



Tuesday e-Tech Alert
April 24, 2007
Number 81

Use Caution with In-Rack Sprinkler Selection for Aerosol Storage

In a previous *eTechAlert* (No. 60 – July 18, 2006), NFSA members were cautioned about conflicts within the in-rack sprinkler diagrams of the 2002 edition of NFPA 30B – *Code for the Manufacture and Storage of Aerosol Products*. Face sprinklers were shown in the plan views in Figures 6.3.2.7(b)(3) and 6.3.2.7(c)(3), but not in the elevation views. These figures were corrected in the 2007 edition of the document.

Some NFSA members have now encountered problems relating to the orifice size of in-rack sprinklers that are allowed. Tables 6.3.2.7(a) through 6.3.2.7(l) appear to designate the use of in-rack sprinklers with K-factors greater than or equal to K-8.0. This would allow the use of K-11.2, K-14.0, K-16.8 and even K-25.2 spray sprinklers in racks. Table 7.4.1, which deals with the use of ESFR sprinklers in retail sales applications, lists quick response K-11.2 sprinklers as the only in-rack sprinkler option. This violates NFPA 13 (Section 8.13.2.1 in the 2007 edition), which states that in-rack sprinklers can only be K-5.6 or K-8.0. This section of NFPA 13 is important because it gets coupled with sections in chapters 12 through 20 that provide discharge criteria for in-rack sprinklers. In most cases, discharge criteria are given in terms of minimum pressures, in which case users generally choose the smaller orifice sprinkler (K-5.6) to meet the criteria. In a few cases, NFPA 13 specifies a minimum flow, i.e. 30 gpm, leading users to choose the largest orifice sprinkler allowed in order to decrease the pressure at the most remote sprinkler. Since the largest in-rack orifice sprinkler allowed is K-8.0, this calls for a minimum pressure at the most remote sprinkler of 14 psi.

If NFPA 30B intends to allow the use of larger orifice sprinklers, the 30 gpm requirement could theoretically be met by a K-11.2 sprinkler at 7.2 psi, a K-14.0 sprinkler at 4.6 psi, or a K-25.2 sprinkler at 1.4 psi. Obviously, these sprinklers are not allowed to be used at pressures less than 7 psi in accordance with their listing. Spray patterns do not develop sufficiently at lower pressures.

NFSA researched the history of the development of these tables, and it appears that the Technical Committee on Aerosol Products made a deliberate decision to allow the larger orifice sprinklers. There is a specific reference in the public comments regarding the use of sprinklers with orifice sizes greater than 8.0. There is also a reference to a single fire test that was performed with K-11.2 in-rack sprinklers at 45 gpm (16 psi) that was successful.

As a result, NFSA specifically asked the following of the staff liaison for the committee:

- 1) Are sprinklers with orifice sizes greater than 8.0 allowed to be used as in-rack sprinklers even though NFPA 13 does not allow such use of these sprinklers?
- 2) If the answer to question 1 is “yes”, what is the minimum pressure (if any) at which these sprinklers are allowed to be used?

Greg Harrington, the NFPA staff liaison, has responded to the first question with the opinion that the answer is “no”. He has urged NFSA to proceed with a proposed change to one or both documents to correct any perceived conflict between NFPA 13 and 30B, using a Tentative Interim Amendment if the subject is viewed as an emergency. His opinion is that it is not the intent of NFPA 30B to permit an arrangement specifically prohibited by NFPA 13 unless NFPA 30B specifically states such arrangement is permitted for a particular application. In such case, following NFPA guidelines, NFPA 30B is obligated to explain the deviation from NFPA 13 via an annex note, which it has not done.

NFPA 13 and NFPA 30B essentially reference each other. NFPA 30B is one of only three NFPA documents (NFPA 30 and NFPA 409 being the others) from which NFPA 13 does not extract and reprint specialized sprinkler system discharge criteria, but whose discharge criteria are instead referenced for use by the sprinkler standard (See Section 21.3.1 in the 2007 edition of NFPA 13). NFPA 30B in turn requires conformance with NFPA 13 through a reference in Section 4.6.1. The question of whether the choice of in-rack sprinkler orifice size falls within the “discharge criteria” is one that may need to be resolved by the NFPA Standards Council.

Upcoming NFSA “Technical Tuesday” Online Seminar – May 8th

Topic: Changes to the Residential Sprinkler Standards

Instructor: Kenneth E, Isman, P.E., NFSA Vice President of Engineering

Date: May 8, 2007

This seminar will discuss the major changes in the 2007 editions of NFPA 13R and NFPA 13D. Included in the discussion for this seminar will be a complete analysis of how to handle obstructions to residential sprinklers and the use of residential sprinklers under ceiling configurations that were not contemplated during the listing process.

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

Upcoming NFSA “Business Thursday” Online Seminar – May 17th

Topic: Construction Defect Laws

Instructor: Buddy Dewar, NFSA Director of Regional Operations

Date: May 17, 2007

The cost of correcting construction defects can be quite expensive but often pales to the cost of litigation that may or may not accompany the conflict. Often fire sprinkler contractors are faced with litigation to correct construction defects caused by other trades. And this litigation often leads to negative insurance claim history that surface during renewal periods. This seminar reviews legislation that has passed many state Legislatures and details language necessary for inclusion in legislation to help protect the contractor. A sample draft law will be provided.

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

NFSA Announces “Technical Tuesday” Schedule for 2nd Half of 2007

The following topics have been selected for the online technical classes for the second half of 2007:

Date	Topic	Instructor
July 17	Multipurpose Piping	Russell P. Fleming, P.E.
Aug 7	Flammable and Combustible Liquids – Part 1	Victoria B. Valentine, P.E.
Aug 21	Concealed Space Area Calculations	Cecil Bilbo, Jr.
Sept 11	Smoke and Heat Vents	Michael Friedman, P.E.
Sept 25	Cloud Ceilings	Kenneth E. Isman, P.E.
Oct 9	Special Considerations for Dry Systems	Cecil Bilbo, Jr.
Oct 23	Flammable and Combustible Liquids – Part 2	Victoria B. Valentine, P.E.
Nov 6	Spec Buildings	Kenneth E. Isman, P.E.
Nov 20	NFPA 25 – 2007 Update	Russell P. Fleming, P.E.
Dec 11	Other Problem Areas/Frequently Asked Questions	Cecil Bilbo, Jr.

The following are the descriptions for each class:

July 17, 2007 – **Multi-Purpose Piping Systems** – Russell P. Fleming, P.E, Executive Vice President – Basic/Intermediate

NFPA 13 specifically recognizes the use of sprinkler systems with non-fire protection connections, and NFPA 13D and NFPA 13R also contemplate some types of combined piping systems. This seminar will provide a historical review of combination system concepts, review the current applicable rules of the NFPA standards, and discuss the potential impacts of their use. Do these systems simply represent an available alternative or are they the future of the fire sprinkler industry?

August 7, 2007 – **Flammable and Combustible Liquids – Part 1** – Victoria B. Valentine, P.E., Manager of Product Standards – Basic/Intermediate

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.

August 21, 2007 – **Concealed Space Area Calculations** – Cecil Bilbo, Jr., Director of Technical Services – Basic/Intermediate

There are many different requirements for defining the remote areas of a sprinkler system when concealed spaces are present. This seminar will discuss the calculation of sprinkler systems when there are concealed spaces present. It will define concealed spaces and explain the differences between the types of concealed spaces. In addition, the 3,000 sq ft rule and how eaves and overhangs affect these decisions will be included. Also, optional methods of protection for these spaces will be reviewed.

September 11, 2007 – **Smoke Vents, Heat Vents, and Draft Curtains** – Michael J. Friedman, P.E., NFSA Consultant – Intermediate

While not the primary function of a sprinkler design technician, the effect of smoke vents, heat vents, and draft curtains on sprinkler performance is critical to proper sprinkler placement and integration of venting systems. This seminar will provide information a technician needs to know and the effect on sprinkler layout.

September 25, 2007 – **Cloud Ceilings** – Kenneth E. Isman, P.E, Vice President of Engineering – Intermediate

They have been called “Cloud Ceilings”, “Non-continuous Ceilings” and even “Islands in the Sky” by architects. These architectural features can be described as any ceiling that is not continuous across an entire room or space creating multiple objects in between the observer on the floor and the eventual roof of the room or space. As far as fire sprinklers are concerned, the issues are whether to sprinkle above or below these features (or both). This seminar will address all of the relevant concerns of matching a sprinkler system to a variety of different architectural features that have the potential to block hot gasses from getting to sprinklers and the potential to block discharge from the sprinklers from getting to the floor below.

October 9, 2007 – **Special Considerations for Dry Systems** – Cecil Bilbo, Jr., Director of Technical Services – Intermediate

This seminar will discuss the special requirements that are often overlooked on dry systems. The discussion will include the calculation of water delivery times and the new manifolds for testing systems in this manner, as well as the new requirements for signs and information on a dry sprinkler system. Also, find out if the small room rule and the largest room method can be used on dry systems. More importantly, the TIA recently issued for dry systems and its affect on the development of the 2007 edition of NFPA 13 will be discussed. In addition, this seminar will take a look at the history of the requirements for water delivery in NFPA 13 over the last hundred years.

October 23, 2007 – **Flammable and Combustible Liquids – Part 2** – Victoria B. Valentine, P.E., Manager of Product Standards – Intermediate

Automatic fire protection for inside storage of flammable and combustible liquids is one of the most common topics that sprinkler contractors have to deal with in NFPA 30. There are many protection schemes that are laid out for the users based on testing data. This seminar will focus on the different arrangements of inside storage and the options put forth by NFPA 30 including the flow charts used for determining protection. In addition, where in-rack protection is needed the schemes will be reviewed.

November 6, 2007 – **Spec Buildings** – Kenneth E. Isman, P.E., Vice President of Engineering – Intermediate

A fundamental assumption of NFPA 13 is that the sprinkler system is designed to match the use of the building. But what do sprinkler contractors do if the use of the building has not been established by the owner? What if the owner does not know how the building is going to be used and is just putting up the building in the hopes that someone else will buy or lease it? This

seminar will provide strategies that sprinkler contractors can use to adequately protect these buildings that are being constructed without specific uses in mind.

November 20, 2007 – **NFPA 25 Update** – Russell P. Fleming, P.E., Executive Vice President – Basic/Intermediate

The 2008 edition of NFPA 25, presented at the June 2007 NFPA conference, includes new responsibilities for system inspectors. Among other items, the committee has been concerned about the lack of signage and the need for an air pressure integrity test for dry pipe systems. The committee has also attempted to address long-standing gray areas such as the degree to which a water supply can deteriorate before an investigation of adequacy is warranted, and the tests needed following component replacement or repair. Even in areas where older editions of NFPA 25 are enforced, the new provisions represent the state of the art that can impact the liability of companies performing inspection, testing and maintenance.

December 11, 2007 – **Special Storage Sprinkler Systems** - Cecil Bilbo, Jr., Director of Technical Services – Intermediate/Advanced

There have been numerous types of sprinklers listed for use in Storage Applications in recent years. Now there are entire systems listed for use in Storage Applications. This seminar will discuss the many options available and the history behind their development. From Large Orifice, to Large Drop, to ESFR, to Big Box, to Antifreeze, all of the available options on the market will be discussed. Also included will be a conversation about “surrounding and drowning” a fire. Understanding the limitations faced by all of these products will help you choose the best strategy for winning the next bid on a storage project.

Additional NFSA Training Opportunities

Two-Week Technician Training Seminar

September 24- October 5 Kansas City, MO

This seminar, the last available for 2007, also serve as a starting point for the NFSA’s two-year Certificate Program for Fire Sprinkler Technicians. For more information, contact Nicole Sprague at 845-878-4200 ext. 149 or email: Sprague@nfsa.org.

3-day Advanced Technician Training Classes

July 24-26 Chicago, IL
September 5-7 St Louis, MO

For more information, contact Nicole Sprague at 845-878-4200 ext. 149 or email: Sprague@nfsa.org.

NICET Inspector Certification Review Classes

May 22-24 Anchorage, AK

June 19-21
August 14-16
November 6-8

Wilmington, DE
San Antonio, TX
Providence, RI

For more information, contact Nicole Sprague at 845-878-4200 ext. 149 or email:
Sprague@nfsa.org.

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:

May 2	Foam Water Systems (1/2 day) (AM)////Las Vegas, NV
May 2	Advanced Pump Layout Procedures (1/2 day)(PM)////Las Vegas, NV
May 8	Inspection, Testing & Maintenance////Colorado Springs, CO
May 9	Residential Sprinklers Homes to High-Rise////Colorado Springs, CO
May 10	Underground Piping (1/2 day) (AM)////Colorado Springs, CO
May 10	Standpipe Systems (1/2 day) (PM)////Colorado Springs, CO
May 15-16	Two-day NFPA 13 Overview & Intro to Plan Review////Richmond, CA
May 17	Inspection, Testing & Maintenance////Richmond, CA
May 29	Introduction to Sprinkler Systems (1/2 day)(AM)////Southfield, MI
May 29	NFPA 13 2002 Update (1/2 day)(PM)////Southfield, MI
May 30	Sprinkler Protection for General Storage////Southfield, MI
May 31	Sprinkler Protection for Rack Storage////Southfield, MI
May 29-30	Two-day NFPA 13 Overview & Intro to Plan Review////Rogers, AR
May 31	Hydraulics for Fire Protection////Rogers, AR
June 5-6	Two-day NFPA 13 Overview & Intro to Plan Review////Anchorage, AK
June 7	Inspection, Testing & Maintenance////Anchorage, AK
June 5-6	Two-day NFPA 13 Overview & Intro to Plan Review////Willoughby, OH
June 7	Underground Piping (1/2 day) (AM)////Willoughby, OH
June 7	Advanced Pump Layout Procedures (1/2 day)(PM)////Willoughby, OH
June 5	Hydraulics for Fire Protection////Albany, NY
June 6	NFPA 13 2002 Update////Albany, NY
June 7	Pumps for Fire Protection////Albany, NY
June 12-13	Two-day NFPA 13 Overview & Intro to Plan Review////Holland, MI
June 14	Hydraulics for Fire Protection////Holland, MI
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

For more information or to register, visit www.nfsa.org or call Michael Repko at 845-878-4207 or email: seminars@nfsa.org.

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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.

In the promotion of the fire sprinkler concept, the National Fire Sprinkler Association represents all fire sprinkler industry interests including fire sprinkler contractors, manufacturers and suppliers of fire sprinklers and related equipment and fire protection professionals. Established in 1905, the National Fire Sprinkler Association provides publications, nationally accredited seminars, representation in codes and standards-making, market development, labor relations and other services to its membership. Headquartered in Patterson, New York, the National Fire Sprinkler Association has regional operations offices throughout the country.