



Tuesday e-Tech Alert
August 28, 2007
Number 93

Cultural Resources TIA Would Ban Grooves for Dry and Preaction

The NFPA Committee on Cultural Resources is proposing a Tentative Interim Amendment to the current (2005) edition of NFPA 909 – *Protection of Cultural Resource Properties – Museums, Libraries and Places of Worship*s aimed at ensuring higher quality dry and preaction sprinkler systems for their special water-sensitive facilities. Part of the original impetus for the TIA was to ensure that piping in preaction systems is pitched – the Committee is aware that this is a new requirement in the 2007 edition of NFPA 13 and wants to ensure that systems installed in these special facilities using earlier editions of NFPA 13 are likewise protected against premature piping corrosion. However, the TIA goes beyond pitching to require that steel pipe be internally galvanized and minimum Schedule 40 wall thickness. The most controversial proposal is that piping be joined using threaded connections or cut grooves. The Committee was presented with information suggesting that the small amounts of water trapped in the low points formed by roll grooves can have a detrimental effect on service life of a system. The TIA was officially initiated by representatives of the Colonial Williamsburg Foundation and Hughes Associates.

The TIA would only affect NFPA 909, not NFPA 13. Any comments should be filed with the Secretary of the NFPA Standards Council no later than September 7, 2007. Comments can be sent to stds_admin@nfpa.org and should reference TIA Log No. 888. No form is required, but comments should be sent on company letterhead. The full text of the proposed TIA is as follows:

12.4.4.3* Preaction and dry pipe systems shall be designed to minimize the risk of corrosion in accordance with the requirements of 12.4.4.3.1 through 12.4.4.3.6.

A.12.4.4.3 Preaction and dry pipe sprinkler systems are more subject to corrosion than standard wet pipe systems, due to the presence of both air and moisture within the pipes. In addition to causing problems which could impair the operation of the sprinkler system and possibly result in system failures, such as preventing valves from opening, restricting water flow and pressure to the sprinklers, and clogging drops and branch lines. The higher rates of corrosion can also result in sprinkler system malfunctions such as leaks that can have a significant adverse impact on sensitive collections and cultural properties. The products of corrosion (black and orange residue made up primarily of ferric and ferrous oxides and hydroxides) that collect in the piping can cause considerable damage to artwork, historic fabric, and collections upon discharge. The corrosion in the systems can also lead to leaks and piping failures, especially at joints, along the bottom of pipes between roll grooves, and other places where moisture accumulates. Based on this, additional precautions are warranted in areas with susceptible collections or historic fabric, or where sprinkler system repairs or replacement of piping would put the building or contents at an unacceptable risk.

12.4.4.3.1* Branch lines shall be pitched at least 1/2 in. per 10 ft. (4mm/m) and mains shall be pitched at least 1/4 in. per 10 ft. (2mm/m).

A.12.4.4.3.1 Although editions of NFPA 13 prior to the 2007 edition permitted the pipe for systems not subject to freezing to be installed without a back pitch, similar to the design of wet pipe systems, this arrangement allows water to accumulate in low points, increasing the rate of corrosion. Proper pitching is an important element in reducing the risk of corrosion. The pitch requirements included in NFPA 13 should be considered the minimum acceptable pitch. Where adequate clearance is provided to permit the system to be installed without causing interferences with structural elements or causing low points, pitches exceeding this minimum requirement such as ½ inch per 10ft, should be considered.

12.4.4.3.2 Auxiliary drains.

12.4.4.3.2.1* Auxiliary drains shall be provided at all low points in accordance with NFPA 13 requirements for dry pipe systems and preaction systems subject to freezing.

A.12.4.4.3.2.1 Additional auxiliary drainage should be provided, in accordance with NFPA 13, regardless of whether the protected area is subject to freezing.

12.4.4.3.2.2 Auxiliary drains shall be opened and water drained periodically, in accordance with the requirements of NFPA 25.

12.4.4.3.3 Steel pipe used in dry and preaction sprinkler systems shall be internally galvanized and have a minimum Schedule 40 wall thickness.

12.4.4.3.4* Sprinkler piping joints shall be cut groove or threaded joints. Rolled groove joints shall not be used.

A.12.4.4.3.4 Rolled grooves trap water, increasing the likelihood of localized corrosion at groove joints and the bottom of pipes.

12.4.4.3.5 Sprinkler piping and fittings shall be inspected annually for signs of corrosion, leakage, and physical damage, in accordance with NFPA 25.

12.4.4.3.6 During the 5 year inspection and test of the sprinkler system, the interior of portions of the piping near the sprinkler riser shall be physically inspected, to determine the extent of corrosion present. Repairs shall be made as necessary.

Submitter's Reason:

Pre-action and dry pipe sprinkler systems often have been favored by curatorial and conservation professionals for the fire protection of museums and libraries and for retrofitting into historic buildings containing museum or library collections because they limit the probability that water in piping over collections would leak, causing damage to valuable and sometimes irreplaceable collections. Prior to the latest edition of NFPA 13, *Standard for the Installation of Sprinkler Systems*, pre-action systems in heated areas were permitted to be installed without back-pitch. In addition, dry systems installed in heated areas with limited space or retrofitted into existing structures frequently have low points that hold water. Finally, the use of rolled joints for sprinkler piping tends to create small pockets of trapped water at the joint, even where sprinkler piping has the proper back pitch. In the last three years at least four museums have experienced moderate to

severe leaks in dry or pre-action sprinkler piping in systems varying in age from 5 ½ to 20 years old that have, in at least two cases, required the complete replacement of the systems. Studies of at least two of the system failures show that corrosion caused by water trapped in piping was the root cause of the system failures. One of the systems also showed evidence of microbiological influenced corrosion as a contributing factor, but the second did not. The proposed Temporary Interim Amendment to NFPA 909 is intended to add requirements for cultural resource properties using dry or pre-action sprinkler systems to improve the corrosion resistance of the systems to prevent leaks that could potentially damage culturally significant collections.

Emergency Nature: NFPA 909 is used largely by those who operate, work in and maintain cultural resource properties. Because of the highly irreplaceable nature of the contents of these facilities, exposure to any hazards that could damage the buildings contents and historic fabric is of concern. This includes water damage as a result of pipe leakage. Recent damage causing incidents involving leaking sprinkler systems as a result of corrosion have been experienced in a number of cultural resource properties and seem to be increasing. In addition to damaging collections, these premature system impairments require significant resource commitments to remedy. More guidance is needed to help minimize these occurrences which seem to be on the rise. While NFPA 13 includes provisions to mitigate the rate of corrosion in sprinkler systems, NFPA 13 provides minimum standards. The proposed changes provide a means of better controlling the effects of corrosion in sprinkler system and subsequent water damage, and provides for a higher degree of protection that is necessary for cultural resource properties. Without this proposed code change, cultural resource properties with pre-action or dry-pipe systems would be placed at an unnecessary higher level of exposure to water damage.

Upcoming NFSA “Technical Tuesday” Seminar – September 11th

Topic: Smoke Vents, Heat Vents, and Draft Curtains –
Instructor: Michael J. Friedman, P.E., NFSA Consultant
Date: September 11, 2007

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.

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” Seminar – September 20th

Topic: Developing Positive Relationships with Fire Officials
Instructor: Doyle Sutton, NFSA Southwest Regional Manager
(Former Nevada State Fire Marshal)
Date: September 20, 2007

Positive Relationships with Fire Officials is a Professional Relationship that is based on many factors: Professional Association, Knowledge, Extensive Training, Certification or Licensing are just a few of these factors. The foundations of permanent relationships are Basic Communication, Trust, Honesty, and Ethics and an oath to uphold these ethics of their profession to a higher stand of accountability. Positive relationships requires an act of advocacy, that one regularly act as an advocate for another individual, group, or entity in support of a common goal or ideal. Developing relationships in the Fire Service does not happen overnight. It takes time, commitment and hard work. This seminar will cover; what is a Positive Relationship, how to development a relationship with Fire Officials in today's busy work environments, plus review some examples of successful ongoing methods of sustaining those relationships.

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 Technician Training Classes

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

November 6-8 *Providence, RI*

For more information on any of these classes, contact Nicole Sprague by calling 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:

Sept 11	Inspection, Testing & Maintenance////Brea, CA
Sept 13	Sprinklers for Dwellings////Brea, CA
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////Carol Stream, IL
Sept 20	Hydraulics for Fire Protection////Carol Stream, IL
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
Oct 30-31 Two-day NFPA 13 Overview & Intro to Plan Review///Spokane, WA
Nov 1 Sprinkler Protection for Special Storage///Spokane, WA

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

NFSA Tuesday eTechAlert is c. 2007 National Fire Sprinkler Association, and is distributed to NFSA members on Tuesdays for which no NFSA Technical Tuesday Online Seminar is scheduled. Statements and conclusions are based on the best judgment of the NFSA Engineering staff, and are not the official position 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.

About the National Fire Sprinkler Association

Established in 1905, the National Fire Sprinkler Association (NFSA) is the voice of the fire sprinkler industry. NFSA leads the drive to get life-saving and property protecting fire sprinklers into all buildings; provides support and resources for its members – fire sprinkler contractors, manufacturers and suppliers; and educates authorities having jurisdiction on fire protection issues. Headquartered in Patterson, N.Y., NFSA has regional operations offices throughout the country. www.nfsa.org.