



Tuesday e-Tech Alert
May 17, 2005

Questions on Design Approaches and Special Occupancies

The NFSA is currently conducting a 10-part internet-based seminar series focusing on the 2002 edition of NFPA 13. This edition of the Tuesday e-Tech Alert shares a few of the questions raised by participants during the eighth seminar in the series, which addressed Chapters 11, 13, and 17 – Design Approaches and Special Occupancies:

1. Barriers Separating Protection Areas

Q: How deep does a barrier need to be to avoid extending the more demanding protection 15 ft beyond its perimeter per Section 11.1.2? Does an I-beam meet the requirement?

A: NFPA 13 does not specify a minimum barrier depth, and it could be interpreted that an 8-inch lintel that satisfies the definition of a compartment (Section 3.3.6) would be sufficient. However, the barrier should be sufficient to bank heat from the ceiling jet, and the thickness of the ceiling jet can be 5 to 12 percent of the ceiling height above the fire. Draft curtains in manufacturing and storage occupancies are typically several feet deep for this reason. For storage occupancies, Section 12.1.5 is very similar in its call for a 15-ft extension of the more demanding protection unless physically separated by a barrier or partition capable of delaying heat from a fire in one area from fusing sprinklers in the adjacent area. Section 8.4.6.4.1 more specifically calls for a draft curtain of noncombustible construction at least 2 ft in depth to separate areas containing ESFR sprinklers from those with standard response sprinklers. While this could be considered appropriate for ceiling heights associated with storage occupancies, perhaps the best guidance for other types of occupancies is found in the 18-inch deep draft stops specified in Section 8.14.4.1 for the banking of heat around escalator and similar openings

2. Large Additions to Existing Pipe Schedule Systems

Q: When additions over 5,000 sq. ft. are made to existing pipe schedule systems, does Section 11.2.2.5 require that the flows be available at a minimum pressure of 50 psi at the highest sprinkler?

A: Section 11.2.2.3 allows the use of pipe schedule systems for new systems less than 5,000 sq. ft. and for additions and modifications to existing pipe schedule systems. Section 11.2.2.5 allows the use of the pipe schedules for systems exceeding 5,000 sq. ft. providing residual flows are available at pressures that would allow 50 psi at the highest sprinkler. Since 11.2.2.5 does not make a distinction between new and existing systems, it suggests that the 50 psi requirement applies to additions to existing systems larger than 5,000 sq. ft. However, if the history of this section is researched back to its inclusion in the 1991 edition of NFPA 13, it can be seen that the wording of what is now 11.2.2.5 was added as an exception during the public comment period, specifically to allow the use of large new pipe schedule systems under conditions of ample pressure. With exceptions now eliminated from the NFPA format, 11.2.2.5 gives the false impression that the 50 psi minimum pressure applies to all pipe schedule systems over 5,000 sq.

ft. It does not. It was always the intent to allow additions to existing pipe systems at the original lower pressures.

3. Water Supply Duration Ranges

Q: What is the basis of the range of water supply durations specified for both pipe schedule and hydraulically calculated systems in 11.2.2.1 and 11.2.3.1.1? Does an alarm panel within the building allow the use of the lower duration?

A: The lower duration is allowed where remote station or central station waterflow alarm service is provided on the assumption that the fire department will respond sooner to support the system if automatically notified of a fire. An alarm panel within the building does not satisfy this requirement unless it is configured to provide the remote or central station service.

4. Eliminating Hose Stream Allowance for Stored Supplies

Q: What is the intent of the statement in 11.2.3.1.3 that hose allowance is not required for tanks supplying sprinklers only?

A: This section was added in recognition of the fact that owners of buildings in areas without public water supplies have not traditionally been required to provide water for use by responding fire departments. It was agreed that the building owner who wants to provide a sprinkler system should not be asked to underwrite the cost of infrastructure improvements that would not be required in the absence of sprinkler protection. The hose stream allowance is used to help guard against simultaneous demand of hose streams taken from a public water supply that could rob the sprinkler system of its expected pressure. If tanks supply sprinklers only, hose stream allowances are therefore not required.

5. Hose Stream Demands for Stage Protection

Q: If a school has a stage with 1-1/2-inch hose valves, how is inside hose allowance determined?

A: The answer depends on the applicable building or construction code that requires the hose valves at the stage and, more to the point, whether the hose streams are specified as sprinkler system hose connections or as an occupant use (Class II) standpipe system. If the code or specification requires a Class II standpipe system, the 1-1/2-inch hose outlet is required to meet the NFPA 14 demand of 100 gpm at minimum 65 psi. Additional flow is not required where more than one hose connection is provided. NFPA 14 does not specifically address sprinkler systems combined with Class II standpipe systems, but the added standpipe demand could be considered a 100 gpm inside hose stream allowance. In the case of some codes, including the NFPA 101 Life Safety Code®, the hose station for stages (Section 12.4.5.12.2 in the 2003 edition) can be either in accordance with NFPA 13 or part of a Class II or Class III standpipe system. The NFPA 13 option allows use of a 50 gpm flow requirement each for up to two hose stations, but at the available supply pressure of the sprinkler system. Depending on which type of system is provided, good practice would call for a distinction in the type of hose valve used, since UL separately lists 1-1/2 inch hose valves for sprinkler systems and 1-1/2-inch hose valves for standpipe systems. The former have 1-inch inlets and the latter have inlets 1-1/2-inch or larger. The restricted inlet on a sprinkler system hose connection is intended to avoid flowing too much water through the hose connection, and is consistent with the 50 gpm demand as compared to the 100 gpm standpipe demand.

6. Hazard Classification for Laboratories in Schools

Q: Do chemical laboratories in schools and universities fall in the Ordinary 1 or Ordinary 2 hazard categories?

A: In Section 13.8.1, NFPA 13 references the use of NFPA 45 – *Standard on Fire Protection for Laboratories Using Chemicals*. NFPA 45 divides laboratories using chemicals into Classes A (high fire hazard) through D (minimal fire hazard) based on the amounts of flammable and combustible liquids and their storage containers as noted in Tables 10.1.4 and 10.1.5 in that standard. These tables are also shown in the NFPA *Automatic Sprinkler Systems Handbook* commentary as Tables 13.2 and 13.3. As stated in Section 13.8.1, Class A and B laboratories are generally required to be protected as Ordinary Hazard Group 2, while Class C and D laboratories are considered Ordinary Hazard Group 1. However, NFPA 45 also contains Section 4.2.2.2, which states that instructional laboratory units shall be classified as Class C or D laboratory units. Those considered Class D are limited to 50 percent of the flammable and combustible liquids quantities allowed for Class C in the tables. All experiments and tests must be under the direct supervision of an instructor. As Class C and D laboratories, Ordinary Hazard Group 1 protection is therefore specified.

Upcoming NFSA Technical Tuesday Online Seminar:

NFPA 13 Chapter 12 – Storage

Instructor: Kenneth E. Isman, P.E.

Date: May 24, 2005

A separate Chapter 12 on storage was created within the 2002 edition of NFPA 13 to consolidate requirements in this area. As such, the chapter contains the rules for all types of commodities and all storage protection concepts, including spray sprinklers, large drop sprinklers and ESFR sprinklers. The chapter also contains some special design criteria added on the basis of specific fire testing.

This is the ninth in the series of ten seminars dedicated to an in-depth review of the 2002 edition of NFPA 13. Participants develop an appreciation for the way in which the material is organized in the 2002 edition while learning more about the background of the rules themselves. The level of all seminar topics is considered intermediate.

Information and registration for these seminars are available at www.nfsa.org.

2nd Half 2005 Online Seminar Series Announced

The NFSA is announcing a new series of ten online seminars scheduled for the second half of 2005. The series begins with a virtual attendance at the 2005 NFPA World Safety Conference, including the historic vote on sprinklers in dwellings. The other nine seminars will delve more deeply into specific NFPA 13 issues introduced as part of the ongoing overview of the 2002 edition. As in the first half of 2005, a 30 percent savings will result from registration for all ten seminars. Go to www.nfsa.org for registration for the online seminars. Checking all ten boxes for the seminar series will result in the discount.

July 12, 2005 – **Fire Sprinkler Update from the 2005 NFPA World Safety Conference** – Russell P. Fleming, P.E., Executive Vice President – Intermediate

The NFPA has now merged its spring and fall meetings into a single annual World Safety Conference and Exposition, being held June 6-10, 2005 in Las Vegas, Nevada. For those unable to attend, this seminar provides a virtual attendance, including a review of highlights from dozens of technical presentations relating to fire sprinklers, the accompanying exhibition, and a summary of significant sprinkler-related changes to NFPA codes and standards processed at the technical committee report session, including the NFPA 101/NFPA 5000 proposed requirement for sprinkler protection of all dwellings.

August 2, 2005 – **Vertical Shafts** – Victoria B. Valentine, P.E., Manager of Product Standards – Intermediate

Stairways, escalator openings, trash chutes and linen chutes are all types of vertical shafts. These vertical openings between floors require special sprinkler protection. This program will review NFPA 13 and model building codes including draft stops and closely spaced sprinkler requirements.

August 23, 2005 – **Atria and High Ceilings** – Kevin J. Kelly, P.E., Manager of Codes – Intermediate

The concept of sprinkler protection located at very high ceilings or in open areas connecting multiple floors has been an area of study for many years and has the potential for future research. This seminar will cover the current rules from NFPA standards and the model building codes for sprinklers in these areas. This seminar will also cover research that has led to the current rules and recommendations.

September 13, 2005 – **Sprinkler Temperature Ratings** – Kenneth E. Isman, P.E., Assistant Vice President of Engineering – Beginner/Intermediate

Although ordinary temperature sprinklers are encouraged in most circumstances, there are a number of locations where higher temperature classification sprinklers are required or where their use would be advantageous to the design of the system. This program will cover the requirements of where higher temperature sprinklers are required and where they can be used to improve the design of the system.

September 27, 2005 – **Meters, Backflow Preventers, and Pressure Reducing Valves** – Russell P. Fleming, P.E., Executive Vice President – Intermediate

Meters, backflow preventers, and pressure reducing valves share a common feature: they are installed on water supply lines upstream of fire sprinklers. This seminar describes the function of these devices, the various types, laboratory requirements, and how they work. It also examines how these devices are regulated with regard to installation in accordance with NFPA 13 and inspection in accordance with NFPA 25.

October 11, 2005 – **Pitching and Draining of Sprinkler Systems** – Cecil Bilbo, Director of Technical Services – Intermediate

This seminar will discuss the requirements for the proper Pitching and Draining of Automatic Fire Sprinkler Systems. The seminar will focus on the design, installation and testing

requirements from NFPA 13 and NFPA 25. The requirements for material selection from NFPA 13 will also be covered.

October 25, 2005 – **Hose Stream and Hose Stations** – Kevin J. Kelly, P.E., Manager of Codes – Intermediate

NFPA 13 has specific criteria for hose connections supplied by sprinkler systems. The rules for the installation and use are different than those for standpipes. This seminar will cover the current installation rules from NFPA 13 as well as when these systems are required to be installed. Topics covered include; protection of storage, hose equipment, flow and pressure requirements, hose station location, proper use and training, plans and calculations.

November 8, 2005 – **Sloped Ceilings** – Victoria B. Valentine, P.E., Manager of Product Standards – Intermediate

Current installations involve a variety of sloped ceiling conditions and different types of sprinklers used under the sloped ceilings. This program will review sloped ceiling arrangements and the guidance provided by NFPA 13. Special attention will also be given to combustible concealed spaces of wood truss construction with members closely spaced and a slope having a pitch of 4 in 12 or greater.

November 22, 2005 – **Obstructions** – Kenneth E. Isman, P.E., Assistant Vice President of Engineering – Intermediate

This program will review the obstruction rules for standard spray sprinklers, extended coverage sprinklers, residential sprinklers and ESFR sprinklers. Basic clearance issues will be discussed along with the beam rule, three-times rule (four-times rule for extended coverage) and the partition rule. Isolated and continuous obstructions for ESFR sprinklers will be covered along with a discussion of specially listed ESFR sprinklers that are less susceptible to obstruction concerns.

December 6, 2005 – **Fire Department Connections** – Cecil Bilbo, Director of Technical Services – Intermediate

This seminar will discuss the requirements for Fire Department Connections on Automatic Fire Sprinkler Systems. The seminar will focus on the design and testing requirements from NFPA 13, NFPA 14 and NFPA 25. The requirements for material selection from NFPA 13 and NFPA 1963 will also be covered.