



Tuesday e-Tech Alert
February 20, 2007
Number 76

Beware of “Special” Records Storage Warehouse Protection Criteria

Several NFSA members have asked recently about special protection criteria for records storage warehouse protection. One of the leading records storage firms is advocating the use of their own special criteria in lieu of strict application of the NFPA standards. There is concern that this is the same basic protection scheme about which NFSA issued a warning in the November/December 1997 edition of *Sprinkler TechNotes*, following the total loss of a records storage warehouse operated by that company in New Jersey.

At the time the *Sprinkler TechNotes* warning was issued, the International Fire Code Institute (IFCI) had published a new Uniform Fire Code Standard 81-4, which incorporated the special criteria. A major departure from NFPA 231C involved the consideration of service aisles as the flues, with sprinklers located below the catwalks, but no in-rack sprinklers for the longitudinal flues between double row racks. When NFSA pointed out shortcomings of the proposed standard relative to NFPA criteria, the standard was quietly withdrawn by the IFCI.

Test Data Addresses Only Shelf Storage, Not Rack Storage with Shelves

The special criteria currently being advocated appears to continue to involve the use of records stored in racks with solid shelves, in which the only “in-rack” sprinklers are placed under intermediate catwalks located between sets of double-row racks. The advocates of this protection scheme point to a test conducted in April of 2000 for the National Archives and Records Administration, the report of which was prepared by Rolf Jensen and Associates. While relevant test data can certainly be used to support departures from NFPA 13 using the “equivalency” clause (Section 1.5 in the 2007 edition), the Authority Having Jurisdiction and other parties must be sure that the test condition matches the proposed application.

The test conducting in 2000, like previous testing of records storage conducted with sprinklers under catwalks, involved paper records stored on shelves. Shelf storage is not the same as rack storage with solid shelves. The difference is the presence of internal flue spaces within racks, which allow the spread of fire up through racks. Shelf storage has no internal flue spaces and tends to force the heat from the fire out into the aisles where sprinklers under the catwalks can be effective. With racks, the sprinklers under the catwalks will be substantially delayed in their operation while the fire grows upward within the unprotected flue spaces, potentially overwhelming ceiling sprinklers.

The 2000 Shelf Storage Test Result

In the 2000 test, the records were stored on what was referred to as “a typical shelving arrangement”. Included with the paper records was a minor amount (5% by volume) of plastics (magnetic computer tape). Two sets of double-row shelving units were separated by a 30-inch

aisle. Each metal shelf unit was 42 inches long by 30 inches deep, with shelves spaced 12 inches apart vertically. The array was 30 ft high, with catwalks located at the 16.25 ft and 24.5 ft elevations. The total width of the array was 12.5 ft wide, consisting of the four 30-inch shelf widths plus the 30-inch aisle. The shelving units abutted each other, allowing no flue spaces.

Ignition took place along the bottom face of one side of the aisle, centered between two of the sprinklers under the lower catwalk. The first sprinkler to operate (2 minutes and 51 seconds into the fire) was a sprinkler located under the upper catwalk directly above the ignition point. By this time the flames had reached the 12-ft level on both sides of the aisle. The operation of the sprinkler prevented further upward development of the fire, and final extinguishment of the fire was accomplished with a fire hose approximately 29 minutes into the fire. No operation took place of ceiling sprinklers or sprinklers under the lower catwalk. The report concluded that 155°F quick response sprinklers should be staggered under the catwalks with a maximum spacing of 7 ft on center.

NFPA 13 Protection Criteria for Shelf Storage of Records

Protection for shelf storage is found in Section 12.2 of the 2002 edition of NFPA 13 and in Chapter 14 of the 2007 edition and is limited to 15 ft in height. Section 12.2.2.4 of the 2002 edition (Section 14.5 of the 2007 edition) contains special criteria for protection of storage with sprinklers located under walkways at vertical intervals not exceeding 12 ft, with sprinklers spaced not more than 8 ft apart horizontally.

NFPA 13 Protection Criteria for Rack Storage of Records

For records stored on racks, i.e. storage configurations with flue spaces, the fact that aisles are usually less than 3.5 ft in width brings in multiple row rack criteria. For storage up to and including 25 ft in height, the criteria can be found in Section 12.3.2.1.4 of the 2002 edition or Section 16.2.1.3.3.2 of the 2007 edition. In-rack sprinklers are mandatory over 15 ft, with maximum 12 ft spacing and maximum protection area of 100 sq. ft. While not specifically calling for staggering of sprinklers, the standard states “the rack plan view must be considered to determine the area covered by each sprinkler”, which suggests it would be unacceptable to place in-rack sprinklers only under catwalks while ignoring the longitudinal flues between back-to-back racks. Where flue spaces are not maintained between typical “pallet loads”, solid shelf criteria (Section 12.3.1.9 in the 2002 edition or Section 16.1.6 in the 2007 edition) must be applied.

For the protection of multiple row rack storage greater than 25 ft in height, the general protection criteria calls for minimum 4 ft aisles and no solid shelves (Section 12.3.4.1.3 in the 2002 edition and Section 16.3.12 in the 2007 edition). The only protection option allowed by NFPA 13 for Class III storage exceeding 25 ft in height with aisles less than 4 ft in width involves the use of ESFR sprinklers in accordance with Section 12.3.4.3 of the 2002 edition or Section 16.3.3 of the 2007 edition. Solid shelves are not permitted with ESFR sprinklers.

Summary

In addition to the loss of the records storage warehouse in New Jersey in 1997, there have been other very severe losses in these types of facilities. As recently as July of 2006 a records storage center in London, England, was a total loss to fire despite protection by a fire sprinkler system. Neither the British Automatic Fire Sprinkler Association nor the European Fire Sprinkler

Network has been able to obtain information about the design of the sprinkler system, but the facility was operated by the same company that lost the facility in New Jersey.

The protection of records storage deserves additional and appropriate fire testing, but conservatism is warranted in the meantime. For storage on shelves without flue spaces, NFPA 13 currently allows protection to maximum 15 ft in height with sprinklers under catwalks in addition to ceiling sprinklers. The Authority Having Jurisdiction is in a position to allow greater storage heights based on test data in support of that configuration. For storage on racks, typical narrow aisles mean that NFPA 13 criteria for multiple row racks must be used, and solid shelf criteria must be applied unless all transverse and longitudinal flues are provided so as to allow consideration as open rack storage.

Upcoming NFSA “Business Thursday” Online Seminar – March 1st

Topic: Preventing Sexual Harassment

Instructor: Dave Bowman, PhD

Date: March 1, 2007

Most managers are aware that it is illegal to discriminate on the basis of gender, and they even know that they have to be careful about words and actions that can be construed as sexual harassment. Yet, sex discrimination and sexual harassment are issues that continue to create legal problems for companies. Managers must understand sexual harassment is a form of sex discrimination, and they must be able to identify the types and patterns of sexual harassment. They must be ready, willing, and able to change their own behaviors to create the right environment and set the proper example for employees to eliminate any possibility of sexual harassment claims. The overall objective for participants of this course is to recognize what is and what isn't sexual harassment.

By the end of this course, participants will be able to do the following:

- State why it is important to understand issues of sexual harassment
- Define the terms sex discrimination and sexual harassment
- Describe the two types of sexual harassment: quid pro quo and hostile work environment
- Recognize the factors that contribute to a hostile work environment
- List common patterns of harassment
- State methods of preventing sexual harassment
- Be mindful of the company's policy on sexual harassment
- Describe appropriate conduct in the event a sexual harassment investigation occurs

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 Technical Tuesday Online Seminar – March 6th

Topic: Changes to Underground Piping and Water Supplies

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

Date: March 6, 2007

Chapter 10 of NFPA 13 has been extracted completely out of NFPA 24 so that the two documents have exactly the same requirements for the installation of underground pipe. This program will discuss the relevant changes to all of NFPA 24, Chapter 10 of NFPA 13 and the significant changes in the old Chapter 15 of NFPA 13 on Water Supplies, now renumbered as Chapter 23.

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.

Remaining NFSA Two-Week Technician Training Events

Just like the two-week technician training seminar held in Philadelphia in October, the seminar recently completed in Denver, CO was totally sold out. Make your reservations early for the two remaining technician training events in 2007:

April 16-27	Orlando, FL
September 24- October 5	Kansas City, MO

These seminars also serve as starting points 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.

2007 Schedule for 3-day Advanced Technician Training and NICET Inspector Certification Review Classes

The NFSA Engineering Department has set up the following classes for open registration:

May 22-24	ITM NICET Review	Anchorage, AK
June 19-21	ITM NICET Review	Wilmington, DE
July 24-26	Advanced Technician Training	Chicago, IL
August 14-16	ITM NICET Review	San Antonio, TX
September 5-7	Advanced Technician Training	St Louis, MO
November 6-8	ITM NICET Review	Providence, RI

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

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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.