

Number 140

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Editor - Russell P. Fleming, P.E.

## Ceiling Penetrations in Earthquake Areas and Oversized Holes

As newer editions of the International Building Code (IBC) are adopted and enforced across the United States, fire sprinkler contractors in earthquake-prone areas have been surprised by requirements for oversized holes around sprinkler penetrations of suspended ceilings. The requirement is not found directly within the IBC or in NFPA 13, but in ASCE/SEI 7. This is a standard jointly published by the American Society of Civil Engineers and the Structural Engineering Institute and titled *Minimum Design Loads/or Buildings and Other Structures*. The standard has become the repository for earthquake and other design loads and is referenced in the IBC.

The oversized hole requirement is not considered a sprinkler system requirement but rather a ceiling requirement, applicable only to suspended ceilings. Within ASCE/SEI 7, criteria for protecting sprinkler systems against earthquakes are found in Section 13.6.8 for Piping Systems. The oversized hole criteria are found in Section 13.5.6 on Suspended Ceilings.

The special rules only apply to sprinklers penetrating suspended ceilings in Seismic Design Categories D through F, the higher risk areas. These categories tend to be found on the west coast, in the New Madrid fault area near St. Louis and Memphis, and in the area of Savannah, Georgia. With the exception of essential facilities and hazardous content structures located in soft soil areas, most buildings for which earthquake protection is provided in other parts of the country are in Seismic Design Category C, for which the oversized holes would not be required.

The wording of the ASCE/SEI 7 section in question, Section 13.5.6.2.2(e), is as follows:

**"Except where rigid braces are used to limit lateral deflections, sprinkler heads and other penetrations shall have a 2 in. {50 mm} oversize ring, sleeve, or adapter through the ceiling tile to allow for free movement of at least 1 in. {25 mm} in all horizontal directions. Alternatively, a swing joint that can accommodate 1 in. (25 mm) of ceiling movement in all horizontal directions is permitted to be provided at the top of the sprinkler head extension."**

Some important clarifications and additional information:

- The exception for "where rigid braces are used to limit lateral deflections" relates to bracing of the suspended ceiling, not the sprinkler system.
- The use of flexible drops is widely being considered one means of satisfying the requirement without the oversized holes, since these drops provide at least as much free movement as swing joints.
- The clearances around the sprinkler penetrations are not required if the sprinkler system, other mechanical systems, and ceiling grid are all specially designed and tied together to move as a unit in conformance with Section 13.5.6.3 - "Integral Construction."
- Sprinkler manufacturers are soon expected to introduce special lines of wider escutcheon plates to cover these 1-inch ceiling gaps, as opposed to requiring the use of "goof plates" or "oops plates".
- There are no plans to include these requirements within NFPA 13, not even within the 2010 edition that is currently being prepared, but that does not negate the building code requirement.

## **Upcoming "Business Thursday" Online Seminar - February 19th**

*Topic: Contractors and the Authority Having Jurisdiction*

*Instructor: Bob Kleinheinz, NFSA Illinois Regional Manager*

*Date: February 19, 2009*

The NFSA is proud to present a program on dealing with relationships between the Contractor and the Authority Having Jurisdiction. This program will cover the day to day working relationships that each side needs to foster. When an AHJ and a local contractor get along from the plan review process to the final inspection everyone goes home happy. The most important goal for both sides is to keep the customer happy. By following a few simple guidelines both sides can meet that goal.

## **Upcoming "Technical Tuesday" Online Seminar - February 24th**

*Topic: Small Room Rule*

*Instructor: Cecil Bilbo, Jr., C.E.T., NFSA Consultant*

*Date: February 24, 2009*

The Small Room Rule is actually a combination of two separate requirements (and a definition) in NFPA 13 that applies to the spacing and location of spray sprinklers. The Small Room Rule also has a minor application in the conduction of hydraulic calculations. Many people don't know it, but half of the Small Room Rule can also be used for determining discharge from residential sprinklers under certain conditions. This seminar will review all of these uses for this misunderstood rule.

Information and registration for the above "Technical Tuesday" and "Business Thursday" seminars are available at [www.nfsa.org](http://www.nfsa.org) or by calling Dawn Fitzmaurice at 845-878-4200 ext. 133.

Additional training opportunities available through the NFSA engineering department include...

### **Two-Week Layout Technician Training**

March 2-13, 2009	Orlando, FL
March 23-April 3, 2009	Cincinnati, OH
August 10-21, 2009	Omaha, NE
September 14-25, 2009	Baltimore, MD
October 12-23, 2009	Phoenix, AZ

### **Inspection and Testing for the Sprinkler Industry**

April 7-9, 2009	Champaign, IL
April 14-16, 2009	Long Island, NY
April 21-23, 2009	Nashville, TN
June 16-18, 2009	Leominster, MA

### **Advanced Technician Training**

June 23-25, 2009	Denver, CO
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For more information on the above classes, contact Nicole Sprague using [Sprague@nfsa.org](mailto:Sprague@nfsa.org) or by calling 845-878-4200 ext. 149.

### **In-Class Training Seminars**

The NFSA training department also offers in-class training on a variety of subjects at locations across the country. Here are some upcoming seminars:

February 18	Pumps for Fire Protection	Poughkeepsie, NY
February 19	Standpipe Systems (1/2 Day)	Poughkeepsie, NY
February 19	Underground Piping (1/2 Day)	Poughkeepsie, NY
February 20	Inspection, Testing & Maintenance	Poughkeepsie, NY
February 24	Commissioning & Acceptance Testing (1/2 Day)	Nampa, ID
February 24	Standpipe Systems (1/2 Day)	Nampa, ID
February 25	Hydraulics for Fire Protection	Nampa, ID
February 26	Pumps for Fire Protection	Nampa, ID
March 3-4	NFPA 13 Overview & Intro to Plan Review (2 Day)	Brockton, MA
March 5	Inspection, Testing & Maintenance	Brockton, MA
March 24-25	NFPA 13 Overview & Intro to Plan Review (2 Day)	Bettendorf, IA
March 26	Plan Review Policies & Procedures	Bettendorf, IA
March 24-25	NFPA 13 Overview & Intro to Plan Review (2 Day)	Fairbanks, AK
March 26	Inspection, Testing & Maintenance	Fairbanks, AK
March 27	General Storage	Fairbanks, AK
March 24	Inspection, Testing & Maintenance	Freeport, ME
March 25	Sprinklers for Dwellings	Freeport, ME
March 26	CPVC Sprinkler Piping (1/2 Day AM)	Freeport, ME
March 26	Commissioning & Acceptance Testing (1/2 Day PM)	Freeport, ME
March 30	Introduction to Sprinklers (1/2 Day AM)	Anchorage, AK
March 30	CPVC Sprinkler Piping (1/2 Day PM)	Anchorage, AK
March 31	Pumps for Fire Protection (1/2 Day AM)	Anchorage, AK
March 31	Commissioning & Acceptance Testing (1/2 Day PM)	Anchorage, AK
March 31	NFPA 13 Update	Willoughby, OH
April 1	Hydraulics for Fire Protection	Willoughby, OH
April 2	General Storage	Willoughby, OH

For more information on these seminars, or to register, please visit [www.nfsa.org](http://www.nfsa.org) or call Dawn Fitzmaurice at 845-878-4207 or email [seminars@nfsa.org](mailto:seminars@nfsa.org).

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***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 lifesaving 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](http://www.nfsa.org)*

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