlert 80 – Question 3 - Water Curtain Sprinklers

Follow-up Question: The eTechAlert dated April 17, 2007 (Question 3 - Water Curtain Sprinklers) indicates it is acceptable to utilize standard spray sprinklers in a water curtain configuration to provide a 2-hour separation along a glass partition. Specific Application Window Sprinklers offered by Tyco have specific installation guidelines. Per Tyco's data literature these "window sprinklers" are to be located within each mullioned glazing segment. When utilizing fast response, standard spray, vertical sidewall sprinklers in a water curtain for protection of a glass partition, what guidelines are to be used for sprinkler placement and spacing? I am attempting to protect a 2-hour glass partition with mullions spaced 1'-7" to 4'-0" apart.

Answer: There are a number of variables that affect every situation, and therefore no single answer is correct. There are four basic situations where sprinklers can be installed to wet glass and substitute for a fire resistance rating:

- 1) Where a building code specifically references the use of sprinklers to spray on the glass. This was one situation described in the eTechAlert. In this case, the building code specifies where to put the sprinklers, and any standard spray sprinklers are permitted to be used. Usually, the building code will specify that the sprinklers need to be located so as to wet the entire surface of the glass. In most cases, the sprinklers are being used to substitute for 1-hr fire resistance ratings. For example, section 404.5 of the International Building Code requires that an atrium be separated from the rest of a building by a 1-hr rated wall. Exception 1 to this section states that the 1-hr fire resistance rating is not required if a glass wall is protected with sprinklers on 6 ft spacing with deflectors located 4 to 12 inches from the glass and the sprinklers are capable of spraying the entire surface of the glass without obstructions. These sprinklers are not required to be specially listed window sprinklers because the building code has specifically stated that they only need to be regular automatic sprinklers.
- 2) Where a substitution for a 1-hr or 2-hr rated wall is desired where no mention of the sprinklers is made in the code, specially listed window sprinklers can be proposed to substitute for such walls.
- 3) Where the substitution for the sprinklers is part of a special engineer's or architect's design that is being performed as an alternate to the code. In other words, the code might require a 1-hr or 2-hr wall and the architect or engineer might design a system of sprinklers to wet glass instead and get approval from the AHJ for the variation from the code. This would not necessarily be required to be a special listed window sprinkler depending on the information presented to the AHJ and the variance granted.

- 4) Where exposure protection is provided in accordance with the recommendations of NFPA 80A – *Protection of Buildings from Exterior Exposure Fires* or some similar document, allowing specified reductions in the minimum distance between buildings. A 75 percent reduction in separation distance is recommended for listed automatic window sprinklers in the NFPA 80A tables, as compared to a 50 percent reduction for other types of sprinklers protecting wall openings equipped with ordinary glass. Where automatic exposure protection sprinkler systems (per NFPA 13) are used to protect wall openings in conjunction with wired glass or ¾-hour or higher protection, NFPA 80A acknowledges a reduction in the separation distance to 5 ft (1.5 m).

So, it can be seen that the type of sprinkler required for use depends on the specific situation and what the code would otherwise require.

3. May 1, 2007 eTechAlert 82 - Question 1 – 4-way Riser Bracing on Walls

Follow-up Question: The answer to the second part of Question 1 in this eTechAlert indicates it is acceptable to put a 4-way brace on a riser BELOW the flexible coupling at the top of riser. How can this be correct?

Answer: Prior to the 1987 edition of NFPA 13, the annex figure detailing the 4-way bracing at the top of the riser showed the option of attaching the four-way brace to the top of the wall, but the brace was located above the upper flexible coupling on the riser. This arrangement could have subjected the riser to damaging stress if the wall and roof assembly moved differentially, and the figure was subsequently modified to show only roof attachments. More recent changes to NFPA 13, however, have provided additional guidance, and the need to find suitable points for distribution of loads sometimes creates a need for wall attachment. New wording added in the 2002 edition clarifies that flexible couplings are needed above and below each intermediate point of support for risers, which must be provided at maximum 25 ft (7.6 m) intervals. This leads to the requirement that the flexible coupling be above the wall-mounted four-way brace. If the 4-way brace on wall attachment is not located within 2 ft of the roof main, the 2002 edition of NFPA 13 would require a lateral brace on the roof-supported main no more than 20 ft (12.2 m) from the riser and a longitudinal brace with 40 ft (12.2 m) of the riser. Beginning in the 2007 edition of NFPA 13, the maximum distance of the first lateral brace to the end of the main is reduced to maximum 6 ft (1.8 m).

4. May 1, 2007 eTechAlert 82 - Question 4 – Four-way Bracing at Riser Nipples

Follow-up Question: The answer to Question 4 in the eTechAlert directs one to put flexible couplings in long riser nipples. Is this correct? Also, it alludes to NFPA not meaning what it states with regard to the terms “RISER” and “SYSTEM RISER”. I was always taught that NFPA was specific when it used terms that it defines. It seems wrong that any NFPA document would misuse a term. Why would we say riser when we don’t mean riser?

Answer: The committee does intend that one flexible coupling be provided in risers exceeding 3 ft (0.9 m) in length, two for risers exceeding 7 ft (2.1 m) in length. No exceptions are made for riser nipples serving branch lines. These couplings, which could be part of flexible tees, are intended to accommodate differential movement between the branch lines and mains without inducing damaging stresses on the tees at the top or bottom of the riser nipples. With regard to terminology, when we noted that Committee sometimes uses the term "riser" but intends "system

riser", such as for the four-way brace requirement, we don't mean to imply that the Committee is being deliberately misleading. Sometimes the Committee resorts to a shorthand version of system terminology, and sometimes terms are carried over from previous editions without being refined in accordance with new definitions. In the case of bracing, the Committee has made it clear that four-way braces are required for risers on mains where there is a change in elevation of 3 feet or more. Requiring a four-way brace at the top of a riser nipple would conflict with other sections of the standard, such as the requirement that branch lines only be braced laterally when 2-1/2 inches or larger, and not braced longitudinally regardless of size. Language addressing hanger support of "risers" in Section 9.2.5 (2007 edition) likewise does not apply to riser nipples.

5. May 1, 2007 eTechAlert 82 - Question 12 – Schedule 30 Pipe Bracing

Follow-up Question: In discussing adjustments needed to the NFPA 13 tables when piping other Schedule 10 or Schedule 40 is used for earthquake bracing, the answer to eTechAlert Question 12 contained the phrase: "Because Schedule 30 pipe is not commonly used in fire sprinkler applications..." In our area, almost everyone has switched to Dyna-Thread schedule 30 pipe.

Answer: The eTechAlert response was that appropriate dimensions should be used in the adjustments, which can be obtained from the pipe manufacturer. In ASME/ANSI pipe standards, dimensions for Schedule 30 steel pipe do not show up until minimum 8-inch nominal diameter. As such there is no official Schedule 30 in the smaller pipe sizes, and manufacturers can make Schedule 30 pipe to different sizes. Some manufacturers, like Allied with its Dyna-Thread product, use the informal "Schedule 30" term to apply to their special listed pipe with minimum wall thickness designed to produce a UL Corrosion Resistance Ratio (CRR) of 1.00 when threaded, i.e. at least equal to Schedule 40 threaded pipe. Allied's own literature includes the phrase "often referred to as a Schedule 30". Other manufacturers, such as Youngstown Tube, manufacture a slightly thicker Schedule 30 product. The situation is similar to "Schedule 7" pipe, not an officially standardized wall thickness but a term that suggests a wall thickness somewhere between Schedule 5 and Schedule 10.

6. May 15, 2007 eTechAlert 83 – Sprinklers Under Loading Dock Canopies

Follow-up Question: This eTechAlert came at a good time. I have a project right now that is a freight terminal (dock), protected inside with sprinklers. On the exterior there are docks that are covered by a noncombustible roof. The exterior roof/canopy is over 4 ft in width. Trucks are loaded and unloaded on the exterior of the dock, and the contents of the trucks can be virtually anything from Class I commodities to Group A plastics to flammable liquids and aerosols. The pallet loads may be on the exterior dock from minutes to hours while the trucks are being loaded and unloaded. The 2002 edition of NFPA 13 states:

8.14.7.4 Sprinklers shall be installed under roofs or canopies over areas where combustibles are stored and handled. Does this require sprinkler protection under the exterior roof of the truck terminal described above? Do combustibles have to be stored **and** handled under the exterior roof of this facility to require sprinkler protection under the exterior roof? While the body of NFPA 13 uses the words "stored **and** handled", I note that the annex uses the words "storage **or** handling": "A.8.14.7.4 Short-term transient storage, such as that for delivered packages, and the presence of planters, newspaper machines, and so forth, should not be considered storage or handling of combustibles."*

Answer: These situations must often be addressed by the AHJ on a case-by-case basis.

First of all, don't get too hung up on the "stored and handled" vs. "stored or handled" debate. The definition of handling is so nebulous that if the objects are put down to be stored and picked up when their storage time is over, they are being "handled". So, whenever you have storage, you also have handling. What the committee is trying to say is that the length of stay is a determining factor. If objects are there under the canopy for a short time, then sprinklers are not necessary. If objects are there for a long time, then sprinklers need to be installed. It is up to the AHJ to make a judgment call as to how long a time period to allow. Cars driving up to drive-up windows at banks do not stay long enough to warrant sprinkler protection. Wooden pallets kept outside under a big overhang do hit the threshold for requiring sprinkler protection under the overhang. Somewhere in between these two extremes is a dividing line as to when sprinklers are needed and when they are not. The committee has never been able to reach a consensus on exactly how to express when sprinklers are needed and when they are not. During a recent NFSA seminar, the NFPA 13 staff liaison advised that everything he has researched on the subject leads him to the conclusion that the purpose of the sprinkler system is not to protect the trucks. The trucks are transient and the sprinkler system is not designed to be an exposure protection system for the building, nor is it intended to deal with the shielded fire that would occur inside of a truck under the canopy. By the time that a fire in a truck broke out of the top of the truck, a sprinkler system designed for the contents of the truck would not be able to control the fire anyway. The best guidance we can give is to look at the operations plan for the facility and the neighborhood. There are many places in this country where people cannot leave loads of material on a loading dock for any period of time (overnight perhaps might be a good break point) due to security considerations. In these areas, operations will call for materials to be moved inside from the loading dock soon after delivery. It is also possible that the operator of the facility is concerned about the condition of the materials and will move them inside soon after delivery to keep them out of the elements. In such cases, we wouldn't worry about the sprinklers under the canopy. But if the building is secure and the contents are going to be left out overnight, then we would consider putting sprinklers under the canopy to protect this storage. In this case, the design of the sprinkler system should not be for the trucks themselves, but for the worst-case contents of the trucks and the reasonable height of storage left on the loading dock.

7. July 3, 2007 eTechAlert 88 - Question 4 - Butterfly Valves in Closed Loops

Follow-up Question: I certainly understand your logic on the butterfly valves, but it would appear that an OS&Y cracked open to create a "friction loss" for the flow meter that is in a closed loop would create as much or more turbulence than a butterfly valve, as there is no "gate" opening.

Answer: We agree that this would result in turbulence, but the pump flow test is intended to be conducted at 100% of rated flow of the pump and at 150% of the rated flow, which means that the valve should be pretty well opened. Any valve can be expected to cause some turbulence, but a butterfly valve will always be worse than a gate valve.

8. July 3, 2007 eTechAlert 88 - Question 6 - Master Pressure Control Valves

Follow-up Question: Regarding your answer to Question 6, it appears you are saying the 2003 edition of NFPA 14 does not allow the use of a "master" pressure control valve. Can you tell me where that information is in that standard?

Answer: The only reason for using a master PRV is to eliminate a fire pump in multiple zone buildings. Editions of NFPA 14 prior to 2007 have always prohibited this practice by requiring that each zone have its own pump. For example, see section 7.9.1 in the 2003 edition. Similar sections exist in earlier editions.

Upcoming NFSA “Technical Tuesday” Online Seminar – August 7th

Topic: Flammable and Combustible Liquids – Part 1

Instructor: Victoria B. Valentine, P.E., NFSA Director of Product Standards

Date: August 7, 2007

Flammable and combustible liquids offer a challenge to many fire protection systems. The amount of liquids and the storage arrangement can affect the ability of a fire to be controlled. NFPA 30, Flammable and Combustible Liquids Code, offers some guidelines on how to protect specific arrangements. This seminar will review the different types of systems that can be used to protect these hazardous liquids and some scenarios that fall outside the scope of the standardized protection schemes.

Information and registration for this seminar is available at www.nfsa.org or by calling Dawn Fitzmaurice at 845-878-4200 ext. 133.

Upcoming NFSA “Business Thursday” Online Seminar – August 16th

Topic: How to do Effective Strategic Planning

**Instructor: Don Pamplin, NFSA Northwest Regional Manager
(Former Fire Chief of Vancouver, British Columbia, Canada)**

Date: August 16, 2007

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 this seminar is available at www.nfsa.org or by calling Dawn Fitzmaurice at 845-878-4200 ext. 133.

NFSA Technician Training Classes

The two-week NFSA technician training class scheduled for September 24- October 5 in Kansas City, MO, is completely full at the present time, and a wait list is being developed. However, the extra class added for November of 2007 in Newburgh, NY still has availability. These seminars also serve as starting points for the NFSA's two-year Certificate Program for Fire Sprinkler Technicians.

Only the following classes remain in the 2007 NFSA engineering department training schedule:

Two-Week Technician Training Seminar

November 5-16 Newburgh, NY

3-day Advanced Technician Training Class

September 5-7 St Louis, MO

NICET Inspector Certification Review Classes

August 7-9 Indianapolis, IN
August 14-16 San Antonio, TX
November 6-8 Providence, RI

For more information on any of these classes, contact Nicole Sprague using Sprague@nfsa.org or by calling 845-878-4200 ext. 149.

In-Class Training Seminars

NFSA also offers in-class training on a variety of subjects at locations across the country. Here are some upcoming seminars:

July 31 Introduction to Sprinkler Systems (1/2 day)(AM)///Pataskala, OH
July 31 Underground Piping (1/2 day) (PM)///Pataskala, OH
Aug 1 Pumps for Fire Protection///Pataskala, OH
Aug 2 Sprinkler Protection for Rack Storage///Pataskala, OH
Aug 14-15 Two-day NFPA 13 Overview & Intro to Plan Review///Centerville, OH
Aug 16 Hydraulics for Fire Protection///Centerville, OH
Sept 18 Sprinkler Protection for General Storage///Seattle, WA
Sept 19 Sprinkler Protection for Rack Storage///Seattle, WA
Sept 20 Pumps for Fire Protection///Seattle, WA
Sept 18-19 Two-day NFPA 13 Overview & Intro to Plan Review///Baltimore, MD
Sept 20 Pumps for Fire Protection///Baltimore, MD
Sept 25 Sprinkler Protection for General Storage///Eugene, OR
Sept 26 Sprinkler Protection for General Storage///Eugene, OR
Sept 27 Inspection, Testing & Maintenance///Eugene, OR
Oct 23 Introduction to Sprinkler Systems (1/2 day)(AM)///Woodland, CA
Oct 23 Underground Piping (1/2 day)(PM)///Woodland, CA
Oct 24 Inspection, Testing & Maintenance///Woodland, CA
Oct 25 Basic Seismic Protection (1/2 day)(AM)///Woodland, CA
Oct 25 Advanced Seismic Protection (1/2 day)(PM)///Woodland, CA

For more information on these seminars, or to register, please visit www.nfsa.org or call Michael Repko at 845-878-4207.

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