



Amy Beasley Cronin
Secretary, Standards Council

16 August 2010

To: Interested Parties

Subject:

Standards Council Decision (Final):	D#10-10
Standards Council Agenda Item:	#10-8-15 thru 10-8-20
Date of Decision*:	5 August 2010
TIA Nos. 1000, 995, 994, 996, 997 and 998 on NFPA 13, 13D and 13R, all 2010 editions	

Dear Interested Parties:

At its meeting of 3-5 August 2010, the Standards Council considered an appeal on the above referenced matter.

Attached is the final decision of the Standards Council on this matter.

Sincerely,

A handwritten signature in black ink that reads "Amy Beasley Cronin".

Amy Beasley Cronin
Secretary, NFPA Standards Council

- c: D. Berry, M. Brodoff, L. Fuller, J. Lake, J. Moreau-Correia
Members, TC on Residential Sprinkler Systems (AUT-RSS)
Members, TC on Sprinkler System Installation Criteria (AUT-SSI)
Members, TCC Automatic Sprinkler Systems (AUT-AAC)
Members, TC on Inspection, Testing, and Maintenance of Water-Based Systems (INM-AAA)
Members, NFPA Standards Council (AAD-AAA)
Individuals Providing Appeal Commentary

*NOTE: Participants in NFPA's codes and standards making process should know that limited review of this decision may be sought from the NFPA Board of Directors. For the rules describing the available review and the method for petitioning the Board for review, please consult section 1-7 of the NFPA Regulations Governing Committee Projects and the NFPA Regulations Governing Petitions to the Board of Directors from Decisions of the Standards Council. Notice of the intent to file such a petition must be submitted to the Clerk of the Board of Directors within 15 calendar days of the Date of Decision noted in the subject line of this letter.



Standards Council Decision (Final):	D#10-10
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SUMMARY ACTION: *The Standards Council voted to issue TIAs 1000, 995 and 994 on NFPA 13, NFPA 13R and NFPA 13D, respectively, which, for new installations, prohibit the use of antifreeze solutions within all NFPA 13D applications and within the dwelling unit portions of NFPA 13 and NFPA 13R sprinkler systems. In addition, the Council directed that the responsible technical committees conduct further activities as set forth in the decision.*

At its meeting of August 3-5, 2010, the Standards Council considered six proposed Tentative Interim Amendments (TIAs), together with related appeals, regarding antifreeze in new residential fire sprinkler installations. Two TIAs were submitted on each of the following documents: NFPA 13, *Standard for the Installation of Sprinkler Systems*, NFPA 13D, *Standard for the Installation of Sprinkler Systems in One- and Two- Family Dwellings and Manufactured Homes*, and NFPA 13R, *Standard for the Installation of Sprinkler Systems in Residential Occupancies up to and Including Four Stories in Height*. Of the TIAs, one group of three (TIAs 1000, 995, and 994) sought collectively to prohibit the use of antifreeze solutions within all NFPA 13D applications and within the dwelling unit portions of NFPA 13 and NFPA 13R systems (the “No Antifreeze” TIAs). The other group of three (TIAs 996, 997, and 998) sought collectively to prohibit the use of antifreeze solutions in excess of 50% by volume within all NFPA 13D applications and within the dwelling unit portions of NFPA 13 and NFPA 13R systems (the “50% Antifreeze” TIAs). These latter TIAs permitted only the use of factory premixed antifreeze solutions.

The six proposed TIAs were balloted through the responsible Technical Committees – the Technical Committee on Sprinkler System Installation Criteria for NFPA 13, and the Technical Committee on Residential Sprinklers for NFPA 13D and NFPA 13R – as well as the Technical Correlating Committee on Automatic Sprinkler Systems (the TCC). Balloting was completed in accordance with the *NFPA Regulations Governing Committee Projects*, but, as detailed further in this decision, the ballot results are of limited significance because of new technical data and information that has recently become available. The TIAs, ballot results, and several related appeals have nevertheless been forwarded to the Council for consideration. In this unusual and compelling situation, in which the status quo in the existing sprinkler documents is no longer tenable, and in which circumstances require emergency action, the Council has voted to issue three TIAs, the effect of which, pending further technical committee consideration, will be to prohibit the use of antifreeze within the dwelling unit portions of sprinkler systems.

BACKGROUND

Antifreeze solutions have long been used in sprinkler systems to protect piping in unheated areas subject to freezing temperatures. Since at least 1940, NFPA standards have included guidance on the use of antifreeze solutions in sprinkler systems. The events that led to the development of the proposed TIAs to limit or prohibit the use of antifreeze solutions in residential sprinkler applications began when the NFPA became aware of a fire incident in Truckee, California, which took place in August of 2009. Emerging information concerning this incident raised concern surrounding the combustibility of antifreeze solutions in residential sprinkler systems. The incident reportedly involved a grease fire in a kitchen where a sprinkler system with a reportedly high - possibly in excess of 70% - concentration of antifreeze deployed. The fire resulted in a single fatality and serious injury to another person, and the possibility was raised that the antifreeze solution discharging from the sprinkler intensified the fire and resulting harm.

In response to these reports, several activities were initiated within the NFPA and the NFPA-affiliated Fire Protection Research Foundation (the Research Foundation). These activities and especially the resulting reports of the Research Foundation will be described here only in brief, and the reader is urged to consult the Research Foundation reports available at www.nfpa.org/antifreeze for the presentation of the available research and analysis. With this caveat, it suffices to say, in outline, that the NFPA, in response to reports of the Truckee incident, commissioned the Research Foundation to conduct a literature review and develop a research plan on antifreeze solutions and residential fire sprinkler systems. A report on this project was published by the Research Foundation as "*Literature Review and Research Plan Antifreeze Solutions in Home Fire Sprinkler Systems*," (prepared for the Fire Protection Research Foundation by Code Consultants, Inc., May 28, 2010) (the First Research Foundation Report). Meetings of the NFPA Technical Correlating Committee on Sprinkler Systems (the TCC) were also convened to review available information. During this period, Underwriters Laboratories (UL) conducted a series of tests in an effort to begin exploring the effect of antifreeze solutions in certain residential sprinkler configurations (the Phase I tests). The Phase I tests were not conducted as part of the Research Foundation activities, but several of the tests were witnessed by researchers working on behalf of the Research Foundation and are summarized in the First Research Foundation Report. The results of these Phase I tests were also presented at a meeting of the TCC. The results of these limited Phase I tests could not provide answers to all questions concerning the safe use of antifreeze solutions in residential sprinkler systems. They did point to serious concerns with the use of higher concentrations of antifreeze and were inconclusive as to the safety of antifreeze in lower concentrations of 50% by volume or less.

With the Phase I tests, the First Research Foundation Report and other available information, two sets of competing TIAs on antifreeze in residential sprinkler systems were developed and submitted by several parties. As summarized more fully above, the three No Antifreeze TIAs, prohibited the use of antifreeze solutions and the 50% Antifreeze TIAs prohibited the use of antifreeze solutions in excess of 50% by volume and required that only factory premixed solutions be used. The TIAs were submitted to the ballot of the responsible technical committees and the TCC. Five of the TIAs failed letter ballot of the technical committees. The No Antifreeze TIAs showed considerable support, including one TIA which failed by only a single vote. One of the TIAs, the 50% Antifreeze TIA on NFPA 13 did pass ballot. Unlike the balloting on the TIAs for NFPA 13D and NFPA 13R, however, the 50% Antifreeze TIA on NFPA 13 was balloted separately from the No Antifreeze option for NFPA 13, and it is not clear what effect the sequencing of the balloting on NFPA 13 may have had on the outcome.

The confusing and inconclusive ballot results may have stemmed from the limited nature of the data then available to the technical committees. The Council, however, need not undertake to

analyze these TIA results in any depth because events have largely superseded them. Specifically the First Research Foundation Report had concluded that "the existing research as well as the recent near-term [Phase I] testing conducted by UL indicate the urgent need for further research into the effectiveness of currently permitted antifreeze solutions." This conclusion led to the development of a Phase II test plan to investigate in greater depth the potential for large-scale ignition of antifreeze solutions discharged from residential sprinklers and the influence of antifreeze solutions on the effectiveness of residential sprinkler systems in controlling a fire condition and maintaining tenable conditions for egress. With great rapidity, the Research Foundation mounted a project to fund and conduct the Phase II testing, with UL and Code Consultants, Inc. under contract to do the testing and to develop a report. However, even under the aggressive testing schedule, the test results did not become available until after the close of balloting on the TIAs. Indeed, the Phase II tests were completed just prior to the commencement of the Standards Council's August meeting and have now been published as "Interim Report: Phase II Research Antifreeze Solutions in Home Fire Sprinkler Systems, (Prepared for the Fire Protection Research Foundation by Code Consultants, Inc., August 11, 2010) (www.nfpa.org/antifreeze) (the Second Research Foundation Report).

At the Standards Council meeting, Steve Wolin, of Code Consultants, Inc., presented the Research Foundation reports, including the results of the Phase I and II tests. A hearing then proceeded to consider appeals and arguments as to what course of action the Council should pursue with respect to the TIAs. Rather than focus on the various arguments presented on the TIAs, the Council for purposes of this decision, focuses on some undisputed conclusions of the Phase II testing, namely that the existing provisions in NFPA 13, NFPA 13R and NFPA 13D, relating to antifreeze are no longer supportable as written. Specifically, current standards recommend the use of the antifreeze solutions, depending on the chemical being used and level of freeze protection being sought, to exceed 50% concentration, by volume, up to, in some cases, as much as 70%. See, e.g., NFPA 13, Table 7.6.2.2. The conclusions of the Research Foundation report, however, were clear this was no longer acceptable. Specifically, the new research from the Phase II testing clearly indicates that antifreeze solutions of propylene glycol exceeding 40% and glycerin exceeding 50% by volume are not appropriate for use in residential sprinkler systems, and the fire size increased (to some extent) for all the antifreeze solutions tested under certain sprinkler discharge and fire test conditions. Moreover, although these concentrations met UL 1626 fire control criteria and exhibited similar performance to that of water alone, consideration must also be given to adding appropriate safety factors for concentrations of these antifreeze solutions in the relevant standards. See Second Research Foundation Report at Executive Summary, pp. 1-2.

Given these conclusions, the Council must now determine how to proceed. At the hearing to consider the TIAs, several alternatives were suggested and advocated to varying degrees, including: take no action and refer the matter back to the responsible technical committees to review the new technical data from the Phase II testing and consider further appropriate action; issue the 50% Antifreeze TIAs; issue the No Antifreeze TIAs; or issue modified TIAs taking into account the test results reported by the Research Foundation.

In normal circumstances, the Council might well have delayed taking any action in order to give time to the responsible technical committees to review and take action based on the technical issues and new data presented by the Research Foundation reports. It is clear, however, from the discussion at the hearing, and from the complicated nature of the technical information that will need to be reviewed that consideration by the technical committees will require some time. Given the serious nature of the safety concerns related to the current concentrations of antifreeze permitted in existing NFPA standards, the Council believes that immediate action needs to be taken.

As to the actions that have been proposed, issuing TIAs that would merely limit antifreeze solutions to 50% by volume is not an adequate step. The Phase II test results showed that a 50% by volume limitation for propylene glycol is not appropriate, and, depending on what safety factors may be needed, may not be appropriate for glycerin either. The 50% Antifreeze TIAs, moreover, would allow 50% solutions of other antifreeze compounds including diethylene glycol and ethylene glycol, which have not been tested and may well require different limits. Given the circumstances, the Council does not believe it would be appropriate for the Council to issue the 50% Antifreeze TIAs.

Nor is it appropriate for the Council itself to craft and issue new TIAs that fully consider and address the technical issues raised by the Research Foundation data and other information now available. Crafting new TIAs is the province of the technical committees. In the interim, however, emergency action needs to be taken. This is not in dispute as the balloting on all the TIAs confirmed the emergency nature of addressing the existing antifreeze provisions concerning residential applications.

Considering the entire record before it, the Council has concluded that the most prudent course of action at this time must be the most conservative approach to assuring safety in new residential sprinkler installations. That course of action is to prohibit the use of antifreeze in new residential sprinkler systems unless and until the responsible technical committees, after due consideration and any correlation by the TCC, reach consensus on a different approach. Accordingly, the Council has voted to issue the three TIAs 1000, 995 and 994 on NFPA 13, NFPA 13R and NFPA 13D, respectively, that prohibit the use of antifreeze solutions in new residential sprinkler applications.

In reaching this decision, the Council wishes to make several points. First, the Council's action follows on previous action already taken by the NFPA. On July 6, 2010, the NFPA, separate from its standards development process, and acting in its role as a safety advocate, issued a Safety Alert responding to developing concerns about the use of antifreeze solutions in residential applications. The Safety Alert urged that, until further information was available, new residential sprinkler systems should be designed and installed so as not to require the use of antifreeze solutions. The TIAs now being issued merely extend this recommendation, pending any further consideration and action by the responsible technical committees.

Second, it should be noted that for 13R and 13D residential systems, sprinklers are not required to be installed in unheated areas. At any rate, the use of antifreeze should be avoidable in most if not all residential installations through alternative design approaches including the use of insulation and other means.

Third, the Council wishes to emphasize that in issuing the TIAs, it is not undertaking to make any final technical determination about the correct course of action that may eventually emerge. The technical issues concerning the content of NFPA codes and standards are generally for the responsible consensus based technical committees to determine, and the same should be true in this case. The Council's action is an emergency action only, and is not intended to prejudge the merits of any further revisions that the responsible technical committees may propose. As to the technical committees' further consideration of the technical issues, the record suggests that the Research Foundation reports and other information now available will require careful and considered review. This, of course, may take some time, but it is also possible that the technical committees may be able to act quickly to bring new recommendations to the Council. The Council urges the committees to address this matter with reasonable speed and provide clear technical substantiation for any further actions that are proposed. Should the committees do so

prior to the Council's next scheduled meeting, the Council will make every effort to expedite its consideration of the matter through a special meeting or letter ballot.

The Council wishes to address two additional important matters beyond the scope of the present TIAs. First, the TIAs that were presented to the Council all involve standards that address the design and installation of new sprinkler systems. The important question of what should be done to address antifreeze in existing residential sprinkler systems is, therefore, not addressed by these TIAs. Fortunately, the NFPA in its July 6, 2010 Safety Alert has addressed existing systems. Specifically, the Safety Alert stresses that fire sprinklers are extremely effective protection devices, significantly reducing deaths, injuries and property loss from fire. It urges that these systems should not be disconnected and it recommends that the following actions be taken:

- If you have, or are responsible for, a residential occupancy with a fire sprinkler system, contact a sprinkler contractor to check and see if there is antifreeze solution in the system.
- If there is antifreeze solution in the system, as an interim measure, drain the system and replace it with water only. Problems associated with freezing of sprinkler pipes can be mitigated by alternative measures such as insulation. NFPA hopes to provide further guidance based on additional testing before the winter freezing months.

These recommendations and any updates that the NFPA may provide as a result of the Phase II testing (see www.nfpa.org/antifreeze for any updates as they may become available) provide important guidance on the handling of antifreeze in existing residential sprinkler systems. The responsible technical committees within the NFPA consensus codes and standards development process, however, should now review where and how relevant NFPA standards might be made to address antifreeze in existing systems. Relevant committees, including the Technical Committee on Sprinkler System Installation Criteria, the Technical Committee on Residential Sprinkler Systems, the Technical Correlating Committee on Automatic Sprinkler Systems, and the Technical Committee on Inspection, Testing, and Maintenance of Water-Based Systems, should consider this question in a coordinated manner and report back to the Council no later than its October 2010 meeting with any proposed actions or recommendations.

Finally, the actions taken in this decision do not address antifreeze in non-residential commercial applications. As the Research Foundation reports suggests, commercial sprinklers and occupancies present quite different characteristics than residential sprinklers and occupancies and, as the First Research Foundation Report suggests, any analysis of antifreeze in sprinkler systems is highly dependent on the specific characteristics of the sprinkler design and setting. The current activities, driven by clear concerns identified in residential sprinkler systems, have been a necessary response to an emerging problem. Further research will likely be necessary to better understand and address the use of antifreeze in various non-residential commercial settings. The role of the relevant committees in considering further standards development activities in this area and in recommending needed research is clear, and the Council is, therefore, requesting that they begin to review and consider the use of antifreeze in non-residential contexts and report back to the Council by its October 2010 meeting with any proposed actions or recommendations.

In conclusion, the Council wishes stress the importance of fire sprinklers in safeguarding lives and property. The home in particular is the place where most fire fatalities occur, and when home sprinklers are present, the risk of dying in a home fire decreases by 83%. It is hoped that the actions of the Standards Council, the valuable contributions of the NFPA and the Research Foundation, (including the project contractors, technical panel and sponsors), and the continuing

activities of the sprinkler related NFPA technical committees will all combine to help ensure the continued effectiveness and wide use of these important safety devices.

Council Member Roland Huggins recused himself during the hearings, deliberations and vote on the issue. Council Members Shane Clary and Ralph Gerdes wished to be recorded as voting negatively.



Tentative Interim Amendment

NFPA 13

Standard for the Installation of Sprinkler Systems

2010 Edition

Reference: 7.6.1

TIA 10-1

(SC 10-8-16/TIA Log #1000)

Pursuant to Section 5 of the NFPA Regulations Governing Committee Projects, the National Fire Protection Association has issued the following Tentative Interim Amendment to NFPA 13, *Standard for the Installation of Sprinkler Systems*, 2010 edition. The TIA was processed by the Technical Committee on Sprinkler System Installation Criteria and the Technical Correlating Committee on Automatic Sprinkler Systems, and was issued by the Standards Council on August 5, 2010, with an effective date of August 25, 2010.

A Tentative Interim Amendment is tentative because it has not been processed through the entire standards-making procedures. It is interim because it is effective only between editions of the standard. A TIA automatically becomes a proposal of the proponent for the next edition of the standard; as such, it then is subject to all of the procedures of the standards-making process.

1. *Add a new section 7.6.1 as follows:*

7.6.1 Dwelling Units. Antifreeze shall not be permitted to be used within the dwelling unit portions of sprinkler systems.

2. *Renumber the remainder of the section accordingly.*

Issue Date: August 5, 2010

Effective Date: August 25, 2010

(Note: For further information on NFPA Codes and Standards, please see www.nfpa.org/codelist)

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Tentative Interim Amendment

NFPA 13D

Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes

2010 Edition

Reference: 3.3.9.1, 4.1.4, 5.2.7, 8.3.3, and A.8.3.3.1

TIA 10-1

(SC 10-8-18/TIA Log #994)

Pursuant to Section 5 of the NFPA Regulations Governing Committee Projects, the National Fire Protection Association has issued the following Tentative Interim Amendment to NFPA 13D, *Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes*, 2010 edition. The TIA was processed by the Technical Committee on Residential Sprinkler Systems and the Technical Correlating Committee on Automatic Sprinkler Systems, and was issued by the Standards Council on August 5, 2010, with an effective date of August 25, 2010.

A Tentative Interim Amendment is tentative because it has not been processed through the entire standards-making procedures. It is interim because it is effective only between editions of the standard. A TIA automatically becomes a proposal of the proponent for the next edition of the standard; as such, it then is subject to all of the procedures of the standards-making process.

1. Delete 3.3.9.1 and renumber remainder of subsection 3.3.9.

2. Delete entire subsection 4.1.4, Antifreeze Systems.

3. Revise 5.2.7 to read as follows:

“Joints for the connection of copper tube for wet type systems shall be soldered joints or be brazed.” (delete the words “and antifreeze systems”).

4. Delete Item (2) of subsection 8.3.2 and renumber (3) as (2).

5. Revise section 8.3.3.1 to read:

8.3.3.1 Antifreeze shall not be permitted in sprinkler systems.

6. Delete A.8.3.3.1.

7. Delete all subsections and accompanying Annex A paragraphs commencing with 8.3.3.2 and ending with 8.3.3.5.

Issue Date: August 5, 2010

Effective Date: August 25, 2010

(Note: For further information on NFPA Codes and Standards, please see www.nfpa.org/codelist)



Tentative Interim Amendment

NFPA 13R

Standard for the Installation of Sprinkler Systems in Residential Occupancies up to and Including Four Stories in Height

2010 Edition

Reference: 4.7 and 5.4.3

TIA 10-1

(SC 10-8-19/TIA Log #995)

Pursuant to Section 5 of the NFPA Regulations Governing Committee Projects, the National Fire Protection Association has issued the following Tentative Interim Amendment to NFPA 13R, *Standard for the Installation of Sprinkler Systems in Residential Occupancies up to and Including Four Stories in Height*, 2010 edition. The TIA was processed by the Technical Committee on Residential Sprinkler Systems and the Technical Correlating Committee on Automatic Sprinkler Systems, and was issued by the Standards Council on August 5, 2010, with an effective date of August 25, 2010.

A Tentative Interim Amendment is tentative because it has not been processed through the entire standards-making procedures. It is interim because it is effective only between editions of the standard. A TIA automatically becomes a proposal of the proponent for the next edition of the standard; as such, it then is subject to all of the procedures of the standards-making process.

1. *Add new sections as follows:*

4.7 Antifreeze Systems. Antifreeze shall not be permitted within the dwelling unit portions of sprinkler systems.

5.4.3 Antifreeze shall not be permitted within the dwelling unit portions of sprinkler systems.

2. *Renumber 5.4.3 as 5.4.4.*

Issue Date: August 5, 2010

Effective Date: August 25, 2010

(Note: For further information on NFPA Codes and Standards, please see www.nfpa.org/codelist)

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