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BULLETIN NO.

11-3

BULLETIN

Date: **May 2011**

Subject: **Antifreeze in New Residential and Commercial Fire Sprinkler Systems - NFPA 13, 13D or 13R**

Reference: **Section 903.2.8 of the building subcode; Section R313 of the one- and two-family dwelling subcode**

Background

The National Fire Protection Association (NFPA) has issued antifreeze safety alerts and Tentative Interim Amendments (TIAs) to NFPA 13, 13D and 13R. They have issued three alerts July 2010, August 2010 and April 5, 2010. The first alert was issued after fire tests revealed flash fires upon activation of the sprinkler head occurred when concentrations of propylene glycol in excess of 40% or glycerin in excess of 50% were used in antifreeze systems. NFPA advised that, if residential systems were installed that contained antifreeze, they should be drained and refilled with water until additional guidance was issued based upon further fire tests. Once the results of these tests were reviewed, NFPA issued a second safety alert in which they recommended that antifreeze levels not exceed 40% propylene glycol or 50% glycerin in existing systems and antifreeze not be used in new systems. Through the latest alert issued on March 5, 2011, a new set of TIAs were released. The NFPA Sprinkler Technical Committees for 13,13D and 13R, as well as the Technical Correlating Committee on Automatic Sprinkler Systems, all agreed that antifreeze can be used in new fire sprinkler system installations.

The Fire Protection Research Foundation had burn tests conducted at Underwriters Laboratories to collect data on the reaction of different antifreeze solutions when exposed to fire. Tests were conducted with many different levels of antifreeze solutions in the sprinkler systems. Some tests confirmed that there is a risk of ignition when higher levels of antifreeze are in the systems. The tests revealed that mixtures of 70% glycerin and 30% water caused a flash fire when the sprinkler head operated. The test also showed that 60% propylene glycol and 40% water also caused a flash fire when the head operated. Further testing revealed that no ignition of the antifreeze spray was observed with propylene glycol not exceeding 40% or with glycerin not exceeding 50%. The fire reaction at these levels upon sprinkler head activation was the same as if only water was being applied.

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Guidance

The Division of Codes and Standards has reviewed the Fire Protection Research Foundation final report, the Underwriters Laboratories Inc. Fire Test Data Summary and NFPA's Tentative Interim Amendments (TIAs). The Department is providing the following guidance.

The Department is allowing the use of antifreeze in new installations; however, other methods of protection should be considered by the designer before deciding that antifreeze must be used. Some examples of other protection methods are dry systems, additional insulation over exposed sprinkler pipes and approved use of heat tape. When a condition exists where sprinkler protection is required in an area that is susceptible to freezing within new installations and antifreeze must be used, it must be a premixed antifreeze solution. NFPA has added a definition of "Premixed Antifreeze Solution" in its last set of TIAs: "A mixture of an antifreeze material with water that is prepared by the manufacturer with a quality control procedure in place that ensures that the antifreeze solution remains homogeneous." NFPA also requires that "All premixed antifreeze solutions shall be provided with a certificate from the manufacturer indicating the type of antifreeze, concentration by volume, and freezing point." The levels of antifreeze must not exceed 40% propylene glycol or 50% glycerin for all occupancies.