MEMORANDUM

TO: Correlating Committee on Health Care Facilities

FROM: Elena Carroll, Sr. Technical Committee Administrator

DATE: July 30, 2020

SUBJECT: NFPA 99 Proposed Tentative Interim Amendment (TIA) No. 1521

The Technical Committee on Piping Systems has been balloted on proposed TIA 1521, submitted by Rob Early of Compressed Gas Association, and the endorsers are Neil Gagné, Wm. G. Frank Medical Gas Testing Consulting, LLC and James Lucas, Tri-Tech Medical Inc. A copy of the proposed TIA and the preliminary results of the TC balloting are attached.

This proposed TIA is being submitted to you for ballot on Revising 5.1.3.10.2.4. In accordance with Section 5 of the Regulations Governing the Development of NFPA Standards, you are being balloted on any correlation issues resulting from the proposed TIA and whether this matter is of an emergency nature. A “disagree” vote is limited to subjects within the purview of the Correlating Committee. Opposition on a strictly technical basis is not sufficient grounds for substantiating a “disagree” vote.

This proposed TIA has been published for public comment in the July issue of NFPA News with a Public Comment Closing Date of August 20, 2020. Any public comments received will be circulated to the committee. Finally, the Standards Council will review and consider the issuance of this TIA.

The ballot can now be accessed through the NFPA online ballot system at the following link: NFPA Ballot Link. Please complete the ballot or before August 13, 2020 by 11:59 pm ET.

While completing your ballot, please remember the following:

- A comment is required for both Question No. 1 and Question No. 2 for the online TIA ballot. Comments must accompany all Negative, Abstaining and Agree votes.

- If you vote “Agree” on Question 1, simply add “Agree” to the comment field and if you vote “Agree” on Question 2, insert the applicable letter(s) selections in the comment field which can be found in the Instructions box on the ballot site.

You must hit SUBMIT to SAVE your work. Note: the system session will time you out after 60 minutes; any work not submitted at that time will not be saved! You may return to finish or change your ballot at any time up to the closing date. Ballot comments exceeding 4,000 characters must be submitted in a Word document via email, to Elena Carroll at ecarroll@nfpa.org.

Note: Please remember that the return of ballots and attendance at committee meetings are required in accordance with the Regulations Governing the Development of NFPA Standards.
MEMORANDUM

TO: Technical Committee on Piping Systems

FROM: Elena Carroll, Sr. Technical Committee Administrator

DATE: July 30, 2020

SUBJECT: NFPA 99 Proposed TIA Log No. 1521 PRELIMINARY TC BALLOT RESULTS

According to 5.6(a) in the NFPA Regs, the preliminary results show this TIA HAS achieved the ¾ majority vote needed on both Ballot Item No. 1 (Technical Merit) and Ballot Item No. 2 (Emergency Nature).

<table>
<thead>
<tr>
<th></th>
<th>Technical Merit</th>
<th>Emergency Nature</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Abstentions</td>
<td>Abstentions</td>
</tr>
<tr>
<td>25</td>
<td>Agree (w/comment, Braidich, Fasel, Volz)</td>
<td>Agree (w/comment, Anderson, Braidich, Fasel, Mohile, Volz)</td>
</tr>
<tr>
<td>3</td>
<td>Disagree (Beebe, Gregory, Litvin)</td>
<td>Disagree (Beebe, Currence, Gregory, Litvin, Smidt)</td>
</tr>
</tbody>
</table>

33 Eligible to Vote
5 Not Returned (Frankel, Franklin, Schwartzkopf, Schwipps, Walsh)

There are two criteria necessary to pass ballot [(1) simple majority (2) affirmative ¾ vote]. Both questions must pass ballot in order to recommend that the Standards Council issue this TIA.

(1) In all cases, an affirmative vote of at least a simple majority of the total membership eligible to vote is required.

\[ \text{33 eligible} \div 2 = 16.5 = (17) \]

(2) The number of affirmative votes needed to satisfy the ¾ requirement is 21.

\[ (33 \text{ eligible to vote} - 5 \text{ not returned} - 0 \text{ abstentions} = 28 \times 0.75 = 21) \]

Ballot comments are attached for your review.

This proposed TIA has been published for public comment in the July issue of NFPA News with a Public Comment Closing Date of August 20, 2020. Any public comments received will be circulated to the committee. The Standards Council will consider the issuance of this TIA.
Eligible to Vote: 33
Not Returned: 5
Michael Frankel, Ronald J. Schwipps, Mark T. Franklin, Sean Schwartzkopf, Kevin J. Walsh

Vote Selection | Votes | Comments
--- | --- | ---
AGREE | 25 | Allan D. Volz
Three Ft. is not equal to 1 Meter. Revise the measurement to equal distances.
Ed Golla
Agree
E. Daniel Shoemaker
Agree
Scott Hamilton
agree
Charles Cowles
Agree
Ronald M. Smidt
Agree
Gary Currence
Agree
Jeffery F. McBride
Agree
Bret M. Martin
Agree
Keith Ferrari
Agree
James L. Lucas
I agree with the substantiation provided.
Douglas Miller
agree
Mark Fasel
I agree this creates conflict with the NFPA 55 standard which is referenced in NFPA 99.
Neil Gagné
Agree
Jonathan C. Willard
Agree
Elizabeth A. "Betsy" Shapiro
agree
Mark David Carter
Agree
Kevin A. Scarlett
Agree
Dana A. Colombo
i have no issue with this TIA
David B. Mohle
I agree.
Edward J. Lyczko
Agree
Grant A. Anderson
In agreement of the technical merits
David Braidich
Providing minimum clearances on all sides of the vaporizer is critical to its operation.
Andrew Fuchs
agree
James K. Lathrop
I concur
DISAGREE | 3 | John C. Gregory
NFPA 55 section 17.1.2.1 The SOURCE VALVE shall be the line of separating the applicability between
NFPA 55 and NFPA 99. Also section 17.1.2.2 through 17.1.2.3. NFPA 99 has no precedent over any part of
the cryogenic system upstream of the source valve.
Edward A. Litvin
The evidence regarding icing conditions and vaporizer performance was not strongly supported in the
submission by research and technical merit. Additionally, in a cryogenic yard there often is a main tank, a
backup tank, vaporizers, valving and piping. The language therefore should be amended relating to the 3-
foot clearance requirement. It may need to consider clearance to the cryogenic tank and appurtenances
such as the piping, valves, and instruments. In summary, this is a good proposal but it requires more
consideration and perhaps detail to describe inclusion/exclusion.
Chad E. Beebe
since this was deliberated by the committee and a deliberate decision was made to deviate from NFPA 55
this TIA should not be accepted. The change needs full committee deliberation during next cycle. it
doesn't create a conflict with NFPA 55, one code is simply more stringent than the other. This is a
minimum code document, nothing prevents owners/manufacturers/suppliers from providing additional
clearance. The substantiation mentions that the additional space "helps"the vaporizer perform better
and that it "can lead" to excessive ice build up. At best the evidence seems anecdotal and opinion at this
point. Since the 2021 edition isn't published and being enforced and facilities haven't built to its
requirements its hard to understand how we could have instances where this has been designed to this
code. It would be beneficial to review the case studies to determine if indeed this issue is because of the
one side not having clearance or some other root cause.

ABSTAIN | 0 |

Vote Selection | Votes | Comments
--- | --- | ---
AGREE | 23 | Allan D. Volz
The proposed TIA intends to accomplish a recognition of an advance in the art of safeguarding property
or life where an alternative method is not in current use or is unavailable to the public.
Ed Golla
A B
<table>
<thead>
<tr>
<th>Name</th>
<th>Vote</th>
</tr>
</thead>
<tbody>
<tr>
<td>E. Daniel Shoemaker</td>
<td>Agree</td>
</tr>
<tr>
<td>Scott Hamilton</td>
<td>b</td>
</tr>
<tr>
<td>Charles Cowles</td>
<td>Agree</td>
</tr>
<tr>
<td>Jeffery F. McBride</td>
<td>Agree</td>
</tr>
<tr>
<td>Mark David Carter</td>
<td>D</td>
</tr>
<tr>
<td>Bret M. Martin</td>
<td>A,B</td>
</tr>
<tr>
<td>Keith Ferrari</td>
<td>D</td>
</tr>
<tr>
<td>James L. Lucas</td>
<td>I agree with the substantiation provided.</td>
</tr>
<tr>
<td>Douglas Miller</td>
<td>agree</td>
</tr>
<tr>
<td>Mark Fasel</td>
<td>Due to timing of publication i agree the subject is of an emergency nature.</td>
</tr>
<tr>
<td>David B. Mohile</td>
<td>I agree that the subject is of an emergency nature. If we can possibly get this in for the first printing that would be fine.</td>
</tr>
<tr>
<td>Neil Gagné</td>
<td>Agree</td>
</tr>
<tr>
<td>Jonathan C. Willard</td>
<td>Agree</td>
</tr>
<tr>
<td>Elizabeth A. &quot;Betsy&quot; Shapiro</td>
<td>a.</td>
</tr>
<tr>
<td>Kevin A. Scarlett</td>
<td>Agree</td>
</tr>
<tr>
<td>Dana A. Colombo</td>
<td>I have no issue with this TIA</td>
</tr>
<tr>
<td>Edward J. Lyczko</td>
<td>1 2</td>
</tr>
<tr>
<td>Grant A. Anderson</td>
<td>The technical merits appear to satisfy the definition of an emergency nature</td>
</tr>
<tr>
<td>David Braidich</td>
<td>Conflict between standards.</td>
</tr>
<tr>
<td>Andrew Fuchs</td>
<td>B</td>
</tr>
<tr>
<td>James K. Lathrop</td>
<td>I concur</td>
</tr>
<tr>
<td><strong>DISAGREE</strong></td>
<td>5</td>
</tr>
<tr>
<td>John C. Gregory</td>
<td>I disagree, this is NOT of an emergency nature. Vaporizers have been functioning fine unless under high usage prior to pandemic. Now there is a higher use, the facility and bulk supplier need to determine what is best action for them to proceed to alleviate possible freezing on a temporary basis. As systems go back to normal operation, this will likely not be an issue any longer, unless it was already undersized to begin with.</td>
</tr>
<tr>
<td>Ronald M. Smidt</td>
<td>I am not sure based on the submitted documentation that the requestor has shown that this poses emergency threat to safety. I will be interested in the thoughts of other TC members.</td>
</tr>
<tr>
<td>Gary Currence</td>
<td>While I do agree that there is a concern with conflicting information in 2 different NFPA documents, I disagree with this being considered of emergency nature. Per the TIA substantiation, this committee has already voted on this and determined that a minimum clearance on 3 sides was acceptable. This is a minimum code. If a new system going in requires more clearance, the supplier is allowed to require more to meet their specifications.</td>
</tr>
<tr>
<td>Edward A. Litvin</td>
<td>An emergent nature and threat to safety has not been substantiated.</td>
</tr>
<tr>
<td>Chad E. Beebe</td>
<td>Since this change was fully vetted by the committee during the normal process and the deliberate decision was made to deviate from NFPA 55 and there isn’t a true conflict between the codes there is no emergency criteria met. To make this change the committee should review the case studies that fully detail the suspected issue.</td>
</tr>
<tr>
<td><strong>ABSTAIN</strong></td>
<td>0</td>
</tr>
</tbody>
</table>
1. Revise 5.1.3.10.2.4 to read as follows:

5.1.3.10.2.4 Cryogenic fluid central supply systems shall have a minimum work space clearance of 3 ft (1 m) around three sides of the storage container, three sides of the vaporizer(s), and the cabinet opening or front side of the pressure-regulating manifold for system maintenance and operation. [55:17.2.4].

Substantiation: The NFPA 55/99 task group collected into one chapter all the requirements in NFPA 55 and NFPA 99 dealing with cryogenic fluid central supply systems. The material was added to a new chapter 17, “Cryogenic Fluid Central Supply Systems for Health Care Facilities,” in the 2020 edition of NFPA 55. The task group submitted a public input to NFPA 99 for the 2021 edition to use the NFPA extraction process to copy and paste NFPA 55 chapter 17 into NFPA 99 chapter 5. The material was extracted to NFPA 99 as section 5.1.3.10 and its subsections.

The NFPA 99 piping technical committee made the extracts as described above and tagged the material as being extracted from NFPA 55. However, the piping technical committee did not extract into section 5.1.3.10.2.4 the material in NFPA 55 section 17.2.4 that required 3 feet clearance around all components as shown below:

5.1.3.10.2.4 Cryogenic fluid central supply systems shall have a minimum work space clearance of 3 ft (1 m) around the storage container, vaporizer(s), and cabinet opening or front side of the pressure-regulating manifold for system maintenance and operation. [55:17.2.4].

Instead, the technical committee developed new language as shown below, dropping the extract tag, that required the 3 feet clearance only on three sides:

5.1.3.10.2.4 Cryogenic fluid central supply systems shall have a minimum work space clearance of 3 ft (1 m) around three sides of the storage container, three sides of the vaporizer(s), and the cabinet opening or front side of the pressure-regulating manifold for system maintenance and operation.

The piping committee provided the following reason for creating a new section 5.1.3.10.2.4: “Storage vessels and vaporizers can be easily serviced with three sides of clearance around them. (As long as some common sense is used to keep the controls on the clearance sides). Real estate outside of a Hospital or other healthcare facility is hard to come by and the additional 3 ft of clearance adds 9 sq ft of additional footprint to the central supply system for each vessels, vaps and cabinet location. That adds up quickly with multiple tanks and vaporizers on a concrete pad.
The piping committee’s change creates two issues:

1. By removing the NFPA 55 extract tag and changing the text in 5.1.3.10.2.4, the piping committee has created a conflict between NFPA 55 and NFPA 99. The NFPA 55/99 task group had earlier reached agreement within the two technical committees that NFPA 55 will have primacy over cryogenic fluid central supply systems. From a work process viewpoint, technical committees should not make changes to extracted material but should submit proposed changes to the source document, in this case NFPA 55, chapter 17.

2. During the COVID-19 crisis, many health care facilities were faced with the need to supply medical oxygen in larger flow rates than the original capacity of the cryogenic fluid central supply system. In particular, the vaporizers were required to convert more liquid oxygen to gaseous oxygen. Doing so increased the ice load on vaporizers. Ambient air vaporizers work by transferring heat from the surrounding air to the fins on the vaporizer which in turn cause the cryogenic fluid to boil and turn to a gas. As the heat transfers from the air to the vaporizer, the air cools and drops toward the ground being replaced by warmer air. This air movement is called convection. As this heat transfer takes place, some of the moisture in the air condenses on the surface of the vaporizer and becomes ice. When air flow is restricted, more of this moisture turns to ice and continues to grow in layers. The ice that forms is not 32 degree ice. This ice can drop to temperatures in the minus 100 degree range and cause damage to nearby material and equipment. This ice builds up and reduces the effective area of the vaporizer which allows extremely cold gas to enter the facility’s piping systems. There have been incidents reported where the medical gas pipeline going into the facility has become encased in ice due to lack of proper vaporization. This means there is a need for more room for air circulation, ice growth and for an open area for vaporizer defrosting when required. Having 3 feet of clearance on all four sides does help the vaporizer perform better under challenging conditions. Requiring 3 feet spacing only on three sides can lead to excessive ice build-up on vaporizers.

**Emergency Nature:** The NFPA Standard contains a conflict within the NFPA Standard or within another NFPA Standard.

The 2021 edition of NFPA 99 is almost ready to publish and does not have a NITMAM dealing with the issue raised in this proposed TIA, so the change cannot be made in the body of NFPA 99. Creating the TIA will allow it to be released at the same time or shortly after the 2021 edition of NFPA 99 is issued, allowing users to follow the updated guidance immediately rather than wait three years for the 2024 edition of NFPA 99.
TENTATIVE INTERIM AMENDMENT BALLOT

EMERGENCY NATURE SELECTION OF RESPONSES

A. The standard contains an error or an omission that was overlooked during the regular revision process.

B. The NFPA Standard contains a conflict within the NFPA Standard or with another NFPA Standard.

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

D. 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.

E. The proposed TIA intends to accomplish a recognition of an advance in the art of safeguarding property or life where an alternative method is not in current use or is unavailable to the public.

F. The proposed TIA intends to correct a circumstance in which the revised NFPA Standard has resulted in an adverse impact on a product or method that was inadvertently overlooked in the total revision process or was without adequate technical (safety) justification for the action.