



**Tuesday e-Tech Alert**  
**June 28, 2005**

## **In-Rack Sprinkler Connections**

The rules relating to in-rack sprinklers are not found in one place but scattered throughout NFPA 13 according to subject area. This is very evident in the index of NFPA 13, where there are two dozen different subheadings leading to section references for rules on “in-rack sprinklers.”

Rules for connection of in-rack sprinklers to ceiling sprinklers are sometimes confused with the rules for hose connections to ceiling systems, but they are more stringent. The two sets of rules are related due to the fact that Section 8.16.5.1.3 (NFPA 13 2002 edition) allows hose connections in rack storage areas to be taken from the ceiling system in the same area “as long as in-rack sprinklers are provided in the same area and are separately controlled”. Otherwise the hose connections must be fed from outside hydrants, a separate piping system for small hose stations, valved hose connections on sprinkler risers upstream of all sprinkler control valves, or adjacent sprinkler systems.

Connection of in-rack sprinklers to ceiling systems is addressed in Section 8.15.1.6. The basic rule in 8.15.1.6.1 is that separate indicating control valves and drains be provided for rack sprinkler systems so that ceiling and in-rack sprinklers can be controlled independently. The maximum size of an in-rack system is limited by Section 8.13.1 to 40,000 sq. ft., regardless of the number of levels of in-rack sprinklers. This matches the maximum size of a ceiling sprinkler system used to protect storage per Section 8.2.1, but there is no requirement that the ceiling and in-rack systems be aligned.

Sections 8.15.1.6.2 and 8.15.1.6.3 state special circumstances under which the in-rack sprinklers do not have to be fully independent of the ceiling sprinklers, and appeared as exceptions in prior editions of NFPA 13. Section 8.15.1.6.2 simply allows up to 20 in-rack sprinklers to be fed directly from any one ceiling system without the need for a separate indicating valve. Section 8.15.1.6.3 allows the separate indicating valves to be arranged as sectional valves “where the racks occupy only a portion of the area protected by the ceiling sprinklers.”

The wording of this last section is so broad as to open the door to abuse and loss of the original intent. Since there are no limits on the number of in-rack sprinklers or the floor area covered by the in-rack system, it could be used for a situation in which the rack storage occupies almost all of the storage area. In an extreme case, it has been pointed out that it could be used to allow a sectional valve to serve a 40,000 sq. ft. rack system within a building with a ceiling system protecting 40,000 sq. ft. of storage and an additional 12,000 sq. ft. of office space. It could also be used to justify the use of sectional valves to in-rack sprinklers from adjacent ceiling systems, provided there was at least some overlap between the in-rack sprinklers and the opposite ceiling sprinklers.

This poorly worded provision of NFPA 13 had its origin in the 1995 edition of NFPA 231C, and the intent was not well documented when it was brought into that standard. The intended limits of its application remain a gray area today. Even the NFPA’s *Automatic Sprinkler Systems*

*Handbook* has a difficult time with Section 8.15.1.6.3, using a diagram (labeled Exhibit 8.36) to illustrate its use, but inserting a mysterious additional sectional control valve for the downstream ceiling sprinklers.

In general, it is required that in-rack sprinklers be controlled through entirely separate indicating valves. This has obvious advantages in terms of maintaining protection when either system is temporarily shut down for repairs or modifications. Section 8.15.1.6.2 already defines a small system for which this concern is not considered necessary. With its allowance of sectional valves, Section 8.15.1.6.3 addresses half the concern: it allows the rack system to be shut down without impairing the ceiling system, but not vice versa. It should therefore be applied with caution.

### **Upcoming NFSA Technical Tuesday Online Seminar:**

**Fire Sprinkler Update from the 2005 NFPA World Safety Conference**  
**Instructor: Russell P. Fleming, P.E., NFSA Executive Vice President**  
**Date: July 12, 2005**

The NFPA has now merged its spring and fall meetings into a single annual World Safety Conference and Exposition, held June 6-10, 2005 in Las Vegas, Nevada. 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. Even those who were at the NFPA conference could not have attended even half of the technical presentations covered in this seminar.

Information and registration for this seminar can be found at [www.nfsa.org](http://www.nfsa.org).

### **2<sup>nd</sup> Half 2005 Online Seminar Series Announced**

The seminar noted above is the first of a new series of ten online seminars scheduled for the second half of 2005. 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](http://www.nfsa.org) for full descriptions and registration for the online seminars. Checking all ten boxes for the seminar series will result in the discount. Other seminars in the series:

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

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

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

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

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

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

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

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

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