



National Fire Protection Association

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MEMORANDUM

TO: NFPA Technical Correlating Committee on Automatic Sprinkler Systems

FROM: Joanne Goyette

DATE: April 14, 2011

SUBJECT: NFPA 13, NFPA 13D, NFPA 13R, and NFPA 24 ROP TCC Letter Ballots (A2012)

In accordance with the NFPA Regulations Governing Committee Projects, attached are the Letter Ballots on the Report on Proposals (ROP) for the 2013 Editions of NFPA 13, NFPA 13D, NFPA 13R, and NFPA 24. Also attached are copies of the Proposals.

Please note the ballot has two parts:

Part 1 is a Letter Ballot on the Technical Correlating Committee Amendments to the ROP (TCC Notes), and not on the Proposals themselves. Reasons must accompany “Negative” and “Abstaining” votes.

Part 2 is an Informational Letter Ballot Authorizing the Release of the ROP.

Negative votes are limited to subjects within the purview of the TCC. Opposition on a strictly technical basis is not sufficient grounds for substantiating a negative vote. If you have correlation issues please identify and describe your concerns in the area of the ballot form for identification of correlation issues.

Please complete and return your ballot as soon as possible but no later than **Thursday, April 28, 2011**. As noted on the ballot form, please return the ballot to Joanne Goyette via e-mail to jgoyette@nfpa.org or via fax to 617-984-7110. You may also mail your ballot to the attention of Joanne Goyette at NFPA, 1 Batterymarch Park, Quincy, MA 02169.

The return of ballots is required by the Regulations Governing Committee Projects. As usual, nonvoting members (for example, the nonvoting technical committee chairs) need not return ballots.

Attachments:

Ballot Forms
NFPA 13, NFPA 13D, NFPA13R, and NFPA 24 Proposals

13-33 Log #CP404 AUT-SSI
(3.4.1.1 Premixed Antifreeze Solution, 7.6)

Final Action: Accept

TCC Action: The TCC directs the TC to review the need to specify the purity of antifreeze solutions, since field mixing is no longer permitted.

Submitter: Technical Committee on Sprinkler System Installation Criteria,

Recommendation: 1. Add a new definition as 3.4.1.1 to read as follows:

3.4.1.1 Premixed Antifreeze Solution . 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.

2. Remove the new section 7.6.1 that was added by issuance of TIA No. 10-1 (Log #1000) and renumber sections.

3. Revise 7.6.1.5 to read as follows:

7.6.1.5 A placard shall be placed on the antifreeze system main valve that indicates the manufacture type and brand of the antifreeze solution, the concentration by volume of the antifreeze solution used, and the volume of the antifreeze solution used in the system.

4. Revise 7.6.2.1 to read as follows:

7.6.2.1* Where sprinkler systems are supplied by potable water connections, the use of antifreeze solutions other than water solutions of pure glycerine (C.P. or U.S.P. 96.5 percent grade) or propylene glycol shall not be permitted.

Antifreeze solutions shall be limited to premixed antifreeze solutions of glycerin (chemically pure or United States Pharmacopoeia 96.5%) at a maximum concentration of 48% by volume, or propylene glycol at a maximum concentration of 38% by volume.

5. Add a new 7.6.2.1.2 to read:

7.6.2.1.2 Premixed antifreeze solutions of propylene glycol exceeding 40% concentration by volume shall be permitted for use with ESFR sprinklers where the ESFR sprinklers are listed for such use in a specific application.

6. Add new 7.6.2.1.3 to read as follows:

7.6.2.1.3 Premixed antifreeze solutions other than those described in 7.6.2.1 that are listed for use in sprinkler systems shall be permitted to be used.

7. Add a new 7.6.2.1.4 to read as follows:

7.6.2.1.4 All premixed antifreeze solutions shall be provided with a certificate from the manufacturer indicating the type of antifreeze, concentration by volume, and freezing point.

8. Delete current Table 7.6.2.2 and replace it with the following table in the annex renumbered as Table A.7.6.2.1

A.7.6.2.1 See Table A.7.6.2.1.

****Insert Table A.7.6.2.1 Here****

8. Delete 7.6.2.3 and Table 7.6.2.3.

~~7.6.2.3 If potable water is not connected to sprinklers, the commercially available materials indicated in Table 7.6.2.3 shall be permitted for use in antifreeze solutions.~~

~~Table 7.6.2.3 Antifreeze Solution to Be Used if Nonpotable Water Is Connected to Sprinklers~~

9. Revise 7.6.2.4 to read as follows:

7.6.2.4 An premix antifreeze solution with a freezing point below the expected minimum temperature for the locality shall be prepared provided.

10. Delete existing 7.6.2.5 as well as the Figures 7.6.2.5(a), 7.6.2.5(b), and 7.6.2.5(c) and Annex A.7.6.2.5.

~~7.6.2.5* The specific gravity of the prepared solution shall be checked by a hydrometer, in accordance with Figure 7.6.2.5(a), Figure 7.6.2.5(b), and Figure 7.6.2.5(c), with suitable scale or a refractometer having a scale calibrated for the antifreeze solution involved.~~

~~FIGURE 7.6.2.5(a) Densities of Aqueous Ethylene Glycol Solutions (Percent by Weight):~~

~~FIGURE 7.6.2.5(b) Densities of Aqueous Propylene Glycol Solutions (Percent by Weight):~~

~~FIGURE 7.6.2.5(c) Densities of Aqueous Glycerine Solutions (Percent by Weight):~~

~~A.7.6.2.5 The following are data sources for Figure 7.6.2.5(c):~~

~~(1) Density data for 100 percent water was taken from Lange's *Handbook of Chemistry*, Revised Tenth Edition, page 1199. Temperatures have been converted from Celsius to Fahrenheit units, and data points at 10 degree Fahrenheit~~

multiplies have been determined by linear interpolation. Conversion from relative to absolute density was achieved by multiplying by 0.999973.

~~(2) Densities of glycerine-water solutions at 0°C and above were taken from Table III (p. 6) in *Glycerol* by Anthony Armin Newman, C.R.C. Press, 1968. Densities for temperatures below 0°C were taken from Table IV. Temperatures have been converted from Celsius to Fahrenheit units, and data points at 10-degree Fahrenheit multiples have been determined by linear interpolation.~~

~~(3) Density data for pure glycerine was taken from Table II (p. 6) in *Glycerol* by Anthony Armin Newman, C.R.C. Press, 1968, and derived from the thermal expansion data in Table 7-9 in *Glycerol* by Carl S. Miner and N. N. Dalton, Reinhold Publishing Corp., 1953 (American Chemical Society Monograph Series #117) using the density for 0°C as a base point. Temperatures have been converted from Celsius to Fahrenheit units, and data points 10-degree Fahrenheit multiples have been determined by linear interpolation.~~

~~(4) Freezing points were taken from the article, "Freezing Points of Glycerol and its Aqueous Solution" by Leonard B. Lane in *Industrial and Engineering Chemistry*, volume 17 (1925), number 9, page 924. Temperatures have been converted from Celsius to Fahrenheit units.~~

~~11. Delete 7.6.2.6.~~

~~7.6.2.6 The concentration of antifreeze solutions shall be limited to the minimum necessary for the anticipated minimum temperature.~~

~~12. Add an asterisk to Section 7.6 and a new Annex A.7.6 to read as follows:~~

A.7.6 In cold climates and areas where the potential for freezing of pipes is a concern, options other than antifreeze are available. Such options include installing the pipe in warm spaces, tenting insulation over the piping (as illustrated in NFPA 13D), listed heat tracing, and the use of dry pipe systems and preaction systems.

~~13. In A.7.6.2, delete the second paragraph.~~

A.7.6.2 Listed CPVC sprinkler pipe and fittings should be protected from freezing with glycerine only. The use of diethylene, ethylene, or propylene glycols is specifically prohibited. Laboratory testing shows that glycol-based antifreeze solutions present a chemical environment detrimental to CPVC.

The use of premixed antifreeze solutions is not required by this standard but can be required for certain specially listed equipment or systems. Thoroughly mixed antifreeze is less likely to drop out of solution. When antifreeze solutions are mixed on-site, the solution should be thoroughly mixed before being pumped into the piping. Prior to pumping solution that is mixed on-site into system piping, several samples should be tested from the batch to ensure that the concentration of the solution is uniform.

~~14. Delete existing A.7.6.2.4 and Figure A.7.6.2.4.~~

~~A.7.6.2.4 Beyond certain limits, an increased proportion of antifreeze does not lower the freezing point of solution (see Figure A.7.6.2.4). Glycerine, diethylene glycol, ethylene glycol, and propylene glycol should never be used without mixing with water in proper proportions, because these materials tend to thicken near 32°F (0°C).~~

~~FIGURE A.7.6.2.4 Freezing Points of Water Solutions of Ethylene Glycol and Diethylene Glycol.~~

Substantiation: Recommendations were primarily based on test results in the Phase 1 and 2 fire tests conducted at Underwriters Laboratories.

Recommendations cover all occupancies in new with few exceptions since the fire test results indicate concerns previously limited to dwelling units would apply to all occupancies. Test data indicate that under certain conditions antifreeze solutions would increase the heat release rates in fires that could adversely affect the benefits of sprinkler protection for both life safety and property protection.

Test data indicated that as concentrations of antifreeze solutions are increased above 50% glycerin by volume or 40% propylene glycol by volume the heat release rates increased as the tested sprinklers discharged at higher operating pressures. The lower concentration of 48% glycerin by volume and 38% propylene glycol by volume limits were set to allow for variations in actual field conditions that could affect performance that may not have been covered in the scope of the recent fire tests. These conditions include different sprinkler types and deflector designs.

Test data indicate that the impact of higher concentration solutions was significant regarding heat release rates following sprinkler operation. Therefore, to avoid high concentration of antifreeze solutions in low elevations and in sprinkler drops, antifreeze solutions would be limited to factory mixed, certified by manufacturers according to industry standards. Factory mixed solutions should remain homogeneous in the systems.

Specific exceptions for ESFR sprinklers for both new and existing systems are included since the other test data associated with the listings support their continued use at higher percent volume antifreeze solutions.

When considering systems used in freezing areas, other types of (non- antifreeze) systems should be encouraged

since there remain areas that should be further investigated to assess the impact of antifreeze type systems on fire control.

Allowances are permitted for other types of antifreeze solutions when fully investigated consistent with the listing process. This is consistent with current NFPA standards encouraging new technologies.

Committee Meeting Action: Accept

Number Eligible to Vote: 30

Ballot Results: Affirmative: 27 Negative: 1

Ballot Not Returned: 2 Kirn, M., Slocum, L.

Explanation of Negative:

MILLER, T.: This proposal eliminates the historical small antifreeze systems that have been in this standard for over 50 years. The committee should have never permitted the installation of large antifreeze systems that were not specifically tested and listed. This change about 10 years ago is what lead to the present problem.

Comment on Affirmative:

KEEPING, L.: While this proposal is absolutely needed in lieu of the current TIA No. 10-1 (Log #1000) and I generally agree with the substance, I remain uncomfortable with some of the elements:

- The properties of 48% glycerin and 38% propylene glycol are not represented in Table A.7.6.2.1, so information that is needed for design and for out in the field is still missing.
- The need for the premixed solutions to be prepared by a manufacturer, rather than by any other agency remains unconvincing. To date questions that have been asked remain unanswered and the information provided on this subject has been all anecdotal, whereas as a definitive technical report is needed.
- Further testing and/or research using standard spray sprinklers, rather than just the residential types, is needed.

13-39 Log #515 AUT-SSI
(3.5 Various Definitions, 9.3.3, and A.9.3.3 (New))

Final Action: Reject

TCC Action: The TCC Rejects this proposal

Current products marketed as "seismic loops" are not evaluated for their ability to accommodate seismic movement, this action could have the unforeseen consequence of not allowing current products to use the term. The HBS TC should evaluate whether such products require listing and whether, independent of listing requirements, the term "seismic loop" is desirable to differentiate from a seismic separation assembly comprised of traditional fittings.

This proposal will be reviewed by the HBS TC at the ROC meeting.

Submitter: Russell P. Fleming, National Fire Sprinkler Association, Inc.

Recommendation: Provide new definitions in Section 3.5.

Seismic Separation Assembly - An assembly of fittings, pipe and couplings, or an assembly of pipe and couplings that permits movement in all directions sufficient to accommodate calculated differential motions during earthquakes or, in lieu of calculations, movement at least twice the width of the seismic separation it is intended to address, at right angles to the separation as well as parallel to it.

Seismic Loop - A special assembly listed for its capability to accommodate movement at least equivalent to a seismic separation assembly, listed for specific pipe diameter sizes and seismic separation widths.

Revise the first sentence of Section A.9.3.3 by putting a period after Figure A.9.3.3(a). and replacing end of sentence with a new sentence as follows:

An example of a listed seismic loop is shown in Figure A.9.3.3(b).

Delete the second paragraph of Section A.9.3.3.

Modify Sections 9.3.3.1, 9.3.3.3, and 9.3.3.4 adding "or listed seismic loop" after "seismic separation assembly" in all three sections.

Substantiation: The definition of a seismic separation assembly has been in the annex for several editions of NFPA 13 but should be moved up with the other definitions. A new term "seismic loop" is being proposed to differentiate between the traditional seismic separation assembly and the special assembly listed for this same purpose. This will aid in the specification of earthquake protection features.

Committee Meeting Action: Accept

Committee Statement: This proposal should go to the HBS committee. The TCC should review this and have the HBS committee address it at the ROC period.

Number Eligible to Vote: 30

Ballot Results: Affirmative: 26 Negative: 2

Ballot Not Returned: 2 Kirn, M., Slocum, L.

Explanation of Negative:

BROWN, P.: I agree with Mr. Lavericks statement on the loop having not been evaluated for seismic applications by UL and a search of the FM Approvals did not reveal any listings for the device.

LAVERICK, G.: The proposed definition of a Seismic Loop specifies that the assembly is listed for its capability to accommodate movement and intend to bridge a seismic separation. These devices are Listed by UL specifically to accommodate movement due to thermal expansion of the piping and have not been evaluated by UL for seismic applications. The remainder of the revisions to the various sections in the proposal refer to a listed seismic loop. The Committee should be aware that this loop has not been evaluated for seismic applications by UL and a search of the FM Approvals did not reveal any listings for this device. For previous editions of the standard, the Committee was aware of this situation, they had reviewed seismic data provided, and accepted the product as a means to bridge the seismic separation. That is the reason for the current wording. Based on this, the proposal should not be accepted.

13-172 Log #19 AUT-SSI
(8.3.3)

Final Action: Reject

TCC Action: The TCC directs the SSI TC to look at modifying the proposed language to correlate with SSD Log#70. The TCC further directs the SSI and SSD TC's to develop a task group to review the issue for consistency.

Submitter: Brett Reynolds, Fire System Design, LLC

Recommendation: Add new text as follows:

Where quick-response sprinklers are installed, all sprinklers within a compartment shall be quick-response unless otherwise permitted in 8.3.3.3 or 8.3.3.5.

8.3.3.5 Residential sprinklers shall be permitted in the same compartment as quick-response sprinklers in dwelling units and their adjoining corridors.

Substantiation: Currently it is unclear if Residential heads can be used with QR heads.

8.4.5.3 allows fast response sprinklers to be installed in the same compartment as Residential Sprinklers.

Quick Response sprinklers are a type of Fast Response sprinkler per 3.6.4.7

Residential Sprinklers are a type of Fast Response Sprinkler per 3.6.4.8.

Residential Occupancies are Light Hazard per A.5.2, therefore suitable for Quick Response or Residential heads.

8.4.5.3 would seem to allow QR and Residential heads in the same compartment, but 8.3.3 currently does not.

Committee Meeting Action: Reject

Committee Statement: Section 8.4.5.3 already allow mixing residential and QR sprinklers within a compartment however, this may need more work to clarify the requirements and allowances. Also refer to 13-381 (Log #70) submitted to SSD addressing how to calculate when sprinkler types are mixed.

Number Eligible to Vote: 30

Ballot Results: Affirmative: 28

Ballot Not Returned: 2 Kirn, M., Slocum, L.

Comment on Affirmative:

KEEPING, L.: While I agree with the Committee Action to reject the proposal, I do not believe that the issue of mixing residential sprinklers and quick response sprinklers as discussed in 8.4.5.3 has been properly dealt with. The Committee Statement which says that "this may need more work to clarify the requirements and allowances" is unsatisfactory, since it is the Committee's responsibility to provide that clarification.

13-279 Log #60 AUT-SSI
(8.16.1.5.1 and 8.16.1.5.2)

Final Action: Accept

TCC Action: The TCC Directs the PRI TC to review and act on Log#60 during the ROC.

Submitter: Peter T. Schwab, Wayne Automatic Fire Sprinklers, Inc.

Recommendation: Delete Sections 8.16.1.5.1 and 8.16.1.5.2.

Substantiation: These are underground requirements and do not belong in NFPA 13. If they are important enough to be in NFPA 13, they should be placed in Chapter 10 of NFPA 24 so as to appear in the extract chapter.

Committee Meeting Action: Accept

Committee Statement: The Committee feels this proposal should be addressed by the PRI committee during the ROC period.

Number Eligible to Vote: 30

Ballot Results: Affirmative: 27 Negative: 1

Ballot Not Returned: 2 Kirn, M., Slocum, L.

Explanation of Negative:

JOYCE, II, E.: I disagree with the committee action on this as these sections are part of a group that is covering valves which includes valve pits and P.I.V's which can relate to undergrounds. Also sectional valves can be in the above ground mains.

13-280 Log #197 AUT-SSI
(8.16.1.5.3, 8.16.1.5.4, and A.8.16.1.5.3 (New))

Final Action: Reject

TCC Action: The TCC does not believe further action is necessary by the PRI TC. This proposed language in this proposal falls under the jurisdiction of the SSI TC.

Submitter: Robert G. Caputo, Fire & Life Safety America / Rep. American Fire Sprinkler Assn.

Recommendation: Add new text to read as follows:

8.16.1.5.3* Multistory buildings exceeding two stories in height shall be provided with a floor control valve, check valve, main drain valve and flow switch for isolation, control and annunciation of water flow on each floor level.

8.16.1.5.4 The floor control valve, check valve, main drain valve and flow switch required by Section 8.16.1.5.3 shall not be required where sprinklers on the top level of a multistory building are supplied by piping on the floor below.

A.8.16.1.5.3 It is not the intent of this section to require floor control valve assemblies in all multistory buildings. Where small buildings such as multilevel condominiums or apartments are under the control of a single owner or management firm, a single control valve should be adequate for isolation, control and annunciation of water flow.

Substantiation: The standard does not currently require floor control valves for any condition. Building code requires floor control valves only when high rise and/or combination standpipes are installed. This results in mid-rise buildings without floor controls, which require draining entire buildings for improvements and repairs on a single level. Floor controls are needed in the interest of water conservation and good practices to keep areas of the building in service while performing improvements or repairs on other floor levels.

Committee Meeting Action: Reject

Committee Statement: Send to PRI for inclusion in NFPA 24.

Number Eligible to Vote: 30

Ballot Results: Affirmative: 22 Negative: 6

Ballot Not Returned: 2 Kirn, M., Slocum, L.

Explanation of Negative:

BROWN, P.: This proposal which provides an opportunity to require control valves for non-high-rise multi-story buildings, where we currently accept taking as much as 156,000 ft² of area out of service just to perform a tenant improvement or replace a single sprinkler in a three story building. This proposal should be accepted.

CAPUTO, R.: I believe there is a typo in the committee statement with regard to sending this proposal to NFPA 24 (should read NFPA 14). However, in light of the committee's continued support of limiting system sizes to 52,000 ft² (and 40,000 ft²) it seems incongruent that we reject a proposal which provides an opportunity to require control valves for non-high-rise multi-story buildings, where we currently accept taking as much as 156,000 ft² of area out of service just to perform a tenant improvement or replace a single sprinkler in a three story building. This proposal should be accepted and added to both NFPA 13 and NFPA 14.

DORNBOS, D.: I agree with submitters' proposal and substantiation.

JOYCE, II, E.: To start with what the submitter is discussing has nothing to do with underground piping and is not related to NFPA 24. He is talking about above ground piping systems not underground or private mains. Additionally it appears he is addressing issues of a non-standpipe offshoot of 8.17.5.2.

LINDER, K.: This proposal should be accepted as any modifications/maintenance in these buildings results in a larger impairment than needed.

VICTOR, T.: I agree with the submitters proposal and substantiation. These devices are necessary to isolate and alarm or annunciate individual floors in a multi-story building. Water conservation, and in some areas drainage control, is becoming a big problem. Subdividing buildings by floor as proposed will conserve water and provide better fire protection in the buildings when performing maintenance and repairs.

Comment on Affirmative:

KEEPING, L.: While I agree with the Committee Action, there is a typographical error in the Committee Statement. Since the subject matter for this proposal is floor control valves, the reference to sending the matter to NFPA 24 is inappropriate.

13-406 Log #275 AUT-SSD
(Figure 13.2.1, 14.2.4.1, 14.2.4.2, 16.2.1.3.2(a) through (g))

Final Action: Accept in Principle

TCC Action: The TCC directs the SSD TC to review all of the design curves for presentation and context for consistency during the next cycle.

Submitter: Tracey D. Bellamy, Telgian Corporation

Recommendation: Rescale and/or truncate the upper portion of the Figures above 3,000 ft².

Substantiation: The upper portion of the Figures are not longer needed with the reduction in allowable area to 3,000 ft².

Committee Meeting Action: **Accept in Principle**

Truncate figures at 4,000 sf. Eliminate the graph above te 4,000 sf mark.

Global change to do this for all the graphs.

Committee Statement: Correlate with storage chapters. There is no need to have the graph go above the 4,000 sf mark as the curves to not go above that level.

Number Eligible to Vote: 25

Ballot Results: Affirmative: 22

Ballot Not Returned: 3 Brown, T., Hogan, A., McNamara, T.

13D-12 Log #CP3 AUT-RSS
(3.3.9.1, 4.1.4, 5.2.7, 8.3.2, 8.3.3, A.4.1.4)

Final Action: Accept

TCC Action: The TCC directs the RSS TC to modify the material property tables for antifreeze solutions included in CP LOG#3 to use a temperature of 77 F when calculating the specific gravity of solutions.

The TCC also directs the TC to review the need to specify the purity of antifreeze solutions, since field mixing is no longer permitted.

Submitter: Technical Committee on Residential Sprinkler Systems,

Recommendation: Revise text as follows:

1. *Undo all of the changes made by TIA No. 10-1 (Log #994) to sections 3.3.9.1, 4.1.4, 5.2.7, 8.3.2 and 8.3.3 returning NFPA 13D to the text of the published 2010 edition with the following changes:*

2. *Add a new definition as 3.3.9.1.1 and related annex note to read as follows:*

3.3.9.1.1* Premixed Antifreeze Solution. A mixture of an antifreeze material with water that is prepared and factory-mixed by the manufacturer with a quality control procedure in place that ensures that the antifreeze solution remains homogeneous.

A.3.3.9.1.1 Where a tank is used as the water supply for the sprinkler system, the tank is not permitted to be filled with antifreeze.

3. *Revise 4.1.4 and related annex note to read as follows:*

4.1.4* Antifreeze Systems. Before freezing weather each year, the following procedure shall be performed:

(1) Empty solution in the entire antifreeze system into convenient containers

(2) Bring solution to the proper specific gravity by adding concentrated liquid as needed, or prepare a new solution, in accordance with 8.3.3

(3) Refill system with the new or remixed solution

A.4.1.4 Tests should be made by drawing a sample of the solution from valve B, as shown in Figure 8.3.3.3.1.1, two or three times during the freezing season, especially if it has been necessary to drain the building sprinkler system for reasons such as repairs or changes. A small hydrometer should be used so that a small sample is sufficient. Where water appears at valve B or where the test sample indicates that the solution has become weakened, the entire system should be emptied and then recharged as previously described. Sampling from the top and bottom of the system helps to determine if the solution has settled. Antifreeze solutions are heavier than water. If the antifreeze compound is separating from the water due to poor mixing, it will exhibit a higher concentration in the lower portion of the system than in the upper portions of the system. If the concentration is acceptable near the top, but too low near the water connection, it may mean that the system is becoming diluted near the water supply. If the concentration is either too high or too low in both the samples, it may mean that the wrong concentration was added to the system.

On an annual basis, test samples should be drawn from test valve B as shown in Figure 8.3.3.2.1(1), especially if the water portion of the system has been drained for maintenance or repairs. A small hydrometer can be used so that a small sample is sufficient. Where water appears at valve B, or where the sample indicates that the solution has become weakened, the entire system should be emptied and refilled with acceptable solution as previously described.

Where systems are drained in order to be refilled, it is not typically necessary to drain drops that are less than 36 inches in length. Most systems with drops have insufficient volume to cause a problem, even if slightly higher concentration solutions collect in the drops. For long drops with significant volume, consideration should be given to draining drops if there is evidence that unacceptably high concentrations of antifreeze have collected in these long drops.

When emptying and refilling antifreeze solutions, every attempt should be made to recycle the old solution with the antifreeze manufacturer rather than discarding it.

4.1.4.1 Annual Antifreeze Solution Test and Replacement Procedure.

4.1.4.1.1 Samples of antifreeze solution shall be collected by qualified individuals in accordance with 4.1.4.1.1.1 or 4.1.4.1.1.2 on an annual basis.

4.1.4.1.1.1 The system shall be drained to verify that (a) the solution is in compliance with 8.3.3, and (b) the solution provides the necessary freeze protection. Solution samples shall be taken near the beginning and near the end of the draining process.

4.1.4.1.1.2* Solution samples shall be taken at the highest practical elevation and the lowest practical elevation of the system.

A.4.1.4.1.1.2 If not already present, test connections (valves) for collection of solution samples should be installed at the highest and lowest practical locations of the system or portion of the system containing antifreeze solution.

4.1.4.1.2 The two samples collected in accordance with the procedures specified in 4.1.4.1.1.1 or 4.1.4.1.1.2 shall be tested to verify that the specific gravity of both samples is similar and that the solution is in compliance with 8.3.3. The specific gravity of each solution shall be checked using a hydrometer with a suitable scale or a refractometer having a scale calibrated for the antifreeze solution.

4.1.4.1.3* If concentrations of the two samples collected in accordance with the procedures above are similar and in compliance with 8.3.3, then (a) the solution drained in accordance with 4.1.4.1.1.1 can be used to refill the system, or (b) the existing undrained solution tested in accordance with 4.1.4.1.1.2 shall be permitted to continue to be used. If the two samples are not similar and not in compliance with 8.3.3, then a solution in compliance with 8.3.3 shall be used to refill the system.

A.4.1.4.1.3 In the past, for some existing systems subject to extremely low temperatures, antifreeze solutions with concentrations greater than what is now permitted by NFPA 13D were used. Such high concentrations of antifreeze are no longer permitted. In situations where extremely low temperatures are anticipated, refilling the fire sprinkler system with a concentration of antifreeze solution currently permitted by the standard might not provide sufficient freeze protection without additional measures. Such measures might include converting the antifreeze system to another type of sprinkler system.

4.1.4.1.4 A tag shall be attached to the riser indicating the date the antifreeze solution was tested. The tag shall also indicate the type and concentration of antifreeze solution (by volume) with which the system is filled, the date the antifreeze was replaced (if applicable), the name of the contractor that tested and/or replaced the antifreeze solution, the contractor's license number, a statement indicating if the entire system was drained and replaced with antifreeze, and a warning to test the concentration of the antifreeze solutions at yearly intervals per NFPA 13D.

4. Add an asterisk to 8.3.3 and add a new A.8.3.3 to read as follows:

8.3.3* Antifreeze Systems.

A.8.3.3 Where protection of pipes from freezing is a concern, options other than antifreeze are available. Such alternatives include running the piping in warm spaces, tenting insulation over pipe, dry-pipe systems, and preaction systems.

5. Revise 8.3.3.2.1 to read as follows:

8.3.3.2.1* For the purposes of this standard, pure glycerine shall mean chemically pure or United States Pharmacopoeia 96.5 percent grade. Unless permitted by 8.3.3.2.1.1, antifreeze solutions shall be limited to premixed antifreeze solutions of glycerine (chemically pure or United States Pharmacopoeia 96.5%) at a maximum concentration of 48% by volume, propylene glycol at a maximum concentration of 38% by volume, or other solutions listed specifically for use in fire protection systems.

6. Add a new 8.3.3.2.1.1 to read as follows:

8.3.3.2.1.1. For existing systems, antifreeze solutions shall be limited to premixed antifreeze solutions of glycerine (chemically pure or United States Pharmacopoeia 96.5%) at a maximum concentration of 50% by volume, propylene glycol at a maximum concentration of 40% by volume, or other solutions listed specifically for use in fire protection systems.

7. Delete 8.3.3.2.2 and 8.3.3.2.3 and related Annex material A.8.3.3.2.3.

~~8.3.3.2.2 Where sprinkler systems are supplied by public water connections, the use of antifreeze solutions other than water solutions of pure glycerine or propylene glycol shall not be permitted.~~

~~8.3.3.2.3* Percent solution by volume of glycerine=water and propylene glycol=water mixtures shall be in accordance with Table 8.3.3.2.3, Figure 8.3.3.2.3(a), and Figure 8.3.3.2.3(b).~~

8. Move Table 8.3.3.2.3 to the annex and renumber as Table A.8.3.3.2.1 while deleting the rows in the table dealing with glycerine and 40% water, glycerine and 30% water, propylene glycol and 50% water and propylene glycol and 40% water. Add an annex note so that the annex and Table would appear as follows:

A.8.3.3.2.1 See Table A.8.3.3.2.1.

****Insert Table A.8.3.3.2.1 Properties of Glycerine and Propylene Glycol Here****

9. Renumber 8.3.3.2.3.1 to 8.3.3.2.2.

~~8.3.3.2.3.1.2~~ The concentration of antifreeze solutions shall be limited to the minimum necessary for the anticipated minimum temperature.

10. Delete 8.3.3.2.4, 8.3.3.2.5 and Table 8.3.3.2.5.

~~8.3.3.2.4~~ Where public water is not connected to sprinklers, water solutions of glycerine, diethylene glycol, ethylene glycol, and propylene glycol shall be permitted to be used in antifreeze solutions.

~~8.3.3.2.5~~ Percent solution by volume of diethylene glycol-water and ethylene glycol-water shall be in accordance with Table 8.3.3.2.5.

~~Table 8.3.3.2.5 Antifreeze Solution to Be Used If Nonpotable Water Is Connected to Sprinklers~~

11. Renumber 8.3.3.2.6 as 8.3.3.2.3 and renumber A.8.3.3.2.6 as A.8.3.3.2.3. Also renumber Figure A.8.3.3.2.6 as Figure A.8.3.3.2.3.

~~8.3.3.2.6.3*~~ An antifreeze solution with a freezing point below the expected minimum temperature for the locality shall be installed.

~~A.8.3.3.2.6.3~~ Beyond certain limits, an increased proportion of antifreeze does not lower the freezing point of the solution (*see Figure A.8.3.3.2.3*). Glycerine, diethylene glycol, ethylene glycol, and propylene glycol never should be used without mixing with water in the proper proportions, because these materials tend to thicken near 32°F (0°C).

12. Renumber 8.3.3.2.7 as 8.3.3.2.4 and revise to read as follows:

~~8.3.3.2.7.4~~ The specific gravity of the antifreeze shall be checked by a hydrometer with a scale having 0.002 subdivisions in accordance with Figure 8.3.3.2.4(a) and 8.3.3.2.4(b).

13. Renumber Figure 8.3.3.2.3(a) as Figure 8.3.3.2.4(a) and delete the 50% curve.

14. Renumber Figure 8.3.3.2.3(b) as Figure 8.3.3.2.4(b) and delete the 60% and 70% curves.

Substantiation: This TIA was developed in response to an NFPA Standards Council directive on the subject of antifreeze use in sprinkler systems. Those members of the NFPA Technical Committee (TC) on Residential Sprinkler Systems that participated in conference call meetings on October 15, 2010 and October 22, 2010, and a task group of the committee that met via conference call on October 20, 2010 developed this proposed TIA. Via a vote of 14 in favor and 4 against, a majority of the members present on the October 22, 2010 conference call meeting finalized the language of this TIA and agreed to move forward with the processing of the TIA.

The action of TIA 10-1 (SC 10-8-18 / TIA Log #994), that was issued by the Standards Council and that has the effect of banning antifreeze systems in all dwelling units, makes this TIA necessary. The ban on all antifreeze systems in dwelling units is more stringent than it needs to be. There are lower concentrations of antifreeze solutions that are effective at preventing the sprinkler system from freezing and have been proven not to contribute to the heat release rate of the fire, but the previous TIA's have banned these concentrations of antifreeze from being used, placing a hardship on the design of fire sprinkler systems in residential occupancies.

This proposed TIA puts back the option of using antifreeze systems in NFPA 13D with a number of new limitations. In addition, the language of NFPA 13D that requires the annual test of the antifreeze has been modified to meet the new criteria (which will also be consistent with NFPA 25). The new material for NFPA 13D is defended as follows:

1. Ethylene glycol and diethylene glycol have been eliminated because they are poisons and because we know them to be combustible liquids. Research has not been performed to determine the extent that they may or may not contribute to the heat release rate of a fire. In the absence of such data, and knowing that such a small percentage of sprinkler systems utilize these solutions, they have been banned until such time as more research can be performed to quantify their experience. This is not considered to create a problem because a substitute solution (glycerine) is available.

2. Glycerine solutions up to 50% (by volume) are permitted under certain conditions because testing performed by both UL and the FPRF showed that solutions at this concentration had the same effect as pure water on the fire hazards considered by the test program under certain conditions of system pressure and sprinkler orifice size. The committee is aware that a 55% glycerine solution produced unsatisfactory results for certain fire scenarios; however, the committee believes that the conditions under which the 50% glycerine solution is permitted includes a sufficient safety factor when only premixed solutions are permitted. Additionally, the manufacturers of glycerine antifreeze solutions indicate that the quality of the premixed solutions can be held to $\pm 1\%$ of the specified concentration which is believed to be sufficient for the intended use.

3. Propylene glycol solutions up to 40% (by volume) are permitted under certain conditions because the testing

performed by both UL and the FPRF showed that solutions up to this concentration had the same effect as pure water on the fire hazards considered by the test program under certain conditions of system pressure and sprinkler orifice size.

4. The language was expanded to include other listed antifreeze products that may be developed in the future. The committee is aware of at least one project underway to get a non-combustible antifreeze recognized and there are some other products that have potential. A listing process would allow these products to come to the market without having to process another TIA.

5. The use of factory premixed solutions is required because solutions that are not mixed properly have a possibility of separating from the water, which allows the pure concentrate (which is heavier than water) to drop out of solution and collect in drops or low points of the system. Such concentrations are combustible and could present problems during fires.

6. The Table on specific gravity of antifreeze solutions was moved to the annex since it is informational in nature and not intended to be a limit on the kind of antifreeze that can be used. The table has been modified by eliminating the concentrations that are no longer permitted. Lower percentage solutions are permitted by NFPA 13, but the specific gravity is not known at this time.

7. The density curves for ethylene glycol were eliminated because these solutions are no longer permitted.

8. Guidance has been provided in an annex note for dealing with drops. Small drops might end up with slightly higher concentrations of antifreeze solutions, but the volumes involved are not likely to cause the problems seen in the field with larger volume solutions. It is impractical to believe that all of the small drops in a system can be completely drained each time the system is drained. Where larger volume drops might have higher concentrations of solutions, consideration needs to be given to draining these larger drops.

9. The information on testing the antifreeze systems is necessary because the Standards Council action on TIA 994 eliminated the rules for maintaining antifreeze systems. Even if antifreeze systems are never again installed in new systems, we still need some rules for testing the existing systems that were installed in accordance with previous editions of NFPA 13D and could not be converted to some other type of system.

10. Glycerine solutions up to 50% (by volume) are permitted for existing systems because testing performed by both UL and the FPRF showed that solutions at this concentration had the same effect as pure water on the fire hazards considered by the test program. This test program included extremely severe fire scenarios coupled with small orifice sprinklers specifically designed to create small water droplets, which were shown in the phase 1 tests to be conducive to igniting antifreeze mixtures. The fact that the 50% glycerine solutions did so well in the tests, shows that they can be used in existing systems. The NFPA has acknowledged this in their technical alert bulletins giving people guidance on what to do until TIAs can be processed for all of the applicable NFPA documents. A slightly different threshold is being proposed for existing systems rather than new systems due to the inability for existing sprinkler systems to be redesigned. Once a sprinkler system has been installed in a climate that needs 50% glycerine, it is a very difficult and expensive task to change that sprinkler system in order to use a lower percentage concentration. The fire testing performed to date has shown no reason to spend such an effort. Use of 50% glycerine solutions is only permitted by NFPA 13D where the climate is such that the solution is needed. Where temperatures are warmer, lower concentration antifreeze solutions are required. Similar logic applies for the use of 40% propylene glycol.

11. For new fire sprinkler systems, a different threshold has been established because the sprinkler system can be designed around the freeze protection available from the solution. If the climate is such that a higher concentration solution is needed, it is not necessary to install an antifreeze system. Other options are available. But for existing system, those other options are too expensive to justify eliminating the use of a solution that we know works.

Emergency Nature:

1. The proposed TIA intends to correct a previously unknown existing hazard.

2. The proposed TIA intends to offer to the public a benefit that would lessen a recognized (known) hazard or ameliorate a continuing dangerous condition or situation.

Committee Meeting Action: Accept

13R-7 Log #3 AUT-RSS
(1.3 and 1.3.1)

Final Action: Reject

TCC Action: The TCC directs SSI and RSS TC's to review 1.3 to determine if this language is needed and if the language is clear to the user of the document. The language as proposed is currently provided in NFPA 13 section 1.3.

Submitter: Eddie Phillips, Southern Regional Fire Code Development Committee

Recommendation: Insert a new 1.3 as follows and renumber the remaining:

1.3 Application.

1.3.1 This standard shall apply to the following:

(1) Character and adequacy of water supplies

(2) Selection of sprinklers

(3) Fittings

(4) Piping

(5) Valves

(6) All materials and accessories

Substantiation: The inclusion of an "application" section is consistent with the "manual of style" and consistent with the layout of NFPA 13. The proposed language is almost a mirror with NFPA 13 1.3 Application.

Committee Meeting Action: Reject

Committee Statement: The language is not needed and is not all inclusive. It could lead to confusion.

Number Eligible to Vote: 31

Ballot Results: Affirmative: 28

Ballot Not Returned: 3 Hoover, T., Osburn, M., Shaw, H.

Comment on Affirmative:

ISMAN, K.: This issue should be raised with the TCC. The language was proposed because it is in NFPA 13, but it was rejected because it is poorly written. It should be taken out of NFPA 13 as well.

24-13 Log #31 AUT-PRI
(5.9.4.2 (New))

Final Action: Reject

TCC Action: The TCC directs the TC to consider dropping the term "readily" or provide alternate language to better define "readily accessible" without using ambiguous wording.

Submitter: James Everitt, Western Regional Fire Code Development Committee

Recommendation: Add text as follows:

5.9.4 Drainage.

5.9.4.1 The pipe between the check valve and the outside hose coupling shall be equipped with an approved automatic drip.

5.9.4.2 The approved automatic drip where required shall be readily accessible for inspection and maintenance

Substantiation: In areas subject to freezing NFPA 13 SECTION 8.17.2.6 provides no direction for accessibility and maintenance of this valve leaving the pipe vulnerable to freeze damage.

Committee Meeting Action: Reject

Committee Statement: The term readily accessible is not enforceable and the requirement would mandate installation in vaults in some applications which is not justified.

Number Eligible to Vote: 30

Ballot Results: Affirmative: 25 Negative: 1

Ballot Not Returned: 4 Bonds, R., Frakes, B., Laguna, A., Twele, S.

Explanation of Negative:

GLUMAC, T.: This valve should be accessible for inspection, testing and to reduce the likelihood of freezing and subsequent impairments.