

Tuesday e-Tech Alert

November 1, 2005



Flexible Drops

Listed flexible drops have been around for several years, but are getting a great deal of attention at present. Originally developed for the semiconductor industry to allow easier inspection of duct sprinklers, the stainless steel braided drops have expanded in applications, and models are available that incorporate elbows to accommodate lateral placement with limited ceiling space. The 2000 edition of the UL Fire Protection Equipment Directory was the first to include the “flexible sprinkler hose fittings” with three listings. The 2005 UL Directory includes more than a dozen. Some recent developments with regard to these products:

NFPA 13 Proposal – As it prepares the 2007 edition of the sprinkler standard, the NFPA Technical Committee on Hanging and Bracing acted on a proposal that sought to preclude the use of flexible drops as unsupported armovers, acting instead to propose a new section addressing their use:

“9.2.3.7* Flexible Sprinkler Hose Fittings. Listed flexible sprinkler hose fittings and its (sic) anchoring components, intended for use in installations connecting the sprinkler system piping to sprinklers shall be installed in accordance with the requirements of the listing including any installation instructions.

“A.9.2.3.7 Examples of areas of use include clean rooms, suspended ceilings and exhaust ducts.”

Product Standards – Although FM Global has had a published standard 1637 for these devices for a number of years, Underwriters Laboratories has announced that its subject 2443, which has served as the basis for its listings, will become a standard on November 10, 2006. Efforts have also begun to compare FM and UL requirements in preparation for international standards development activities in this area.

Use in Earthquake Areas – The incorporation of new earthquake protection criteria for ceilings in ASCE 7 as referenced in both the International Building Code and NFPA 5000 has generated greater interest in flexible drops as a means of avoiding oversize escutcheons in high risk earthquake areas such as the west coast. For ceilings in seismic design categories D, E, and F, Section 9.6.2.6.2.2(e) of ASCE 7 states:

“e. 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 are permitted to be provided at the top of the sprinkler head extension.”

Compatibility with CPVC – Noveon has included “Flexhead® fire sprinkler connections” among the products in its compatibility program, based on the assurance that no protective oils are used that would react negatively with its Blazemaster® pipe and fittings.

Some common questions regarding the flexible drops:

Q: Can flexible drops be used as armovers, i.e. have a lateral component?

A: Yes. The fact that the NFPA 13 Committee did not act to preclude the use of the flexible connections as armovers essentially endorsed this practice, although it is expected that listings will address the anchoring issues. The Committee made a statement to accompany its action:

“The committee has concerns with equivalency as a hanger and the relationship and quality control of the support of the ceiling grid. The committee seeks additional information from manufacturers and listing agencies to document the equivalency of these products meeting or exceeding the current level of hanging requirements of NFPA 13 in accordance with the requirements of the equivalency and new technology requirements of NFPA 13.”

In other words, the Committee could still change its position as a result of the public comment period on the proposed change.

Q: Are the flexible drops listed for both wet and dry systems?

A: Use in dry systems requires an additional test by the laboratories, but the flexible drops in the market are all generally listed for both wet and dry service.

Q: What types of ceilings can be used with flexible drops?

A: The flexible drops are listed for use with a ceiling grid bracket for connection to t-bar ceilings. An opinion from UL in June of 2001 clarified that “installation onto a dry wall ceiling is acceptable when the ceiling-mounted bracket is screwed to a rigid surface.” In other words, the bracket normally connected could be approved for connection to the lower chord of trusses or other structural members.

Q: Although the flexible drops would obviously be able to meet the performance of a swing joint for ceilings in high risk earthquake areas, wouldn't the anchoring concerns be greater?

A: ASCE 7 also requires (9.6.2.6.2.2(a)) that a heavy duty t-bar grid system be used for ceilings in Seismic Design Categories D, E, and F, which may offset some of the concerns.

Q: Is there any experience or test results involving the flexible drops in earthquake events?

A: Recently, to address some of the concerns of the NFPA 13 Hanging and Bracing Committee, the Flexhead company submitted its products for full scale seismic testing on a shake table. These may have been the first tests that looked at a combination of non-structural ceiling components including the ceiling system, air diffusers, sprinklers, lighting, etc., and results were reportedly good.

Q: Why are the flexible drops allowed to have interior diameters less than 1 inch?

A: Where the drops are of stainless steel, the listing laboratories consider them not subject to occlusion in the manner of black steel, and therefore more similar to copper tube. Scale from adjacent mains and lines settling in the drops is still a concern and must be addressed per the rules of NFPA 13, but the sprinkler orifice is the critical diameter in that case.

Q: What about the friction loss through these drops?

A: The friction loss through flexible drops cannot be ignored. The laboratories provide friction loss information in terms of the equivalent length of 1-inch schedule 40 pipe using the minimum allowable radius of bending. For each listed flexible sprinkler hose fitting, the UL directory includes the statement: "Maximum number of bends, maximum bend angles, and associated pressure losses are shown in the manufacturer's installation instructions."

Upcoming NFSA Technical Tuesday Online Seminar

Topic: Pitching and Draining of Sprinkler Systems

Instructor: Cecil Bilbo, NFSA Director of Technical Services

Date: November 8, 2005

This seminar will discuss the requirements for the proper pitching and draining of automatic fire sprinkler systems. The seminar will focus on the design, installation and testing requirements from NFPA 13 and NFPA 25. The requirements for material selection from NFPA 13 will also be covered.

To register visit www.nfsa.org.

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