| 21-4-1 | Report of the Committee Membership Task Group (J. Quiter, Chair). No Attachment |
| 21-4-1-a | Consideration of Non-Reappointments. No Attachment |
| 21-4-1-b | Act on pending applications for Committee Members. No Attachment |
| 21-4-1-c | Request for classification reconsideration. No Attachment |
| 21-4-1-d | Report back to Council in accordance with Decision No. 20-6 (20-12-21). No Attachment |
| 21-4-2 | Report of the Awards Task Group (J. Golinveaux, Chair). No Attachment |
| 21-4-3 | Update from P&P Chair. No Attachment |
| 21-4-4 | Report of the December 2020 Minutes. No Attachment |
| 21-4-5 | Review of the process of Standards Council decision making by Suzanne Gallagher, Deputy General Counsel. No attachment. |

**TENTATIVE INTERIM AMENDMENTS (TIAs)**

<p>| 21-4-6 | Act on the issuance of proposed Tentative Interim Amendment (TIA) to revise section 10.5.1.6.2 and add new associated Annex material of the 2020 edition of NFPA 2, Hydrogen Technologies Code (TIA No. 1542). |
| 21-4-6-a | Text of proposed TIA No. 1542. See Attachment 21-4-6-a |
| 21-4-6-b | Ballot results of TIA No. 1542. PASSED ballot on both technical merit and emergency nature – 29 voting members/26 agree on technical merit/0 disagree/0 abstained/3 ballots not returned/26 agree on emergency nature/0 disagree/0 abstained/3 ballots not returned. See Attachment 21-4-6-b |
| 21-4-6-c | No comments were received. |
| 21-4-7 | Act on the issuance of proposed Tentative Interim Amendment (TIA) to revise Annex A.7.2.2 Item (5) of the proposed 2022 edition of NFPA 10, Standard for Portable Fire Extinguishers (TIA No. 1557). |
| 21-4-7-a | Text of proposed TIA No. 1557. See Attachment 21-4-7-a |
| 21-4-7-b | Ballot results of TIA No. 1557. FAILED ballot - passed ballot on technical merit but failed ballot on emergency nature– 31 voting members/22 agree on technical merit/6 disagree/0 abstained/3 ballots not returned/19 agree on emergency nature/9 disagree/0 abstained/3 ballots not returned. See Attachment 21-4-7-b |
| 21-4-7-c | One comment was received. See Attachment 21-4-7-c |
| 21-4-8 | Act on the issuance of proposed Tentative Interim Amendment (TIA) to revise section 4.7.1.6 of the 2018 edition of NFPA 12, Standard on Carbon Dioxide Extinguishing Systems (TIA No. 1543). |
| 21-4-8-a | Text of proposed TIA No. 1543. See Attachment 21-4-8-a |</p>
<table>
<thead>
<tr>
<th>21-4-8-b</th>
<th>Ballot results of TIA No. 1543. <strong>PASSED</strong> ballot on both technical merit and emergency nature – 34 voting members/26 agree on technical merit/0 disagree/1 abstained/7 ballots not returned/26 agree on emergency nature/0 disagree/1 abstained/7 ballots not returned. See Attachment 21-4-8-b</th>
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<tbody>
<tr>
<td>21-4-8-c</td>
<td>No comments were received.</td>
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<tr>
<td>21-4-9</td>
<td>Act on the issuance of proposed Tentative Interim Amendment (TIA) to revise section 20.5.3.1.3 of the proposed 2022 edition of NFPA 13, <em>Standard for the Installation of Sprinkler Systems</em> (TIA No. 1560).</td>
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<tr>
<td>21-4-9-a</td>
<td>Text of proposed TIA No. 1560. See Attachment 21-4-9-a</td>
</tr>
<tr>
<td>21-4-9-b</td>
<td>Ballot results of TIA No. 1560. <strong>FAILED</strong> ballot on both technical merit and emergency nature – 36 voting members/22 agree on technical merit/12 disagree/0 abstained/2 ballots not returned/18 agree on emergency nature/16 disagree/0 abstained/2 ballots not returned. <strong>PASSED</strong> CC ballot on correlation but <strong>FAILED</strong> ballot on emergency nature – 22 voting members/19 agree on correlation/2 disagree/0 abstained/1 ballots not returned/7 agree on emergency nature/5 disagree/0 abstained/1 ballots not returned. See Attachment 21-4-9-b</td>
</tr>
<tr>
<td>21-4-9-c</td>
<td>No comments were received.</td>
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<tr>
<td>21-4-10</td>
<td>Act on the issuance of proposed Tentative Interim Amendment (TIA) to add new Annex material A.14.3.2 to the 2019 edition of NFPA 72, <em>Fire Alarm Signaling Code</em> (TIA No. 1548).</td>
</tr>
<tr>
<td>21-4-10-a</td>
<td>Text of proposed TIA No. 1548. See Attachment 21-4-10-a</td>
</tr>
<tr>
<td>21-4-10-b</td>
<td>Ballot results of TIA No. 1548. <strong>FAILED</strong> ballot on both technical merit and emergency nature – 28 voting members/16 agree on technical merit/8 disagree/1 abstained/3 ballots not returned/16 agree on emergency nature/8 disagree/1 abstained/3 ballots not returned. <strong>PASSED</strong> CC ballot on both correlation and emergency nature – 19 voting members/17 agree on correlation/0 disagree/1 abstained/1 ballots not returned/14 agree on emergency nature/3 disagree/1 abstained/1 ballots not returned. <strong>REBALLOT FINAL RESULTS</strong> of TIA No. 1548. <strong>PASSED</strong> ballot on both technical merit and emergency nature – 28 voting members/16 agree on technical merit/5 disagree/0 abstained/7 ballots not returned/16 agree on emergency nature/5 disagree/0 abstained/7 ballots not returned. See Attachment 21-4-10-b</td>
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<tr>
<td>21-4-10-c</td>
<td>Four comments were received. See Attachment 21-4-10-c</td>
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<tr>
<td>21-4-11</td>
<td>Act on the issuance of proposed Tentative Interim Amendment (TIA) to add new section 26.2.10 to the 2019 edition and proposed 2022 editions of NFPA 72, <em>Fire Alarm Signaling Code</em> (TIA No. 1549).</td>
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<tr>
<td>21-4-11-a</td>
<td>Text of proposed TIA No. 1549. See Attachment 21-4-11-a</td>
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<tr>
<td>21-4-11-b</td>
<td>Ballot results of TIA No. 1549. <strong>PASSED</strong> ballot on both technical merit and emergency nature – 26 voting members/24 agree on technical merit/0 disagree/0 abstained/2 ballots not returned/24 agree on emergency nature/0 disagree/0 abstained/2 ballots not returned. <strong>PASSED CC</strong> ballot on both correlation and emergency nature – 19 voting members/17 agree on correlation/0 disagree/0 abstained/2 ballots not returned/17 agree on emergency nature/0 disagree/0 abstained/2 ballots not returned. See Attachment 21-4-11-b</td>
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<td>21-4-11-c</td>
<td>Two comments were received. See Attachment 21-4-11-c</td>
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<tr>
<td>21-4-12 NFPA 92</td>
<td>Act on the issuance of proposed Tentative Interim Amendment (TIA) to revise Annex A.5.11 Example 4 of the 2021 edition of NFPA 92, <em>Standard for Smoke Control Systems</em> (TIA No. 1547).</td>
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<tr>
<td>21-4-12-a</td>
<td>Text of proposed TIA No. 1547. See Attachment 21-4-12-a</td>
</tr>
<tr>
<td>21-4-12-b</td>
<td>Ballot results of TIA No. 1547. PASSED ballot on both technical merit and emergency nature – 31 voting members/25 agree on technical merit/0 disagree/2 abstained/4 ballots not returned/26 agree on emergency nature/0 disagree/1 abstained/4 ballots not returned. See Attachment 21-4-12-b</td>
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<tr>
<td>21-4-12-c</td>
<td>No comments were received.</td>
</tr>
<tr>
<td>21-4-13 NFPA 99</td>
<td>Act on the issuance of proposed Tentative Interim Amendment (TIA) to add new item (13) to section 6.1.3 and revise Section 6.1.4 of the 2021 edition of NFPA 99, <em>Health Care Facilities Code</em> (TIA No. 1522).</td>
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<tr>
<td>21-4-13-a</td>
<td>Text of proposed TIA No. 1522. See Attachment 21-4-13-a</td>
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<tr>
<td>21-4-13-b</td>
<td>Ballot results of TIA No. 1522. PASSED ballot on both technical merit and emergency nature – 33 members/25 agree on technical merit/2 disagree/0 abstained/6 ballots not returned/24 agree on emergency nature/3 disagree/0 abstained/6 ballots not returned. PASSED CC ballot on both correlation and emergency nature – 18 voting members/14 agree on correlation/0 disagree/0 abstained/4 ballots not returned/14 agree on emergency nature/0 disagree/0 abstained/4 ballots not returned. See Attachment 21-4-13-b</td>
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<tr>
<td>21-4-13-c</td>
<td>No comments were received.</td>
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<tr>
<td>21-4-14-a</td>
<td>Text of proposed TIA No. 1559. See Attachment 21-4-14-a</td>
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<tr>
<td>21-4-14-b</td>
<td>Ballot results of TIA No. 1559. PASSED ballot on both technical merit and emergency nature – 25 voting members/21 agree on technical merit/2 disagree/0 abstained/2 ballots not returned/22 agree on emergency nature/1 disagree/0 abstained/2 ballots not returned. PASSED CC ballot on both correlation and emergency nature – 12 voting members/10 agree on correlation/0 disagree/0 abstained/2 ballots not returned/10 agree on emergency nature/0 disagree/0 abstained/2 ballots not returned. See Attachment 21-4-14-b</td>
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<tr>
<td>21-4-14-c</td>
<td>One comment was received. See Attachment 21-4-14-c</td>
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<td>21-4-15 NFPA 407</td>
<td>Act on the issuance of proposed Tentative Interim Amendment (TIA) to revise Sections 5.1.12, 6.1.3.12.2.7, 6.1.3.12.2.8, 6.1.3.12.2.9 and Table C.1 of the 2017 edition and proposed 2022 editions of NFPA 407, <em>Standard for Aircraft Fuel Servicing</em> (TIA No. 1558).</td>
</tr>
<tr>
<td>21-4-15-a</td>
<td>Text of proposed TIA No. 1558. See Attachment 21-4-15-a</td>
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</table>
| **21-4-15-b** | Ballot results of TIA No. 1558. **FAILED** ballot on both technical merit and emergency nature – 29 voting members/15 agree on technical merit/10 disagree/0 abstained/4 ballots not returned/15 agree on emergency nature/10 disagree/0 abstained/4 ballots not returned.  
See Attachment 21-4-15-b |
| **21-4-15-c** | One hundred sixty (160) comments were received. One hundred fifty-eight (158) comments support the TIA, two (2) comments do not support the TIA.  
See Attachment 21-4-15-c |
| **21-4-15-d** | **APPEAL** Consider the appeal of Steve Berry, National Air Transportation Assoc., to overturn the ballot results of TIA No. 1558 and issue the TIA.  
See Attachment 21-4-15-d |
| **21-4-16** | **NFPA 499** Act on the issuance of proposed Tentative Interim Amendment (TIA) to revise section 3.3.3, and associated Annex material of the 2021 edition of NFPA 499, *Recommenced Practice for the Classification of Combustible Dusts and of Hazardous (Classified) Locations for Electrical Installations in Chemical Process Areas*, (TIA No. 1546). |
| **21-4-16-a** | Text of proposed TIA No. 1546.  
See Attachment 21-4-16-a |
| **21-4-16-b** | Ballot results of TIA No. 1546. **PASSED** ballot on both technical merit and emergency nature – 20 voting members/15 agree on technical merit/0 disagree/1 abstained/4 ballots not returned/16 agree on emergency nature/0 disagree/0 abstained/4 ballots not returned.  
See Attachment 21-4-16-b |
| **21-4-16-c** | No comments were received. |
| **21-4-17** | **NFPA 909** Act on the issuance of proposed Tentative Interim Amendment (TIA) to add new references to sections 2.2, 2.3.1, 2.4, revise section 11.2.5 and add a new section 11.2.6 to the 2021 edition of NFPA 909, *Code for the Protection of Cultural Resource Properties – Museums, Libraries, and Places of Worship*, (TIA No. 1544). |
| **21-4-17-a** | Text of proposed TIA No. 1544.  
See Attachment 21-4-17-a |
| **21-4-17-b** | Ballot results of TIA No. 1544. **PASSED** ballot on both technical merit and emergency nature – 30 voting members/22 agree on technical merit/4 disagree/0 abstained/4 ballots not returned/20 agree on emergency nature/5 disagree/1 abstained/4 ballots not returned.  
See Attachment 21-4-17-b |
| **21-4-17-c** | No comments were received. |
| **21-4-18** | **NFPA 1403** Act on the issuance of proposed Tentative Interim Amendment (TIA) to revise section 4.13.2 of the 2017 edition of NFPA 1403, *Standard on Live Fire Training Evolutions*, (TIA No. 1552). |
| **21-4-18-a** | Text of proposed TIA No. 1552.  
See Attachment 21-4-18-a |
| **21-4-18-b** | Ballot results of TIA No. 1552 **FAILED** ballot on both technical merit and emergency nature – 36 voting members/9 agree on technical merit/21 disagree/2 abstained/2 ballots not returned/8 agree on emergency nature/24 disagree/2 abstained/2 ballots not returned.  
See Attachment 21-4-18-b |
| **21-4-18-c** | Forty-four comments were received.  
See Attachment 21-4-18-c |
| **21-4-18-d** | **APPEAL** Consider the appeal of Ryan McGill, IAFF Local 2068, to overturn the ballot results of TIA No. 1552 and issue the TIA.  
See Attachment 21-4-18-d |
21-4-19 NFPA 1977

Act on the issuance of proposed Tentative Interim Amendment (TIA) to delete and replace Figure 6.1.14.6(a) with existing figure from the 2016 edition of NFPA 1977, *Standard for Protective Clothing and Equipment for Wildland Fire Fighting*, (TIA No. 1562).

21-4-19-a

Text of proposed TIA No. 1562.
See Attachment 21-4-19-a

21-4-19-b

Ballot results of TIA No. 1562. PASSED ballot on both technical merit and emergency nature – 23 voting members/17 agree on technical merit/0 disagree/0 abstained/6 ballots not returned/17 agree on emergency nature/0 disagree/0 abstained/6 ballots not returned. PASSED CC ballot on both correlation and emergency nature – 27 voting members/20 agree on correlation/0 disagree/0 abstained/7 ballots not returned/20 agree on emergency nature/0 disagree/0 abstained/7 ballots not returned.
See Attachment 21-4-19-b

21-4-19-c

No comments were received.

21-4-20 NFPA 1986

Act on the issuance of proposed Tentative Interim Amendment (TIA) to revise sections 8.2.5.5, 8.2.5.7, 8.2.5.8, 8.23.5.4 through 8.23.5.6 and 8.23.5.7(new) of the 2017 edition of NFPA 1986, *Standard on Respiratory Protection equipment for Tactical and Technical Operations*, (TIA No. 1545).

21-4-20-a

Text of proposed TIA No. 1545.
See Attachment 21-4-20-a

21-4-20-b

Ballot results of TIA No. 1545. PASSED ballot on both technical merit and emergency nature – 24 voting members/17 agree on technical merit/2 disagree/2 abstained/3 ballots not returned/17 agree on emergency nature/2 disagree/2 abstained/3 ballots not returned. PASSED CC ballot on correlation but FAILED ballot on emergency nature – 27 voting members/17 agree on correlation/5 disagree/1 abstained/4 ballots not returned/15 agree on emergency nature/6 disagree/2 abstained/4 ballots not returned.
See Attachment 21-4-20-b

21-4-20-c

Nine comments were received.
See Attachment 21-4-20-c

21-4-20-d APPEAL

Consider the appeal of Clint Mayhue, Avon Protection Systems, to overturn the ballot results of TIA No. 1545 and issue the TIA.
See Attachment 21-4-20-d

21-4-20-d-1 APPEAL

Consider the appeal of John Morris, 3M, to uphold the ballot results of TIA No. 1545 and not issue the TIA.
See Attachment 21-4-20-d-1

**REVISION CYCLES**

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<tr>
<td>NFPA 418</td>
<td>2021</td>
<td>PI Closing: January 5, 2022</td>
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</table>

See Attachment 21-4-21

**NEW PROJECTS**

21-4-22

Consider the request of Christopher Wagner, AmeriGas Propane, to develop a standard to address Mobile Food Establishments/Mobile Cooking Operations. Seventeen (17) comments
| 21-4-23 | Consider the request of Brian Lucas, City and County of Denver, CO, to develop a standard to address fire protection of cannabis growing and processing facilities. Eighty-one (81) comments were received. Seventy (70) comments support development of the project, six (6) comments do not support the development of the project, five (5) provided commentary and twenty-six (26) indicated Technical Committee interest. See Attachment 21-4-23 |
| 21-4-24 | Consider the request of the Technical Committee on Hazardous Waste to approve the preliminary draft of NFPA 401, *Recommended Practice for the Prevention of Fires and Uncontrolled Chemical Reactions Associated with the Handling of Hazardous Waste*. If approved, the Technical Committee also requests the Standard to be entered into its initial revision cycle, with a Public Input closing date of January 5, 2022. See Attachment 21-4-24 |
| 21-4-25 | At the December 2020 Council meeting, the Council reviewed the request of Megan Hayes on behalf of NEMA regarding the terms of listed versus certified. After review of all information before it, the issue was directed to staff for review and instructions to report back to the Council during the April 2021 meeting. No Attachment |
| 21-4-26 | In accordance with prior actions and direction of Council, the following standards have completed their current revision cycles and are therefore transferred to the Technical Committee on Emergency Responders Occupational Health: NFPA 1581, *Standard on Fire Department Infection Control Program* NFPA 1582, *Standard on Comprehensive Occupational Medical Program for Fire Departments* NFPA 1583 *Standard on Health-Related Fitness Programs for Fire Department Members* NFPA 1584, *Standard on the Rehabilitation process for Members During Emergency Operations and Training Exercises* Draft development of NFPA 1585, *Standard on Contamination Control*, continues by the Technical Committee on Emergency Responders Occupational Health and will be presented to Council for entry into its initial public revision cycle at a later date. No Attachment |
| 21-4-27 | Review and consider the request to remove NFPA 1081 from new consolidated document NFPA 1010. See Attachment 21-4-27 |
| 21-4-28 | Consider the location/method and dates for the upcoming Council meetings in 2021: August 24-26, 2021 Location/Method TBD December 7-8, 2021 Location/Method TBD |
| 21-4-29 | Update from the Council Secretary. No Attachment |
NFPA 499-2021 Edition

Recommended Practice for the Classification of Combustible Dusts and of Hazardous
(Classified) Locations for Electrical Installations in Chemical Process Areas

TIA Log No.: 1546
Reference: Various paragraphs
Comment Closing Date: February 1, 2021
Submitter: David Wechsler, Consultant
www.nfpa.org/499

1. Revise 3.3.3, and associated Annex material to read as follows:

3.3.3 Combustible Dust. Solid Dust particles that are 500 μm or smaller (i.e., material passing
a U.S. No. 35 Standard Sieve as defined in ASTM E11-17, Standard Specification for Woven
Wire Test Sieve Cloth and Test Sieves) that can form an exploisible mixture when suspended in
air at standard atmospheric pressure and temperature and present a flash fire hazard or
explosion hazard when dispersed and ignited in air.

A.3.3.3 Combustible Dust. See ASTM E1226, Standard Test Method for Explosibility of Dust
Clouds, ISO 6184–1, Explosion protection systems — Part I: Determination of explosion
indices of combustible dust in air, or ISO/IEC/UL 80079-29-2, Explosive atmospheres — Part
20-2: Material characteristics — Combustible dusts test methods, for procedures for
determining the explosibility of dusts. Historically, the explosibility condition has been
described as presenting a flash fire or explosion hazard. It could be understood that the potential
hazard due to the formation of an exploisible mixture when suspended in air at standard
atmospheric pressure and temperature would include ignition.

B.1.2.2 ISO Publications. ISO/IEC/UL 80079-20-2…

2. Revise/renumber 3.3.4, through 3.3.10, and associated Annex material to read as follows:

3.3.4.5-Combustible Fibers/Flyings.
3.3.4.5.1* Combustible Fibers/Flyings.
Fibers/FlyingSolid particles, where one any dimension includes fibers is greater than 500 μm in
nominal size, which can form an exploisible mixture with when suspended in air at standard
atmospheric pressure and temperature.

A.3.3.4.5.1 Combustible Fibers/Flyings. As used in this recommended practice, flying is a general term encompassing any particle that can be suspended in air and
that has one or more dimensions greater than 500 μm. Examples of fibers/flying include flat
platelet-shaped particulate, such as metal flake, and fibrous particulate, such as particle board
core material. To be covered by this recommended practice, the particle must present a flash-
fire hazard or explosion hazard when suspended in air. If the smallest dimension of a
combustible material solid is greater than 500 μm, it is unlikely that the material would be
combustible dust or combustible fibers/flying, as determined by test. Finely divided solids with
lengths that are large compared to their diameter or thickness usually do not pass through a 500
μm sieve, yet when tested could potentially be determined to be exploisible, still pose a
deflagration hazard.

—Combustible flying that present a flash-fire hazard or explosion hazard when dispersed in air
must first be capable of being suspended in air under typical test conditions. The typical test
methods for evaluating a flammable mixture flash fire or explosion hazard are ASTM E1226, Standard Test Method for Explosibility of Dust Clouds, ISO 6184-1, Explosion protection systems — Part 1: Determination of explosion indices of combustible dusts in air, or ISO/IEC/UL 80079-20-2, Explosive atmospheres — Part 20-2: Material characteristics — Combustible dusts test methods, for procedures for determining the explosibility of dusts. A material that is found to not present a flammable mixture flash fire or explosion hazard could still be an ignitable fiber/flying, as defined in 3.3.74.2. Historically, the explosibility condition has been described as presenting a flash fire or explosion hazard. It could be understood that the potential hazard due to the formation of an flammable mixture when suspended in air at standard atmospheric pressure and temperature would include ignition.

3.3.56* Hybrid Mixture. …

3.3.7*3.3.4.2* Ignitable Fibers/Flyings. A finely divided combustible particulate solid with at least one dimension larger than 500 μm (i.e., material that will not pass through a U.S. No. 35 standard sieve as defined in ASTM E11, Standard Specification for Woven Wire Test Sieve Cloth and Test Sieves) that is not likely to be in suspension and that presents a fire hazard. Fibers/flyings where any dimension is greater than 500 μm in nominal size, which are not likely to be in suspension in quantities to produce an flammable mixture, but could produce an ignitable layer fire hazard.

3.3.7A 3.3.4.2 Ignitable Fibers/Flyings. Section 500.5 of NFPA 70 defines a Class III location as one where ignitable fibers/flyings are present, but not likely to be in suspension in the air in quantities sufficient to produce ignitable mixtures. This description addresses fibers/flyings that do not present a flash-fire hazard or explosion hazard by test. This could be because those fibers/flyings are too large or too agglomerated to be suspended in air in sufficient concentration, or at all, under typical test conditions. Alternatively, this could be because they burn so slowly that, when suspended in air, they do not propagate combustion at any concentration.

The zone classification system does not address ignitable fibers/flyings. Where these are present, the user should consider installation in accordance with Article 503 of NFPA 70.

3.3.68 Ignitable Mixture. …

3.3.79 Material Form. …

3.3.8 Material Groups.
3.3.8.1 Combustible Dust Division Material Groups. The division area classification, addressed in Articles 500 and 502 of NFPA 70, divides combustible dusts are divided into Group E, Group F, and Group G.

3.3.4.1 3.3.8.1.1* Group E. Atmospheres containing combustible metal dusts, including aluminum, magnesium, and their commercial alloys, or other combustible dusts whose particle size, abrasiveness, and conductivity present similar hazards in the use of electrical equipment.

A.3.3.4.1 A.3.3.8.1.1 Group E. Atmospheres containing combustible metal fibers/flyings, as defined in 3.3.4.1, are Class II, Group E locations. See note (3) in Table 5.2.3.

3.3.4.2 3.3.8.1.2* Group F. Atmospheres containing combustible carbonaceous dusts that have more than 8 percent total entrapped volatiles (see ASTM D3175, Standard Test Method for Volatile Matter in the Analysis Sample of Coal and Coke, for coal and coke dusts) or that have been sensitized by other materials so that they present an explosion hazard.
A.3.3.4.2 A.3.3.8.1.2 Group F. Although coal, carbon black, charcoal, and coke dusts are examples of carbonaceous dusts, only those atmospheres containing combustible carbonaceous dusts that have more than 8 percent total entrapped volatiles are Class II, Group F.

A.3.3.4.3 A.3.3.8.1.3* Group G. Atmospheres containing combustible dusts not included in Group E or Group F, including flour, grain, wood, plastic, and chemicals.

A.3.3.4.3 A.3.3.8.1.3 Group G. Some carbonaceous dusts with low volatiles will burn but are not combustible dusts as defined by this document. An example would be certain carbon blacks produced by pyrolyzing acrylonitrile. Atmospheres containing combustible nonmetal fibers/flyings or ignitable fibers/flyings are Class III locations.

3.3.8.2 Zone Material Groups. The zone area classification, addressed in Article 506 of NFPA 70, divides combustible materials into Group IIIA, Group IIIIB, and Group IIIIC.

3.3.4.6 3.3.8.2.1 Group IIIIC. Combustible metal dust, including combustible metal fibers/flyings. Group IIIIC is equivalent to Class II, Group E.

3.3.4.5 3.3.8.2.2 Group IIIIB. Combustible dust other than combustible metal dust; Group IIIIB is equivalent to Class II, Groups F and G.

3.3.4.3* 3.3.8.2.3* Group IIIA. Combustible fibers/flyings other than metal. Solid particles, other than combustible metal, including fibers, greater than 500 μm in nominal size that might be suspended in air and could settle out of the atmosphere under their own weight, Group IIIA is equivalent to Class III.

3.3.4.4 A.3.3.8.2.3 Group IIIA. Group IIIA materials are larger particle-size Group IIIIB materials and do not include metal dust or fibers/flyings.

3.3.910 Unclassified Locations. ...

3. Delete/revise/renumber 4.4 through 4.7 to read as follows:

4.4 Classification of Combustible Dusts.

4.4.1 Combustible Dust Groups. Combustible dusts are addressed in Articles 500, 502, and 506 of NFPA 70.

4.4.2 Combustible Dust Division Groups. In combustible dust divisions, the combustible dust is divided into Group E, Group F, and Group G.

4.4.2.1 Group E. Atmospheres containing combustible metal dusts, including aluminum, magnesium, and their commercial alloys, or other combustible dusts whose particle size, abrasiveness, and conductivity present similar hazards in the use of electrical equipment.

4.4.2.2 Group F. Atmospheres containing combustible carbonaceous dusts that have more than 8 percent total entrapped volatiles (see ASTM D3175, Standard Test Method for Volatile Matter in the Analysis Sample of Coal and Coke, for coal and coke dusts) or that have been sensitized by other materials so that they present an explosion hazard.

4.4.2.3 Group G. Atmospheres containing combustible dusts not included in Group E or Group F, including flour, grain, wood, plastic, and chemicals.

4.4.3 Combustible Dust Zone Groups. In combustible dust zones, the combustible dust is divided into Zone Group IIIIC, Group IIIIB, and Group IIIA.

4.4.3.1 Group IIIIC. Atmospheres containing combustible metal dusts, including aluminum, magnesium, and their commercial alloys, or other combustible dusts whose particle size, abrasiveness, and conductivity present similar hazards in the use of electrical equipment.

4.4.3.2 Group IIIIB. Atmospheres containing one of the following:

1. Combustible carbonaceous dusts that have more than 8 percent total entrapped volatiles (see ASTM D3175, Standard Test Method for Volatile Matter in the Analysis Sample of Coal and Coke, for coal and coke dusts) or that have been sensitized by other materials so that they present an explosion hazard.
(2) Combustible dusts not included in Zone Group IIIC, including flour, grain, wood, plastic, and chemicals

4.4.3.3 Group IIIA. Solid particles, including fibers, greater than 500 μm in nominal size, which may be suspended in air and could settle out of the atmosphere under their own weight, Group IIIA is equivalent to Class III.

4.45* Hybrid Mixtures. …
4.56 Electrostatic Discharges. …
4.67 Ignition Criteria. …

4. Revise Table 5.2.3 Note (3) to read as follows:
Table 5.2.3 Selected Combustible Dusts
(3) Combustible metal fibers/flyings, as defined in 3.3.4.13-3.5, are Group E/IIIC materials.

5. Revise 6.1.3 and associated Annex material to read as follows:
6.1.3* Where atmospheres contain Group IIIA materials, or combustible fibers/flyings other than combustible metal fibers/flyings, the classification diagrams for Group IIIB or Group F, or G, should be applied to determine the extent of the hazardous (classified) location. The location should be Zone 20, Zone 21, or Zone 22, Class III, Division 1 or Class III, Division 2 as appropriate.

A.6.1.3 The area classification diagrams for Group IIIB, Group F or Group G are used for the determination of distances. While Group IIIA combustible fibers/flyings materials present a different hazard than Class III ignitable fibers/flyings, the protection techniques are similar. NFPA 70 addresses suitable protection techniques for these materials.

6. Revise 6.2.3.5 to read as follows:
6.2.3.5 If Group F, G, IIIB, or IIIA materials are present in quantities sufficient to be hazardous only as a result of infrequent malfunctioning of handling or processing equipment, and ignition can result only from abnormal operation or failure of electrical equipment, the location should be classified Class II, Division 2 or Zone 22. If Group F or G materials are present in quantities sufficient to be hazardous only as a result of infrequent malfunctioning of handling or processing equipment, and ignition can result only from abnormal operation or failure of electrical equipment, the location should be classified Class II, Division 2. If Group IIIB materials or Group IIIA combustible fibers/flyings are present in quantities sufficient to be hazardous only as a result of infrequent malfunctioning of handling or processing equipment, and ignition can result only from abnormal operation or failure of electrical equipment, the location should be classified Zone 22.

Substantiation: This TIA addresses the following issues: A fiber/flying is NOT a combustible dust particle as seen in the revised 3.3.4.1. A flying/fiber which is not combustible has been more correctly stated in the revised 3.3.4.2 as an Ignitible fibers/flings. An error in which a Class III and Class IIIA were stated as being equal has been corrected. Equivalency statements in 3.3.8.2.1 through 3.3.8.2.3 were corrected by deleting these statements.

(1) 3.3.3 Definition of a combustible dust was modified to change ‘dispersed’ to ‘suspended’ which the committee considered the preferred word. Combustible dust was applied to present the two conditions – a) the material is a small particle and b) the material presents an explosible hazard using ASTM E1226. The use of the terms flash fire and explosion hazard make this requirement more complex and confusing. The term ignition was removed as the
testing to determine explosibility would include ignition.

(2) 3.3.4 was added to address fibers/flyings with 3.3.4.1 addressing combustible fibers/flyings and 3.3.4.2 ignitible fibers/flyings. It has been determined that fiber/flying size in a dimensional consideration may be in one or more dimensions. Therefore, if the dimension is greater than 500 μm in nominal size, one aspect of the criteria has been met. Suspended was added, as the condition of being suspended is an important aspect for the explosible mixture condition.

3.3.4.2 (formerly 3.3.7) was revised to again reflect that Fibers/Flyings are not dust particles. Additionally, this item was revised to better correlate with the revised 3.3.4 discussed under (2). Ignitible Fibers/Flyings are materials which are not combustible metals which are addressed in aspects of dust groups.

(3) A.3.3.7 was renumbered to A.3.3.4.2 per item (1) and the revisions reflect a clarification that ignitible Fibers/Flyings are too large to be suspended in air and therefore may present only a layer ignition potential hazard.

(4) A.3.3.8.1.3 (former A.3.3.4.3) Group G was revised to state that atmospheres containing combustible nonmetal fibers/flyings or ignitible fibers/flyings are Class III locations.

(5) Paragraphs 3.3.6, 3.3.8, 3.3.9, and 3.3.10 would be renumbered as 3.3.5, 3.3.6, 3.3.7, and 3.3.9 respectively due to the revised 3.3.8.

(6) 3.3.8 header “Material Groups” was added to clarify specific material groups.

(7) 3.3.8.1 was revised to properly address Combustible Dust Division Material groups which include sections 3.3.8.1.1, 3.3.8.1.2, and 3.3.8.1.3. Since similar information is also in Section 4.4, the following is redundant and should be removed: 4.4.2.1, 4.4.2.2, 4.4.2.3.

(8) 3.3.8.2 was revised to properly address Zone Material Groups which include sections 3.3.8.2.1, 3.3.8.2.2, and 3.3.8.2.3. Since similar information is also in Chapter 4, the following now is redundant and should be removed: 4.4.3, 4.4.3.1, 4.4.3.2, 4.4.3.3.

(9) 3.3.8.2.1 – The section was modified as Group IIIC is NOT equivalent to Class II, Groups E. The section number was changed as seen in (8).

(10) 3.3.8.2.2 - The section was modified as Group IIIB is NOT equivalent to Class II, Groups F and G. The section number was changed as seen in (8).

(11) A.3.3.8.2.3 was modified as stated in (8) above and therefore this clarification was not needed.

(12) With this information in Chapter 3, the following items which are repeated in Chapter 4 should be deleted: 4.4.4.2, 4.4.2.1, 4.4.2.2, 4.4.2.2, 4.4.2.3: 4.4.3, 4.4.3.1, 4.4.3.2, 4.4.3.3. [This information is redundant with (7) and (8)].

(13) Note 3 under Table 5.2.3 was revised to agree with 3.3.4.1.

(14) 6.1.3 and A6.1.3 were revised for proper correlation with earlier proposed changes.

(15) 6.2.3.5 was revised to address Division conditions and Zone conditions and clarify that the division and zones are different.

Emergency Nature: The standard contains an error or an omission that was overlooked during the regular revision process. The NFPA Standard contains a conflict within the NFPA Standards or within another NFPA Standard. 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.

This TIA addresses the following issues: A fiber/flying is NOT a combustible dust particle as seen in the revised 3.3.4.1. A flying/fiber which is not combustible has been more correctly stated in the revised 3.3.4.2 as an Ignitible fibers/flings. An error in which a Class III and Class IIIA
were stated as being equal has been corrected. Equivalency statements in 3.3.8.2.1 through
3.3.8.2.3 were corrected by deleting these statements.
MEMORANDUM

TO: Technical Committee on Electrical Equipment in Chemical Atmospheres

FROM: Diane Matthews, Committee Administrator

DATE: February 2, 2021

SUBJECT: NFPA 499 Proposed TIA Log No. 1546 FINAL TC BALLOT RESULTS

No comments were received on this TIA, therefore, according to 5.6(a) in the NFPA Regs, the final 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).

20 Eligible to Vote
4 Not Returned (Cirelli, Hamilton, Morrison and Ural)

<table>
<thead>
<tr>
<th>Technical Merit:</th>
<th>Emergency Nature:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abstention (Saverino)</td>
<td>0 Abstentions</td>
</tr>
<tr>
<td>Agree (with comment, Ankele, Egloff, Kohuch, Kines, Lawrence, Jr. and Myers)</td>
<td>16 Agree (with comment, Egloff and Kohuch)</td>
</tr>
<tr>
<td>0 Disagree</td>
<td>0 Disagree</td>
</tr>
</tbody>
</table>

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.

\[ \text{20 eligible} \div 2 = 10 + 1 = \boxed{11} \]

(2) The number of affirmative votes needed to satisfy the ¾ requirement (rounded up) is:

- **Technical Merit**: (20 eligible to vote - 4 not returned - 1 abstention = 15 × 0.75 = 11.25 = 12)
- **Emergency Nature**: (20 eligible to vote - 4 not returned – 0 abstentions = 16 × 0.75 = 12)

Ballot comments are attached for your review.

The Regs at 1.6.2.(c) state: An appeal relating to a proposed Tentative Interim Amendment that has been submitted for processing pursuant to Section 5.2 shall be filed no later than 5 days after the notice of the TIA final ballot results are published in accordance with 4.2.6.

**Appeal Closing Date** for this TIA is February 7, 2021.
NFPA 499 PROPOSED TIA LOG NO. 1546 FINAL BALLOT RESULTS

<table>
<thead>
<tr>
<th>Vote Selection</th>
<th>Votes</th>
<th>Comments</th>
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<tbody>
<tr>
<td>Agree</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Timothy J. Myers</td>
<td></td>
<td>Agree - some sections require editorial revisions before being incorporated into many standards as part of the correlating process.</td>
</tr>
<tr>
<td>Matt Egloff</td>
<td></td>
<td>In the future I would change the wording &quot;standard atmosphere&quot; to allow for changes in elevation and hence pressure. I'm 6000ft above sea level and air pressure is 20% lower here, but the potential hazards are the same. You could also be in an area of higher than normal pressure due to process conditions. In the future we may also wish to look at electrical conductivity of the material as opposed to just &quot;metal&quot; dusts as a criteria, though this will be more involved.</td>
</tr>
<tr>
<td>Babanna Biradar</td>
<td></td>
<td>Agree</td>
</tr>
<tr>
<td>Alphonse Aliperti</td>
<td></td>
<td>AGREE</td>
</tr>
<tr>
<td>Ryan Brownlee</td>
<td></td>
<td>Agree</td>
</tr>
<tr>
<td>James G. Stallcup</td>
<td></td>
<td>I agree</td>
</tr>
</tbody>
</table>

Eligible to Vote: 20
Not Returned: 4
Erdem A. Ural, Adam Morrison, Chris Cirelli, Bridget Hamilton
<table>
<thead>
<tr>
<th>Name</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Haywood Kines</td>
<td>Agree, Recommend a slight change in text to delete &quot;Divides&quot;, reference text shown 3.3.8.1 Combustible Dust Division Material Groups. The division area classification, addressed in Articles 500 and 502 of NFPA 70, combustible dusts are divided into Group E, Group F, and Group G.</td>
</tr>
<tr>
<td>Robert Kohuch</td>
<td>excellent work</td>
</tr>
<tr>
<td>William T. Fiske</td>
<td>Agree</td>
</tr>
<tr>
<td>Donald W. Ankele</td>
<td>I agree that these revisions are needed.</td>
</tr>
<tr>
<td>David B. Wechsler</td>
<td>Agree</td>
</tr>
<tr>
<td>William G. Lawrence, Jr.</td>
<td>Agree A &amp; B &amp; D It might be worth an Annex A comment to the new &quot;3.3.8.2 Zone Material Groups&quot; to note that internationally these are referred to as &quot;equipment groups&quot;. &quot;Material Groups&quot; are related to Comparative Tracking Index as detailed in IEC 60664-1 and UL 840.</td>
</tr>
<tr>
<td>Samuel A. Rodgers</td>
<td>Agree</td>
</tr>
<tr>
<td>Jack H. Zewe</td>
<td>Agree</td>
</tr>
<tr>
<td>Joseph Anthony Aleksa</td>
<td>Agree</td>
</tr>
<tr>
<td><strong>Disagree</strong></td>
<td>0</td>
</tr>
<tr>
<td><strong>Abstain</strong></td>
<td>1</td>
</tr>
<tr>
<td>Joseph V. Saverino</td>
<td>I don't have sufficient technical knowledge to determine whether to agree to this change.</td>
</tr>
</tbody>
</table>
QUESTION NO. 2: I AGREE that the subject is of an EMERGENCY NATURE for one or more of the reasons noted in the Instructions box.

Eligible to Vote: 20  
Not Returned: 4  
Erdem A. Ural, Adam Morrison, Chris Cirelli, Bridget Hamilton

<table>
<thead>
<tr>
<th>Vote Selection</th>
<th>Votes</th>
<th>Comments</th>
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<tbody>
<tr>
<td>Agree</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>Timothy J. Myers</td>
<td></td>
<td>B</td>
</tr>
<tr>
<td>Matt Egloff</td>
<td></td>
<td>The proposed change is clarifying.</td>
</tr>
<tr>
<td>Babanna Biradar</td>
<td>A, B, D</td>
<td></td>
</tr>
<tr>
<td>Alphonse Aliperti</td>
<td>A, D</td>
<td></td>
</tr>
<tr>
<td>Ryan Brownlee</td>
<td>A, B and D</td>
<td></td>
</tr>
<tr>
<td>James G. Stallcup</td>
<td>I agree</td>
<td></td>
</tr>
<tr>
<td>Haywood Kines</td>
<td>A and B</td>
<td></td>
</tr>
<tr>
<td>Robert Kohuch</td>
<td>excellent work</td>
<td></td>
</tr>
<tr>
<td>William T. Fiske</td>
<td>A and B</td>
<td></td>
</tr>
<tr>
<td>Donald W. Ankele</td>
<td>I agree that these revisions are of an emergency nature.</td>
<td></td>
</tr>
<tr>
<td>David B. Wechsler</td>
<td>Agree</td>
<td></td>
</tr>
<tr>
<td>Joseph V. Saverino</td>
<td>I agree with the emergency nature of this change.</td>
<td></td>
</tr>
<tr>
<td>William G. Lawrence, Jr.</td>
<td>Agree</td>
<td></td>
</tr>
<tr>
<td>Samuel A. Rodgers</td>
<td>Reason &quot;A&quot;</td>
<td></td>
</tr>
<tr>
<td>Name</td>
<td>Vote</td>
<td></td>
</tr>
<tr>
<td>-----------------------</td>
<td>--------</td>
<td></td>
</tr>
<tr>
<td>Jack H. Zewe</td>
<td>Agree</td>
<td></td>
</tr>
<tr>
<td>Joseph Anthony Alekse</td>
<td>Agree</td>
<td></td>
</tr>
<tr>
<td>Disagree</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Abstain</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>
NFPA 909- Proposed 2021 Edition


TIA Log No.: 1544
Reference: 2.2, 2.3.1, 2.4, 11.2.5 and 11.2.6(new)
Comment Closing Date: December 7, 2020
Submitter: Marcelo Hirschler, GBH International
www.nfpa.org/909

1. Add a new reference document to Section 2.2 NFPA Publications to read as follows:

2. Add a new reference document to 2.3.1 ASTM Publications to read as follows:

3. Add a new extract reference document to 2.4 to read as follows:

4. Revise 11.2.5 to read as follows:
   11.2.5 The use of Christmas trees and other decorative vegetation shall be in accordance with NFPA 1 and 11.2.6.

5. Add a new section 11.2.6 to read as follows:

   **11.2.6 Combustible Decorative Vegetation. [101:10.3.9]**

   **11.2.6.1 Flammability of Combustible Artificial Decorative Vegetation.** Combustible artificial decorative vegetation shall meet one of the following:
   (1) The flame propagation performance criteria of Test Method 1 or Test Method 2, as appropriate, of NFPA 701
   (2) A maximum heat release rate of 100 kW when tested to NFPA 289, using the 20 kW ignition source [101:10.3.9.1]

   **11.2.6.2 Fire-Retardant Treatments for Natural Cut Christmas Trees.** Where fire-retardant treatments are applied to natural cut Christmas trees, the fire-retardant treatment shall comply with both Test Method 1 and Test Method 2 of ASTM E3082, Standard Test Methods for Determining the Effectiveness of Fire Retardant Treatments for Natural Christmas Trees. [101:10.3.9.2]

   **11.2.6.3 Electrical Equipment. [101:10.3.9.3]**

   **11.2.6.3.1** Electrical wiring and listed luminaires used on combustible artificial decorative vegetation shall be listed for that application. [101:10.3.9.3.1]

   **11.2.6.3.2** The use of electrical wiring and of luminaires constructed entirely of metal shall not be permitted on combustible artificial decorative vegetation. [101:10.3.9.3.2]

   **11.2.6.4 Open Flames.** Candles and open flames shall not be used on or near combustible artificial decorative vegetation. [101:10.3.9.4]

Substantiation: Both NFPA 1 and NFPA 101 have adopted the language proposed in this TIA. Other codes also contain similar types of requirements. The language regarding artificial
decorative vegetation (including Christmas trees) has been in the codes before but the language regarding natural cut Christmas trees is new and is the result of recent developments.

The TIA addresses multiple issues associated with combustible decorative vegetation, both natural and artificial.

With regard to artificial combustible vegetation, it has been found that the fire performance needs to be controlled to prevent the use of materials prone to causing excessive flame spread and releasing excessive heat. NFPA 701 is an NFPA fire test method explicitly designed for assessing flame spread from decorative materials and NFPA 289 is an NFPA fire test method that assesses heat release from large decorative objects. Both test methods have long been in use in NFPA 101 to regulate various products.

With regard to natural decorative vegetation, such as Christmas trees, it has been found that many treatments are offered for sale that are said to improve the fire performance of natural Christmas trees. The Natural Christmas Tree Association has been very worried for some time about the efficacy of some of these products. It has been found that the use of poorly formulated and untested fire-retardant treatments can accelerate the drying out of the Christmas tree and actually worsen the fire danger. The Natural Christmas Tree Association approached both ASTM (committee E05 on fire standards) and individual members off the NFPA Fire Tests committee to develop a test method for assessing whether the treatments offered for sale are actually doing as claimed by manufacturers. The state of California has a fire test that it uses to approve such treatments, based on a small-scale fire test, but other states do not.

As a result of these concerns, ASTM has developed and published ASTM E3082 for that purpose. It contains both a small-scale test (Test Method 1) and a full-scale test (Test Method 2). In order to comply with the requirements of ASTM E3082 a treatment must comply with both tests, and then it will be said to have "passed" the test. Test Method 1 is similar to the test used by the state of California for its requirements. Test Method 2 is a full-scale heat release test largely based on UL Outline of Investigation 2358, “Fire Tests of Pre-Lit Artificial Seasonal Use Trees and Other Seasonal Decorative Items”. The ASTM test method includes pass/fail criteria.

NFPA has also developed a procedure within NFPA 289 (a heat release test for full scale individual fuel items) to also test Christmas tree treatments. The test in NFPA 289 (section 5.5) is similar (but not identical) to the full-scale test in ASTM E3082 (Test Method 2) and does not have pass fail criteria.

NFPA statistics (in the most recent report published) show that, between 2011 and 2015, U.S. fire departments responded to an estimated 200 structure fires, per year, caused by Christmas trees resulting in an annual average of 6 deaths, 16 injuries and $14.8 million in property damage. When comparing Christmas tree fires to other reported home fires, 1 out of every 32 home fires that began with a Christmas tree resulted in a death compared to 1 death out of every 143 reported home fires. In fact, the fire fatality rate has been significantly higher in some other years. Moreover, electrical ignition is a frequent source of such fires.
The consequence of applying inadequate fire-retardant treatments is not just that they do not serve their purpose but also that they dry out the tree making it easier for it to catch fire.

Also, it is important to clarify that the code section on fire retardant treatments for natural Christmas trees only becomes a requirement “where fire retardant treatments are applied” meaning that this does not introduce a requirement that any treatment be applied to natural cut trees. It was also noted that it must be clarified that the requirement applies to the treatment and does not apply to the tree. Therefore, it is the commercial treatment that needs to be tested and not the individual trees. Also, note that this section would not apply anywhere where the use of natural cut Christmas trees is not allowed.

Experience (especially in terms of sources of ignition) shows that artificial decorative vegetation also needs to be protected from both electrical sources and candles or open flames nearby.

**Emergency Nature:** The proposed TIA intends to correct a previously unknown existing hazard. 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. 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.

The introduction into NFPA 1 and into NFPA 101 of the requirement for assessing the effectiveness of flame retardant treatments for natural Christmas trees is brand new. This could not be incorporated into codes and standards before because ASTM E3082 was only approved as a new standard very recently and a final mandatory edition was not available for public input at the time that the 2021 edition of the NFPA 909 code was being developed. As explained in the substantiation for the problem, the development of ASTM E3082 came about because the Natural Christmas Tree Association saw an urgent problem. However, it took several years to produce the background research (primarily at Underwriters Laboratories) and to complete the standards development process.
MEMORANDUM

TO: Technical Committee on Cultural Resources
FROM: Kelly Carey, Committee Administrator
DATE: December 8, 2020
SUBJECT: NFPA 909 Proposed TIA No. 1544 FINAL TC BALLOT RESULTS

No comments were received on this TIA, therefore, according to 5.6(a) in the NFPA Regs, the final results show this TIA HAS achieved the ⅔ majority vote needed on both Ballot Item No. 1 (Technical Merit) and Ballot Item No. 2 (Emergency Nature).

<table>
<thead>
<tr>
<th>30</th>
<th>Eligible to Vote</th>
</tr>
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<tbody>
<tr>
<td>4</td>
<td>Not Returned</td>
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</table>

<table>
<thead>
<tr>
<th>Technical Merit:</th>
<th>Emergency Nature:</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 Abstentions</td>
<td>1 Abstention (Dufault)</td>
</tr>
<tr>
<td>22 Agree (w/ comment, Artim, Finnegan, Morin, Norton, Rogers)</td>
<td>20 Agree (w/ comment, Artim, Crosby, Morin, Norton, Rogers)</td>
</tr>
<tr>
<td>4 Disagree (Freeland, Moeller, Nassi, Nichols)</td>
<td>5 Disagree (Coppinger, Freeland, Moeller, Nassi, Nichols)</td>
</tr>
</tbody>
</table>

There are two criteria necessary to pass ballot [(1) simple majority (2) affirmative ⅔ 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.

\[30 \text{ eligible} - 2 = 15 + 1 = (16)\]

(2) The number of affirmative votes needed to satisfy the ⅔ requirement is as follows:

**Technical Merit:** [30 eligible to vote - 4 not returned - 0 abstentions = 26 \times 0.75 = 19.5 (20)]

**Emergency Nature:** [30 eligible to vote - 4 not returned - 1 abstention = 25 \times 0.75 = 18.75 (19)]

Ballot comments are attached for your review.

The Regs at 1.6.2.(c) state: An appeal relating to a proposed Tentative Interim Amendment that has been submitted for processing pursuant to Section 5.2 shall be filed no later than 5 days after the notice of the TIA final ballot results are published in accordance with 4.2.6.

**Appeal Closing Date** for this TIA is **December 13, 2020**.
NFPA 909 TECHNICAL COMMITTEE ON CULTURAL RESOURCES
PROPOSED TENTATIVE INTERIM AMENDMENT LOG NO. 1544 - FINAL BALLOT RESULTS

QUESTION NO. 1: I AGREE with the TECHNICAL MERITS of the Proposed TIA Log No. 1544 referencing Sections 2.2, 2.3.1, 2.4, 11.2.5 and 11.2.6(new) to the Proposed 2021 Edition of NFPA 909.

Eligible to Vote: 30
Not Returned : 4
Robert D. Wilson, Marilyn E. Kaplan, Chris Portway, Colin M. Robertson

<table>
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<tr>
<th>Vote Selection</th>
<th>Votes</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agree</td>
<td>22</td>
<td>The hazards that Christmas and other decorative trees present and historical fire loss data substantiates the need of this TIA.</td>
</tr>
<tr>
<td>Patricia A. Silence</td>
<td></td>
<td>agree</td>
</tr>
<tr>
<td>Grant Crosby</td>
<td></td>
<td>Agree</td>
</tr>
<tr>
<td>Laura E. Doyle</td>
<td></td>
<td>Agree</td>
</tr>
<tr>
<td>Thomas F. Norton</td>
<td></td>
<td>correlating between various NFPA Committees is important.</td>
</tr>
<tr>
<td>Milosh T. Puchovsky</td>
<td></td>
<td>Agree</td>
</tr>
<tr>
<td>Daniel P. Finnegan</td>
<td></td>
<td>The Technical Merits are supported</td>
</tr>
<tr>
<td>Eileen E. Brady</td>
<td></td>
<td>Agree</td>
</tr>
<tr>
<td>Kevin D. Morin</td>
<td></td>
<td>Agree. The proposed TIA is consistent with language already accepted by NFPA 101.</td>
</tr>
<tr>
<td>Clare Ray Allshouse</td>
<td></td>
<td>Agree</td>
</tr>
<tr>
<td>Nicholas A. Dawe</td>
<td></td>
<td>Agree</td>
</tr>
<tr>
<td>Alfred J. Thornton</td>
<td></td>
<td>Agree</td>
</tr>
<tr>
<td>Rebecca Fifield</td>
<td></td>
<td>Agree</td>
</tr>
<tr>
<td>Mark Hopkins</td>
<td></td>
<td>Agree</td>
</tr>
<tr>
<td>Kevin J. Kelly</td>
<td></td>
<td>Agree</td>
</tr>
<tr>
<td>Wayne D. Moore</td>
<td></td>
<td>Not sure why I have to comment when I agree but it makes sense to update the document before final issuance</td>
</tr>
<tr>
<td>Fred Leber</td>
<td></td>
<td>Agree</td>
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<tr>
<td>Michael Coull</td>
<td></td>
<td>Agree</td>
</tr>
<tr>
<td>Robert L. Dufault</td>
<td></td>
<td>I agree</td>
</tr>
<tr>
<td>Nick Artim</td>
<td></td>
<td>I concur with the TIA and therefore do not see reason to state a reason. If I objected then that would be justification for explanation.</td>
</tr>
<tr>
<td>Sheila Coppinger</td>
<td></td>
<td>agree</td>
</tr>
<tr>
<td>Michael Kilby</td>
<td></td>
<td>Agree</td>
</tr>
</tbody>
</table>
Disagree

Daniel E. Nichols
I believe that this information is already adequately captured by direction of 11.2.5 to NFPA 1. I also believe the technical merits of this TIA have not taken into consideration the specific fire safety issues that NFPA 909 addresses.

Deborah L. Freeland
Concur with Don that the data does not indicate that this is a severe enough problem that it is worth a TIA. The last time we called for data on this there were no fires listed involving trees in churches...perhaps due to the limited time the trees are illuminated, or the short period they are on display? And singling out Christmas trees specifically, rather than all artificial decorations, seems inappropriate.

Luca Nassi
the problem should be addressed for all artificial decorations not just artificial decorative vegetation. For natural trees propose management cautions.

Donald C. Moeller
We have not seen data that this is a such a severe problem that it needs to be addressed without due deliberation by the committee. Decorative items such as Christmas Trees may have significance in a church or cultural center, and there may be a wide variety of means to address flammability hazards and concerns. To the extent that these issues may be an obvious hazard, an enforcer may be able to rely on other fire or maintenance code requirements to address the issue. I don’t think we should be enforcing these types of requirements on cultural resource properties without due deliberation of the impacts and limitations this places on the facility operations. I believe this deserves further deliberation in the regular code development process.

Abstain

0

QUESTION NO. 2: I AGREE that the subject is of an EMERGENCY NATURE for one or more of the reasons noted in the Instructions box.

Eligible to Vote: 30
Not Returned : 4
Robert D. Wilson,Marilyn E. Kaplan,Chris Portway,Colin M. Robertson
<table>
<thead>
<tr>
<th>Vote Selection</th>
<th>Votes</th>
<th>Comments</th>
</tr>
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<tbody>
<tr>
<td>Agree</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Adam Rogers</td>
<td></td>
<td>Yes, given the understandable delay to make the change and proximity to the December holiday season this is prudent.</td>
</tr>
<tr>
<td>Patricia A. Silence</td>
<td></td>
<td>Agree</td>
</tr>
<tr>
<td>Grant Crosby</td>
<td></td>
<td>The emergency nature of the proposed TIA is appropriate due to the intent to correct the previously unknown hazard related to flame retardants for holiday trees. The intent is to reduce structural fires and the potential for the loss of life and property.</td>
</tr>
<tr>
<td>Laura E. Doyle</td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>Thomas F. Norton</td>
<td></td>
<td>correlating between various NFPA Committees is important.</td>
</tr>
<tr>
<td>Milosh T. Puchovsky</td>
<td></td>
<td>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.</td>
</tr>
<tr>
<td>Daniel P. Finnegan</td>
<td></td>
<td>The standard contains an error or an omission that was overlooked during the regular revision process.</td>
</tr>
<tr>
<td>Eileen E. Brady</td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>Kevin D. Morin</td>
<td></td>
<td>D. Studies by WPI have shown the devastating effects of natural Christmas tree fires. It is not an unknown hazard, but a way to ameliorate a continuing dangerous condition.</td>
</tr>
<tr>
<td>Clare Ray Allshouse</td>
<td></td>
<td>D</td>
</tr>
<tr>
<td>Nicholas A. Dawe</td>
<td>Agree</td>
<td></td>
</tr>
<tr>
<td>Alfred J. Thornton</td>
<td>Agree</td>
<td></td>
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<tr>
<td>Rebecca Fifield</td>
<td>C</td>
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</tr>
<tr>
<td>Mark Hopkins</td>
<td>D</td>
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<tr>
<td>Kevin J. Kelly</td>
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<td>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.</td>
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<td>Wayne D. Moore</td>
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<td>Fred Leber</td>
<td>D</td>
<td></td>
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<tr>
<td>Michael Coull</td>
<td>C</td>
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</tbody>
</table>
Nick Artim

The nature of the proposed TIA is appropriate to address the hazards associated the unknown hazards of flame retardants for holiday decorations.

Michael Kilby

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.

Disagree

5

Daniel E. Nichols

Unlike application of NFPA 1 and 101, the statistics utilized to substantiate the change are not specific to the properties covered. I am very understanding of the hazards exhibited by Christmas Trees, but do not believe the reference to NFPA 1 doesn’t already cover the issue to warrant a change on an emergency basis.

Deborah L. Freeland

Based on the lack of fire data, this doesn’t seem of an emergency nature.

Luca Nassi

general problem that does not concern only combustible artificial decorative vegetation. Natural tree risk could be mitigated by management measures.

Donald C. Moeller

Again, I am not convinced that this is an appropriate requirement. And to the extent that this might be, I definitely haven’t seen any data that indicates it is such a concern that it needs to be pushed out in a manner outside of the normal Code cycle.

Sheila Coppinger

this an wait until the regular revision cycle as it is not a new problem

Abstain

1

Robert L. Dufault

I abstain
1. Revise Section 4.13.2 to read as follows:

4.13.2 Pressure-treated wood, oriented strand board (OSB), rubber, plastic, polyurethane foam, tar paper, upholstered furniture, carpeting, and chemically treated or pesticide-treated straw or hay shall not be used as part of the fuel load.

Substantiation: Training fires along with continuing education are a major portion of firefighters' occupational exposures; however, the magnitude and composition of those exposures were not well understood and may vary by the type of training scenario and the fuel package used.

To understand how live fire training contributes to firefighters' and instructors' cancer-causing chemical exposures, a study was conducted and was then published in the International Journal of Hygiene and Environmental Health. The study titled "Firefighters' and instructors' absorption of PAHs and benzene during training exercises" measured biomarkers and chemical concentrations based on level of exposure to the burning of pallet and straw, oriented strand board (OSB), and simulated smoke.

Urine samples were analyzed for metabolites of polycyclic aromatic hydrocarbons (PAHs) and breath samples were analyzed for volatile organic compounds (VOCs) including benzenes. Dermal absorption likely contributed to the biological levels as the respiratory route was well protected.

Median concentrations of nearly all PAH metabolites in urine increased from pre-to 3-hr post-training for each scenario and were highest for OSB, followed by pallet and straw, and then simulated smoke. For instructors who supervised three trainings per day, median concentrations increased with collections after each scenario. A single day of OSB exercises led to a 30-fold increase in 1- hydroxypyrene for instructors, culminating in a median end-of-shift concentration 3.5 times greater than median levels measured from firefighters in a previous controlled, residential fire study. Breath concentrations of benzene increased 2 to 7-times immediately after the training exercises except for simulated smoke training. Measured levels of PAHs and VOCs were highest in scenarios where fuel packages contained OSB and instructors' levels were magnified with accumulated PAHs when taking part in repeated daily exercises.

Further analysis of the make-up of OSB has found that identical chemicals are used in the manufacturing of OSB and polyurethane foam, which has already been banned under 1403.
Polymeric Diphenylmethane Diisocyanate (P-MDI) is noted on the Safety Data Sheet (SDS) for both OSB and the polyurethane foam as the chemical used in the manufacturing process. Both polyurethane foams, OSB, and PMDI have the same CAS number on their SDS sheet, CAS #9016-87-9. The SDS documents were provided by Weyerhaeuser and Louisiana Pacific for OSB. The P-MDI SDS document was provided by BASF. Additionally, this information was cross checked for factuality utilizing the Environmental Protection Agencies Methylene Diphenyl Diisocyanate (MDI) and related compounds action plan April 2011.

By adding OSB to the list of materials banned under 1403 (4.13.2) this will reduce the toxic exposure firefighter are receiving during training. It is our belief that OSB was left out of previous drafts of NFPA 1403 due to the lack of understanding of the manufacturing process of OSB and the resins used in this process.

**Emergency Nature:** The standard contains an error or an omission that was overlooked during the regular revision process. The proposed TIA intends to correct a previously unknown existing hazard. 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.

Studies have shown that firefighters are being exposed to high levels of known carcinogens in firefighter training when oriented strand board (OSB) is burned. Firefighters are coming down with cancer at an alarming rate and we must act now to reduce exposures to known cancer causing chemicals such as pMDI, the binding resin in OSB. Delaying the prohibition of OSB until the next publication of NFPA 1403 will only allow for further exposure of firefighters to known cancer causing toxins in training fires. For these reasons we believe that a Tentative Interim Amendment to NFPA 1403 Section 4.13.2 is necessary.
MEMORANDUM

TO: Technical Committee on Fire Service Training

FROM: Jenny Depew, Committee Administrator

DATE: February 11, 2021

SUBJECT: NFPA 1403 Proposed TIA No. 1552 FINAL TC BALLOT RESULTS

The public comment circulation period has now passed and according to Section 5.6(a) in the NFPA Regs, the final results show this TIA HAS NOT achieved the ¾ majority vote needed on both Ballot Item No. 1 (Technical Merit) and Ballot Item No. 2 (Emergency Nature).

36 Eligible to Vote
2 Not Returned (Rossos, Williamson)

<table>
<thead>
<tr>
<th>Technical Merit:</th>
<th>Emergency Nature:</th>
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<tbody>
<tr>
<td>4 Abstentions (Brush, Glover, Lehtonen, Sewchok)</td>
<td>2 Abstentions (Lehtonen, Sewchok)</td>
</tr>
<tr>
<td>9 Agree (w/comment: Aguilar, Egelin, Keaney, LeBoeuf)</td>
<td>8 Agree (w/comment: Aguilar, Egelin)</td>
</tr>
</tbody>
</table>

There are two criteria necessary to pass ballot [(1) simple majority (2) affirmative vote of ¾ of ballots received]. 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.

\[
\text{[36 eligible ÷ 2 = 18 + 1 = (19)]}
\]

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

**Technical Merit:** (36 eligible to vote - 2 not returned - 4 abstentions = 30 × 0.75 = 22.5 = 23)
**Emergency Nature:** (36 eligible to vote - 2 not returned - 2 abstentions = 32 × 0.75 = 24)
Ballot comments are attached for your review.

The *Regs* at Section 1.6.2.(c) state: An appeal relating to a proposed Tentative Interim Amendment that has been submitted for processing pursuant to Section 5.2 shall be filed no later than 5 days after the notice of the TIA final ballot results are published in accordance with Section 4.2.6.

**Appeal Closing Date** for this TIA is **February 16, 2021.**
<table>
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<tr>
<th>Vote Selection</th>
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<tbody>
<tr>
<td>Agree</td>
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<tr>
<td>Robert E. Fahrb</td>
<td>Agree</td>
<td></td>
</tr>
<tr>
<td>Colli Carrau Aguil</td>
<td>Agree</td>
<td></td>
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<tr>
<td>Eric Grootendorst</td>
<td>Agree</td>
<td></td>
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<tr>
<td>Kevin M. Keaney</td>
<td>Agree</td>
<td></td>
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<tr>
<td>Disagree</td>
<td></td>
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<tr>
<td>Casey Hall</td>
<td>Each AHJ should be able to review information relative to this issue and make their own decisions.</td>
<td></td>
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<tr>
<td>Wesley E. Barbour</td>
<td>The TIA states: “By adding OSB to the list of materials banned under 1403 (4.13.2) this will reduce the toxic exposure firefighter are receiving during training”, however the conclusion of the cited report states that “Training academies should consider exposure risks as well as instructional objectives when selecting training exercises” and does not recommend banning the use of OSB therefore I do not agree with the technical merits as presented in the TIA.</td>
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<tr>
<td>F. Patrick Marlett</td>
<td>More research is necessary on alternative fuels and their properties.</td>
<td></td>
</tr>
<tr>
<td>Kenneth W. Richards, Jr.</td>
<td>The study cited by the submitter, titled “Firefighters’ and instructors’ absorptions of PMHS and benzene during training exercises” does not draw the specific conclusion cited by the submitter, and other factors relating to the proper use, cleaning, and decontamination of protective clothing and equipment worn by the participants may have been an even greater factor to the effect cited. While adding OSB to the list of materials banned under 1403 (4.13.2) may result in a reduction of any toxic exposure firefighters are receiving during training, the replacement combustible material selected for use in place of OSB may actually increase any toxic exposure over what would be experienced by using OSB.</td>
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<tr>
<td>James R. Cannell</td>
<td>The issues were addressed with in last edition.</td>
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<tr>
<td>W. Edward Buchanan, Jr.</td>
<td>While I appreciate the sentiment and motivation for this TIA, I do not support the exclusion of OSB without identifying a recommended fuel replacement. Even “clean wood” fuel produces carcinogens during combustion. Banning OSB without identifying a better replacement does not mitigate the risk. Replacement fuels could cause more risk than OSB. The last revision of NFPA 1403 focused on the importance limiting exposures through rotating personnel and appropriate decon procedures. As research continues, we will look for guidance on improved fuel package recommendations.</td>
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</tr>
<tr>
<td>Daniel Madrzykowski</td>
<td>Exposure to smoke of any kind is a risk. Two papers have been developed that begin to address the issue of exposures from different training fuels. 1) Kenneth W. Fent, Alexander Mayer, Stephen Bertke, Steve Kerber, Dennis Smith &amp; Gavin P. Horn (2019): Understanding airborne contaminants produced by different fuel packages during training fires, Journal of Occupational and Environmental Hygiene 2) Kenneth W. Fent, et al., International Journal of Hygiene and Environmental Health, <a href="https://doi.org/10.1016/j.ijheh.2019.06.006">https://doi.org/10.1016/j.ijheh.2019.06.006</a> (report cited by TIA) In the papers, the exposures from OSB Alpha and the OSB Bravo are very different, yet both contain PMDI. OSB Alpha – cheap one, had results similar to the results from pallets and straw. OSB Bravo was sourced from Canada, based on FF suggestions this was the “clean one”, under certain circumstances OSB Bravo is considered to be “formaldehyde free”. However those circumstances do not include burning it. OSB Bravo generated higher chemical exposures than OSB Alpha. There are many other materials out there – OSB with soy based glue, wood fiber insulation boards that are being used by some departments in flashover simulators. We just don’t know how they perform. In 2021 UL FFSR will start a 3 year DHS funded study to answer those questions.</td>
<td></td>
</tr>
<tr>
<td>Kevin Munson, Jr.</td>
<td>There is not enough relevant scientific data to support the TIA. Once data is available from studies that are currently in process the topic can be discussed again at the committee level.</td>
<td></td>
</tr>
<tr>
<td>Gordon L. Lohmeyer</td>
<td>Additional research and testing is needed before a decision can be reached. Fuel loading plans / burn plans and associated PPE can greatly reduce exposure to harmful or potentially harmful substances.</td>
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<tr>
<td>Corey Wilson</td>
<td>While recognizing the fact that live fire training utilizing OSB presents, I do not believe that enough data exists to show that OSB presents more of a hazard than any of the other approved materials. By following proper decon procedures, limiting the exposure, wearing proper respiratory protection and not standing in the smoke without a facemask, I believe that members can safely train utilizing all approved materials as part of the fuel loads. Once more data becomes available that can better support the technical merits of this TIA then the committee can then re-evaluate OSB as a fuel load in live fire training.</td>
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<tr>
<td>Steven H. Wernstein</td>
<td>There have not been enough studies done to generate data to support the premise of the TIA. At least one additional, comprehensive study is now in process, and once it is concluded, there may be sufficient information to take action. Until then, it would be premature to completely ban OSB from use in fire training scenarios, especially since there is no current viable alternative. The TIA would effectively end flashover training, which could cause more immediate harm to firefighters than any alleged long-term harm from OSB exposure over time.</td>
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</table>
I do not believe the current information supports the proposed change at this time. While I appreciate the desire and the passion of the submitter for enhancing firefighter safety, I cannot agree with the issuance of the TIA for several reasons. First, the adverse impact of removing this fuel and not replacing it with a suitable replacement would be substantial on firefighter training. If we were to remove and eliminate OSB as a fuel we would severely impact the fidelity and contextual impact of training. Removal of OSB will run the risk of completely eliminating any acquired structure for live training purposes as OSB is a common component of residential construction. The submitter does not offer a suitable replacement to OSB for reasons one can only assume is because there does not exist any data to detail what the byproducts of other fuels are and if they may be more hazardous than he espouses OSB is. In the end, removal of OSB without a replacement fuel with a detailed analysis of the byproducts could result in creating even greater exposure that the submitter is requesting to curtail. In the past 10 years, a minimum of 10 line of duty death reports have listed lack of live fire training as a contributing cause demonstrating the clear importance of this training. Removal of a fuel without a suitable replacement would only enhance this deadly outcome as some would eliminate all live fire training as a solution. Additionally, the occupation of a firefighter is subjected to risk as a daily occupational hazard that we are expected to face and mitigate. The job of a firefighter is inherently dangerous and risk management is a vital aspect of the balance that all must demonstrate. The goal of the standard was to provide the safest means of live fire training. Ultimately, ensuring that the first fire a firefighter may face is not in the uncontrolled environment of an emergency incident with unknown fuels. Rather, it is intended to provide a controlled environment for live fire training in the most realistic conditions yet drastically reducing the risk that would be encountered in the unknown environment. The current version of NFPA 1403 recognized the need to take all relevant, available, and accurate data and make the necessary changes to ensure that the risk faced by our personnel is mitigated and outweighed by the benefit gained. As such, the committee introduced measures to reduce this risk such as the mandated training on proper personal protective equipment (PPE) (4.3.2.1), proper donning of PPE (4.7.9), proper rehabilitation (4.4.1), proper rotation so there is limited exposure (4.4.2) (4.7.6.1), and donning of PPE after performing these functions (4.4.7.5). Lastly, the US Firefighter Safety Research Institute has recently been granted a DHS grant to perform the proper and in-depth analysis of fuels for live fire training. The information gained from this comprehensive and thorough study will provide the committee, and the fire service, with a relevant and accurate analysis. This information will not only recommend the correct fuels for fidelity in training but also continue to mitigate the risk to an appropriate level for the fire service. Until this study is completed and results shared, I feel the committee has developed a relevant and appropriate standard for conducting live fire training. Eliminating one fuel based on incomplete information would be short sighted and a disservice to fire service training.

Members of the fire service are extremely passionate people. They are concerned with the health and safety of their citizens also their fellow fire service members. That said, I do not agree with the issuance of this submitted TIA. Firefighting, and all its many facets comprise inherently hazardous tasks. Recent NFPA 1403/1402 revisions and additions have recognized the need to evaluate and minimize risk factors as per the data received to date. The committee introduced several measures throughout the document to reduce several of these risks (training on proper PPE, donning/doffing PPE, rehabilitation, member exposure rotation, etc.). Compliance with the existing document NFPA 1403 provides protections to ensure safety in the confines of extremely important live fire training. It allows departments to create a “controlled environment” for members to experience. The review of fuel loads (and their associated hazards) for live fire training has recently been secured with a grant issued to the US Firefighter Safety Research Institute. Without the knowledge of the results of such study, I would be opposed to completely and immediately remove this item without suitable replacement that provides a model of fire dynamics to our members. The submitter offers no replacement to facilitate such training.

The use of oriented strand board (OSB) in live fire training evolutions has been an ongoing national debate for some time without adequate technical substantiation for the outright banning of OSB or the use of other suitable replacement material. The 2019 study referenced, is welcomed new data, and has recommendations for limiting exposures, increased use of SCBA, increased cleaning of skin and PPE which should all be considered. It further states that the median personal air concentrations of volatile organic compounds (VOC’s) from both OSB and pallet/Straw remained below applicable occupational exposure limits. TIA #1552 submitted by Ryan McGill (I2068) highlights ongoing concerns but does not correct or lessen an overlooked or unrecognized hazard reaching the level of TIA. However, the recommendations in this study needs to be further evaluated in the upcoming edition of NFPA 1403. All possible measures shall be taken to minimize risk during training, but we must also consider the risk/benefit value of live fire training evolutions.

Offer action until additional research is performed and validated. In the interim, limit exposure of both trainees and instructors to live fire training fires that utilize OSB as a fuel. Establish and enforce strong decontamination protocols for both personnel involved in the training and PPE.

All combustion creates carcinogens. More research is needed on multiple types of wood products before we ban one certain type.

As I understand more studies are forthcoming and to make a decision at this time would be premature.

I believe this is a critically important issue and encourage the fire service members of this committee to read the study referenced in the TIA and to read the associated studies referenced within that document. They all conclude there may be an unacceptable level of risk associated with the exposures of concern. The committee has discussed this issue multiple times over several years. A number of years ago we considered a 2007 report prepared for the New South Wales Fire Brigades. The report presented similar conclusions to those included in the TIA reference. A few years ago, the committee concluded that “we do not have the science” to confirm nor deny that OSB fuels present exceptional risks to firefighters in training. At the same time we endeavored to pursue research. I personally concluded that compartmentalized training (flashover containers) presents an extraordinary environment that is unlike any other prolonged exposure firefighters face in training or on the fireground. Nonetheless are firefighters required to sit in a pressurized compartment to observe the flow of combustible gas above their heads. My personal belief is this training can be achieved without such exposures. I am not at all qualified to understand this science, but I have read the various reports all coming to the same conclusion that such environments potentially present harmful exposures to firefighters. Nevertheless, I am not a firefighter: I am a businessman who caters to the fire service. My expertise is in construction and I have applied that expertise to create safe, durable structures in which firefighters may confidently train. I have no expertise in conducting the training that occurs within these structures. I therefore believe a vote from myself or any other business-related member of this committee could be (not necessarily will be, but could be) construed to be motivated by financial interests that might conflict with the committee’s primary mission to advocate the safest realistic firefighter training possible. If it were up to me, we would ban flashover containers. OSB is primarily used in flashover containers, so that would solve two problems. But I leave it to the firefighters to make this decision and I encourage them to do so after careful reading and reflection.
Karen E. Lehtonen
Being new to the technical committee, currently, I do not have sufficient familiarity with this subject to make a judgement on the technical merit of this request: I understand there has been research funded recently to further investigate this area which will provide data for consideration in a future revision.

Heidi Siewert
Myself not the organization that I am representing are experts in this area.

Brian Brush
was not a voting committee member for previous drafts of 1403. For me to judge if this was the result of "an error or an omission that was overlooked during the regular revision process." would be inappropriate.

QUESTION NO. 2 I AGREE that the subject is of an EMERGENCY NATURE for one or more of the reasons noted in the instructions box.

Eligible to Vote: 36
Not Returned: 1
Steven J. Williamson, Daniel N. Rossos

Vote Selection Comments
Agree

William E. Glover
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.

Forest Herndon, Jr.
A & E

Roger M. Labbeau
Reason A: The standard contains an error or an omission that was overlooked during the regular revision process.

Rick Egele
As a manufacture of Class A Fire equipment similar to the example equipment and with the information provided I feel it is important to lean toward safety of my customers.

Manfred Khan
A

Robert E. Rahib
C

Colin Samuel Aguilar
C. With the focus on cancer prevention in the fire service, the amount of time before a revised 1403 would be published, and the recent study showing the markedly increased exposure to carcinogens when using OSB, is enough, in my opinion to say it is of an emergency nature.

Todd Wardwell
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.

Disagree

Larry Hall
This issue was discussed prior to the publication of the current edition of the standard.

Wesley E. Barbour
I understand that the use of OSB was considered during the regular review revision process and was not an error or omission, nor was it an unknown existing hazard.

Patrick Mariatt
This is not an emergency as there is effective protective equipment available to negate the hazard.

Kenneth W. Richards, Jr.,
This topic has been discussed at great length with the committee, and other areas of the Standard has been revised to address the exposure concerns.

William E. Peterson
The use of OSB in Live Fire Training received extensive discussion by the Technical Committee over numerous meetings. This discussion considered the manufacturing process, including the resins used in the process, and the decision to not include OSB in Section 4.13.2 of NFPA 1403 was a deliberate action based on insufficient data showing that exposure to products of combustion from OSB posed an unacceptable level of risk to Live Fire Training participants.

James R. Conzelman
Not new information, the issue was addressed during the revision process of the last edition.

M. Edward Buchanan, Jr.
Research is currently underway that will be considered during the next document cycle.

Daniel Matykaowski
We need more data, rushing to eliminate a material which in many cases provides a thermal and chemical exposure very similar to wood does not make sense. One of the problems with eliminating a fuel is that we don’t know that the replacement, even if it is wood, is any better. This is NOT an emergency. With any live fire training, only expose FEs to smoke in training when needed for the training objective. The exposure to smoke can be mitigated by wearing full PPE and being on fire. Don’t stand in the smoke outside of the training structure/prop. After exposure, conduct a preliminary exposure reduction by brushing down PPE and equipment with soap and rinse. Wipe or wash exposed skin ASAP. Then after training, the trainers and instructors should be getting a shower to clean the rest of their skin.

Kevin Marson, Jr.,
More data needed to vote that the subject is of an emergency nature.

Gordon L. Lehmyer
Additional research and testing is needed before a decision can be reached.

Corey Wilson
I do not believe that this TIA is of an emergency nature for any of the reasons noted in the instructions box.

Steven H. Weinstein
Since I do not agree with the technical merits of the TIA, I do not see the TIA as being of an emergency nature.

James Kent
Do not believe this is of an emergency nature at this time.

Brian A. Wade
This item has been discussed in the past and this should disqualify the emergency nature. More information and research is needed before additional action is taken.

Darrel D. Sherw
The committee was aware and reviewed all of the approved fuels in our regular revision process. There has not been, nor is there currently a comprehensive and relevant study of the byproducts that was overlooked to compel the removal of OSB as a fuel. Secondly, the burning of any material will create a hazard. This hazard has been known to the fire service and our committee since its inception. The intention of developing and delivering realistic live fire training to a voluntary service is based upon ensuring that the risk encountered is minimized and the benefit far outweighs the risk. The committee has worked diligently to be remain cognizant of all hazards faced through comprehensive and relevant data collection. Based upon that information, the current standard mitigates the risk of live fire training to an acceptable level with the immeasurable benefit of preparing firefighters for the unknown environment of an emergency incident.

Douglas J. Mitchell, Jr.
It was made aware to me that the committee received, reviewed and evaluated data as it pertained to fuel packages for approval in the last revision process. I am not compelled that significant data has arisen since the acceptance of the latest revision of NFPA 1403 that warrants action of an emergency nature. I believe the current standard, when followed as written, provides a framework for safe live fire operations. It is my opinion that the data received in the aforesaid study and any others that populate prior to the next revision cycle shall provide additional speaking points to both the submitter and the committee for further evaluation and potential modification of the existing standard.

Erik Hopkins
The use of oriented strand board (OSB) in live fire training evolutions has been an ongoing national debate for some time without adequate technical substantiation for the outright banning of OSB or the use of other suitable replacement material. The 2009 study referenced, is widely known, new data, and has recommendations for limiting exposures, increased use of SCBA, increased cleaning of skin and PPE which should all be considered. It further states that the median personal air concentrations of volatile organic compounds (VOC’s) from both OSB and pallet/Straw remained below applicable occupational exposure limits. TIA #1552 submitted by Ryan McGill (L2068) highlights ongoing concerns but does not correct or lessen an overlooked or un-recognized hazard reaching the level of TIA. However, the recommendations in this study needs to be further evaluated in the upcoming edition of NFPA 1403. All possible measures shall be taken to minimize risk during training, but we must also consider the risk-benefit value of live fire training evolutions.

Jeffrey J. Morrisette
If memory serves correct, this issue was discussed with the limited information available at the time.

Sean M. Gray
Not an emergency. All combustion creates carcinogens.

Brent Norrine
This is not emergency in nature. This has been a topic for several years. More research need to be conducted on the material before this is added to 4.13.2

William J. Watters
As I understand more studies are forthcoming and to make a decision at this time would be premature.
<table>
<thead>
<tr>
<th>Name</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eric Grootendorst</td>
<td>I don't believe it is of emergency nature as outlined. I don't believe it meets any of the stipulations. I believe this should be reviewed next cycle.</td>
</tr>
<tr>
<td>Brian Brush</td>
<td>The author presents a valid concern with regard to the potential long-term impact of exposures to burning OSB. I believe the core intent of NFPA 1403 is to reduce the acute risk to firefighters in training with live fire. Many manufacturers of portable live burn props and coordinators of live burn facilities currently have burn loads calculated and communicated as a fuel package with set number of OSB sheets per burn. Immediate discontinuation of OSB without consideration of this would force live burn fuel package adjustments without associated guidance and potentially present a greater acute live burn problem or put a complete stop to accessible live burn training also leading to risk. This is not of emergent (acute) nature and demands more time for consideration of impact.</td>
</tr>
<tr>
<td>Thomas G. Keeney</td>
<td>This requires further investigation to evaluate scope and strategy.</td>
</tr>
<tr>
<td>Abstain</td>
<td></td>
</tr>
<tr>
<td>Karen E. Lehtonen</td>
<td>I was not a member of the technical committee during the last revision of the standard, so I am unable to offer a vote on this being an error or omission by the technical committee. Additionally, I understand there has been research funded recently to further investigate this area, which will provide data for consideration in a future revision.</td>
</tr>
<tr>
<td>Heidi Sewchok</td>
<td>Myself and the organization that I am representing are not experts in this area.</td>
</tr>
</tbody>
</table>
MEMORANDUM

TO: Technical Committee on Fire Service Training
FROM: Jenny Depew, Committee Administrator
DATE: February 2, 2021
SUBJECT: NFPA 1403 Proposed Tentative Interim Amendment (TIA) No. 1552 – Public Comment Review

The attached Public Comments are being submitted to the Technical Committee on Fire Service Training for review.

If you wish to change your vote, the change must be submitted through the NFPA online ballot system at the following link: NFPA Ballot Link. If you do not wish to change your vote, no response is necessary.

Please complete the ballot on or before **February 9, 2021, 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 Jenny Depew at jdepew@nfpa.org.

The return of ballots is required by the **Regulations Governing the Development of NFPA Standards.**

**Attachment:** Public Comment(s)
Please find attached my public comment along with two attached fuel package test results. Should any member have any questions please feel free to call of email me at any time.

Respectfully,

Ryan McGill
I would first like to thank the technical committee for reviewing TIA #1552. The decision you make on this TIA will have a lasting impact on the lives of many firefighters and their families. On behalf of all the firefighters across the nation I thank you for considering this TIA. As the author of TIA #1552, I felt it was important to submit a public comment to provide some additional information and clear up some misconceptions. When you are finished reading this comment you will have a better understanding of the manufacturing of OSB and chemicals used, the health risks associated with burning OSB, and lastly, how we can continue to provide high quality training by using other tested wood products. Links to the information I cover will be provided at the end of the public comment.

**OSB Manufacturing**

According to the Engineered Wood Association (APA) oriented strand board (OSB) is intended for subflooring, wall sheathing, and roof sheathing. Burning OSB in fire behavior training goes against the intended use of this product. In order to fully understand the risk firefighters face when OSB is burned in firefighter training you must first understand the manufacturing process of OSB.

APA rated 7/16 OSB sheeting is comprised of four layers, two outer layers and two inner layers. The average sheet of 7/16 OSB weighs approximately 47 pounds. Of that 47 pounds the two inner core layers account for approximately 26 pounds of the total weight. It is in these two inner core layers where OSB gets its core strength from the application of Polymeric Diphenylmethane Diisocyanate (pMDI). According to multiple OSB Safety Data Sheets the total percentage of the finished product weight is between 1-14% pMDI. Knowing this information, we can calculate that between 1.3 and 18.2 pounds of cured pMDI is burning when five sheets of OSB is used in fire behavior training. Why is this important? Because pMDI is the same chemical that is used to manufacture Polyurethane Foam, which is already prohibited under NFPA 1403.

**Health Risks**

It has been said that there is not enough data to support banning OSB in firefighter training. This statement could not be further from the truth. There are multiple studies that outline the dangers of Diisocyanates (pMDI). This is not a new issue to the industry, but rather it is a new issue to the firefighting industry. The dangers of pMDI exposure are well documented so much so that NFPA banned burning Polyurethane Foam (pMDI) in firefighter training. The issue at hand is the acknowledgement that pMDI is present in OSB and that pMDI is already prohibited under 1403 as Polyurethane Foam.

So, what are the health risks of pMDI? According to BASF, the worlds largest producer of pMDI: chest discomfort, reduced pulmonary function, wheezing, shortness of breath and difficulty breathing are all known health risks. Additionally, they state that long-term exposures have been reported to cause long
term damage to include reduced lung function, which may be permanent. Lastly BASF states that when this product burns it will produce nitrous gases, fumes/smoke, isocyanate and vapor. It is important to note that Firefighter structural PPE does not dermally protect us from these chemical gases, and it is considered the primary route of exposure.

As I mentioned above there are multiple studies/resources available that document the known danger of products that contain pMDI, they include but are not limited to: “The role of isocyanates in fire toxicity”, “The fire toxicity of polyurethane foams”, “Characterization of a Live Fire Training Simulator for use in the Canadian Fire Service”, “Firefighters and instructors absorption of PAHs and benzene during training exercises”, “Firefighting trainers exposure to carcinogenic agents in smoke diving simulators”, and “Understanding airborne contaminants produced by different fuel packages during training fires”. Other resources include the CDC, NIOS and OSHA. Additionally, the CDC states “preventing exposure to diisocyanates is a critical step in eliminating health hazards”.

Before I end this section on the health concerns of burning OSB I believe it is important that you are aware of a new study that was recently completed as part of the NFPA “How Clean is Clean” study. This study was conducted in Fairfax County on October 27 – 28, 2020. The study evaluated four fuel packages: Pallets, Fiberboard, Plywood and OSB. Of the four fuel packages OSB had the highest average PAH count. It is important to note that OSB was nearly 51% “dirtier” then the Fiberboard. It is also important to note that the CDC states that “there is no safe level of exposure to a carcinogen, and therefore that reduction of worker exposure to chemical carcinogens as much as possible through elimination or substitution and engineering controls is the primary way to prevent occupational cancer”.

Substitute for OSB

I want to start by saying at no point has anyone advocated to stop live fire training, rather we are looking for a safer fuel package that still provides the “desired training effects”. You may have been told that there is not another product available that will produce the desirable training effect or that all things that burn are toxic. These statements are not factual. While yes “all things that burn will produce carcinogens” there is a big difference in toxicity. When choosing a fuel package for firefighter training it is important to understand the chemicals produced as a byproduct of combustion along with how these chemicals affect our DNA and can lead to the development of cancer.

For several years Prince William County Fire and Rescue (Va.) has been burning a product called Fiberboard in fire behavior training with great success. In Early 2019 the Los Angeles County Fire Department started testing Fiberboard as a replacement for their current fire behavior fuel package of pallets and straw. During their testing, the fiberboard was evaluated to see if it would produce the desired training effects along with testing of participants blood, breath, and urine as noted in previous fuel package studies. It is important to note that Fiberboard contains NO synthetic resins or adhesives and has a “non-hazardous” classification, meaning Diisocyanates have been completely removed from the fuel package. As of this writing Fiberboard is still the preferred fuel package for Los Angeles County fire department.
As a result of the work of many people in July of 2020 the Virginia Department of Fire Programs (VDFP) took the unprecedented step to protect firefighters in the Commonwealth of Virginia by prohibiting the burning of OSB in funded firefighter training. As a result of the proactive action by VDFP, departments around the state are now burning Fiberboard in fire behavior training.

Thank you again for taking the time to read this public comment. Should you have any questions please feel free to contact me at any time.

Respectfully,

Ryan McGill

https://www.apawood.org/
https://bct.eco.umass.edu/publications/articles/choosing-between
https://www.weyerhaeuser.com/application/files/5715/3679/3465/Wey
https://polyurethanes.basf.us/products/isocyanates
https://www.cdc.gov/niosh/topics/isocyanates/default.html
https://uwspace.uwaterloo.ca/handle/10012/15999
https://www.researchgate.net/publication/333657147_Understanding
https://www.cdc.gov/niosh/topics/cancer/policy.html

I support this revision to the standard. Our crews are exposed to many toxic fire byproducts on the job. We need to limit exposure and it makes no sense to increase risk by materials used during training.

Chief Dave Freeman
City of Cleveland Heights Fire Department
40 Severance Circle
Cleveland Heights, OH 44118
www.ClevelandHeights.com/Fire
Good afternoon Secretary of the Standard council,

I agree with Ryan McGill, the standard need to be changed to protect firefighters. Oriented Strand Board (OSB) exposes firefighters to high levels of carcinogens when burned. Our members are getting cancer at an alarming rate, so we must do all we can to reduce exposure during Live Fire Training Evolutions.

Thank you,

Richard A Vober
Deputy Chief
Akron Fire Department
81 West Thornton St.
Akron, Ohio 44308
Based on the information detailed and discussion with others, I do believe that OSB when used in a high pressure environment such as a flashover simulator does indeed pose a significant risk to not only the training staff but those in the can as well. I think that working in occupational medicine, I understand the risk to the FF on a typical fire. Subjecting these same firefighters to risk in training environment is not wise and I believe reduction of their risk by limiting the use of OSB should be undertaken.

Al

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Al Pacifico MBA NRP PA-C
The Virginia Department of Fire Programs provides firefighter certification and training for Virginia's Fire Service. We are in support of TIA 1552 (NFPA 1403) to add Oriented Strand Board (OSB) to banned fuels for use in live fire training. Live fire training and exposure to structural fires exposes firefighters to many carcinogens (to include PAHs and Benzene). We also know that the numbers of cancers in firefighters have grown at an alarming rate. We fully realize these exposures are unavoidable, but we also realize that excessive unnecessary exposures to fuel products can be mitigated by using fuel alternatives. Resin binders utilized to manufacture OSB include PMDI (Polymeric methyl diphenyl diisocyanate) and formaldehyde products. PMDI binders according to the research study referenced in the TIA indicate that the OSB with PMDI binders were by far the worst in the amounts of PAHS and benzene measured in firefighters (and especially instructors) participating in the study. With this research in mind, plus other studies that have been out for years, The Virginia Department of Fire Programs took the position to ban the use of Oriented Strand Board (OSB with PMDI) binders in live fire training for all of our sponsored training programs. It would also be worth noting that PMDI is used in the manufacture of polyurethane foam which is already a banned fuel material in NFPA 1403-18 (Chapter 4.13.2). Alternative fuel materials with wax and starch binders provide viable alternatives and are utilized by some fire service agencies. Also the use of pesticide free wood pallets also has been demonstrated to be a viable fuel material. Live fire training is very important in the training of our firefighters. They need to be exposed to as high fidelity of a training experience we can provide them and we feel this can be done without the use of OSB as a fuel material. OSB is primarily used in Flashover Simulator/Fire Behavior training. For these reasons, The Virginia Department of Fire Programs supports TIA 1552 as a needed addition to NFPA 1403.

Briant K. Atkins, Va. PEM  
Chief Safety Officer  
Virginia Department of Fire Programs  
1005 Technology Park Dr  
Glen Allen, Virginia 23059

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CONFIDENTIALITY NOTICE: This electronic message is intended to be viewed only by the individual or entity to whom it is addressed. It may contain information that is privileged, confidential and exempt from disclosure under applicable law. Any dissemination, distribution or copying of this communication is strictly prohibited without the permission of the Department of Fire Programs. If the reader of this message is not the intended recipient, or the employee or agent responsible for delivering the message to the intended recipient, or if you have received this communication in error, please
Standard Council:

As you know a great deal of research has gone into reducing carcinogen exposures to firefighters. Previous research has shown that Polymeric Diphenylmethane Diiocyanate (pMDI) is a resin used in the manufacturing of Polyurethane Foam and Oriented Strand Board (OSB). NFPA 1403 lists Polyurethane foam as a fuel that “shall not be used” in live fire training while OSB is not. Additional studies have shown the use of OSB exposes firefighters to high levels of carcinogens when burned. A risk that should be eliminated.

I support the Proposed TIA No. 1552, Reference: 4.13.2 change to the standard.

Thank you

Kenn Taylor
Battalion Chief
Violet Township Fire Department
8700 Refugee Rd
Pickerington, Ohio 43147

"Friends for Life"
As a principal member on NFPA 400/40 representing the IAFF, as well as being the Executive Director of Virginia's accreditation and training Agency of almost 60,000 Firefighters Statewide, I support this TIA.

I have over 40 years in the fire service and understand the need to train Firefighters in a real world environment as much as possible. However, we need to do it as safely as possible as well.

My extensive experience as a safety Officer, Fire Marshal, Training Officer and Chief officer has taught me there is no reason to expose firefighters needlessly to cancer causing carcinogens in a training environment regardless of the experience gained. It is like putting police officers in a shoot house with live ammo. The risk does justify the outcome. In today's fire service we are seeing an incredible spike in cancer among the fire service and anything we can do to minimize it in both real world and training environments must be considered and implemented.

In addition, the makers of OSB did not manufacture this product to be burned in this environment, it was manufactured as a building material and in this instance it is being used for a purpose it was not intended for.

As the Executive Director of Fire Programs for the Commonwealth of Virginia I have taken the reasonable steps to safeguard my Firefighters in the training environment by banning the use of OSB in any VDFP sponsored live burn. This action is supported by the Virginia Fire Services Board, which represents all of the stakeholder groups in the Commonwealth supporting the fire service.

There are other products which could be used at a much lower exposure level should be considered in this committee and I ask you to do the right thing for our members.

I am available for any follow up questions.

respectfully,

Michael T. Reilly
Executive Director
Virginia Department of Fire Programs
1005 Technology Park Dr.
Glen Allen VA. 23059
To the committee,

In my public comment submitted earlier, I inadvertently wrote "National Fire and Rescue Academy" at the end of my letter and I meant to write "National Fire Protection Association"...sorry for the mistake. Kyle B Anderson

To the 1403 technical committee,

I am writing this public comment in full support of the proposed T.I.A. which bands the burning of OSB in training fires. I have been in the Fairfax County Fire and Rescue department for over 25 years and have been in numerous training fires (fire behavior training) where OSB was used as primary fuel source, unknown to me at first. After a few times in these burns, I noticed a trend – sticky residue on our gear and mask that was unlike the effects of other training fires. Because of this residue, people began questioning what fuel we were using in the Draeger simulator and the answer given was OSB. OSB is used as a major structural component in housing (floors, roofs, and walls) and common sense tells us it was never intended to be used as a fuel package in fires of any kind. I then asked different veteran officers in our fire department if they experienced the same effect after being exposed to the burning of OSB in our training fires and every one of them responded similarly. They all said they had NEVER had the effects on their gear or on their person in training fires before. They all complained they took showers for days and STILL had the same smell coming out of their pores and one mentioned that after using the sauna three days after being exposed to OSB, his wet shirt was discolored and he attributed this to the OSB that had absorbed through his skin.

Although anecdotal knowledge is valuable, the science behind the dangers of OSB is far more concerning. I have read the 2019 study of PAH and benzene levels the Illinois Fire Institute put out concerning OSB versus other fuel packages (such as wood pallets). The study was conclusive in showing the dangers of OSB and what stood out to me was the FACT that even after decon, the participants were breathing out VOC’s and excreting high levels of PAHs in urine - 3, 6 and 9 hours later. There have been other studies put out that show very similar results in the comparison of OSB versus natural wood products so the argument that this study is some type of anomaly or outlier is completely false and misleading. The other argument many have made is a classic “straw man” argument where people use the phrase “all things we burn are toxic”. The idea that “all things are toxic” is not at all addressing the real problem and in fact, is a dangerous statement that minimizes how much more toxic some fuels are compared to natural wood or other natural products. The chemicals in OSB include PMDI which is the same chemical already banned in polyurethane foam...
currently under NFPA 1403. I would like to think that if PMDI was considered harmful enough to ban in polyurethane foam, it would also be banned as a binder in OSB. There is another argument people make for the continued burning of OSB and that is the training need outweighs exposure and OSB is necessary for the desired effect. Let me talk about these individually. First, the idea that the health of our members should ever be compared to a “perceived” need for training is completely antithetical to what we are trying to do in our fight against cancer. We are trying to minimize exposure at any cost, and to allow an unhealthy level of exposure (which OSB represents) should NEVER be accepted. Additionally, the idea that OSB is the only effective fuel source to provide the desired training effect is false and has been disproven by dozens of departments around the country (including Los Angeles County, and around my area, Prince William, Loudoun, and Spotsylvania counties).

Even after considering the anecdotal knowledge and science concerning the dangers of OSB, and the fact that in Virginia the VDFP (Virginia dept. of fire programs) and VPFF (Virginia professional fire fighters) banned the burning of OSB, we are still burning this known carcinogen in Fairfax County during training fires. This is why this T.I.A. is so near and dear to my heart. I have witnessed many firefighters in my own county die of cancer, some of them as young as 50 years old and I recently sent a video to a former co-worker who is in stage 4 cancer and isn’t expected to live. We have learned through time and experience that many past fuel sources have later been found out to be very hazardous to our health. In the past, different chemicals were used in pit fires and other training fires for a “desired effect”, only later to be banned when people inevitably came down with cancer and other health issues and science caught up with common sense. It seems a very likely outcome that the burning of OSB will be something we will look back upon as a mistake that needed to be stopped sooner than later. I would like to think that this committee would want to stay ahead of a problem instead of leading from behind. Any argument that supports the continued burning of OSB is going up against scientific research, practical knowledge, anecdotal knowledge, common sense, cancer prevention, known fuel alternatives, and NFPA 1403 which already bans PMDI, the binder used in OSB.

For the sake of myself, me family, my fellow firefighters, and firefighters around the country, I implore you to vote in favor of this T.I.A and continue the work you’ve already done in putting firefighter’s safety as a priority in the National Fire Protection Association.

Fraternally, Master Technician Kyle B Anderson
Good Evening,

Attached is my public comment in regards to TIA 1552. Thank you!

Jamie Little
Firefighter/EMT-B/Scott Air Supplied Products Technician
NFPA Respiratory Protection Equipment Committee Member
Let me start by saying thank you to the committee members who supported this TIA so it could be considered by the committee and by the fire service. As a member of the Respiratory Protection Equipment Committee and specifically the 1852 task group, I spend a considerable amount of time on the topic of cancer prevention. I have taken on the task of conducting testing and compiling research in regard to the effectiveness of cleaning our SCBAs. Part of this research includes how specific contaminants have a major impact on our overall health and how they are contributing to the rise of cancer rates in the fire service.

One of the goals of the Fire Service Gear Cleaning Validation Project is to recognize what we are being exposed to in order to understand how our gear and equipment should be properly cleaned. Recently in conjunction with International Personal Protection, Inc, we conducted live fire testing using four different fuel packages. We selected Pallets and Straw, Fiberboard, Plywood, and OSB. Each of these fuel packages were burned three times. Each fire we had two meters obtaining samples of the environment. One meter measured total hydrocarbons as hexane and the other was for PAHs. We selected the EPA 16 as the PAHs we were looking to quantify. In addition to the two meters, we also collected wipe samples from the firefighter’s helmet, SCBA, and coat.

The data was overwhelming, the two dirtiest packages were Plywood and OSB. Plywood had highest total hydrocarbons as hexane and OSB had the highest average PAH concentration. Each PAH was examined individually and OSB was the highest in 9 out of the 16. When considering the burn times between Plywood and OSB they are neck and neck for having the highest total hydrocarbons as hexane. The fire service has a general understanding that plywood is not a recognized fuel package. Most departments recognize that plywood produces dangerous contaminates and it is not worth the risk of exposure. The results prove that OSB and Plywood are similar in nature when it comes to the contaminates that are produced. With the understanding of the similarities between OSB and Plywood approving this TIA should be an easy conclusion to come to.

Other studies have shown that some of the same ingredients that are in the resin that holds OSB together can be found in the chemical makeup ofpolyurethane foam. As I know each of you are already aware, polyurethane foam is already prohibited under your standard in section 4.13.2. We know that absorption is the most common way we are exposed to carcinogenic materials. Knowing the dangers of pMDI and how it can be absorbed through the skin it should be alarming to all of us. One way I explain it to people is you need to look at the exposure to carcinogenic materials the same way you look at radiation. Sure, that small dose here and there will probably
not cause any immediate issues, but over the course of a career it will bring your chances of developing cancer up dramatically.

A senior and well-respected member of my department once said, “We can’t have the liberal use of the word safe when we’re talking about fires”. He also said, “There’s nothing we do on the fireground, especially the firefighters, that cross that threshold that is free from harm”. I could not agree more with that individual. We as a fire service have a job to do and if that includes putting our lives on the line to save others, I think we are all willing to make that sacrifice. I completely understand the necessity to create a realistic as possible training environment so that the firefighter is ready for when they face the real thing. Conversely, the purpose of this standard is stated in section 1.2.1. The purpose of this standard shall be to provide a process for conducting live fire training evolutions to ensure that training objectives are achieved and that exposure to health and safety hazards for the fire fighters receiving the training is minimized.

What I do not agree with is doing more harm than good. I will not endorse or mention alternative fuel packages to replace OSB. That decision should be left to the AHJ to make. However, I do agree based on the science that is currently out for our viewing and with the obligation to protect our firefighters, OSB should be added to the list of prohibited items that shall not be used in fuel loads. I would like it to be known that I support TIA 1552 and the re-wording of section 4.13.2. I agree with the submitter in that this is an emergency in nature and should not wait until the next revision cycle to be addressed.

In closing, I would like to thank the committee again for taking up this issue and considering this TIA. If the committee would like access to the data we obtained from our most recent round of testing it can be provided upon request. I truly believe that this simple addition to the standard will raise awareness to the hazards that OSB produces and hopefully save lives in the long run.

Jamie Little
Firefighter/EMT-B/ Scott Air Supplied Products Technician
NFPA Respiratory Protection Equipment Committee Member
On behalf of the President of the Ohio Fire Chiefs’ and the Board of Directors.

Good Afternoon Secretary of the Standard Council,

As you know a great deal of research has gone into reducing carcinogen exposures to firefighters. Previous research has shown that Polymeric Diphenylmethane Diiocyanate (pMDI) is a resin used in the manufacturing of Polyurethane foam and Oriented Strand Board (OSB). 1403 lists Polyurethane foam as a fuel that “shall not be used” in live fire training while OSB is not. Additional research has shown the use of OSB exposes firefighters to high levels of carcinogens when burned. A risk that should be eliminated.

The Members of the Board of Directors for the Ohio Fire Chief’s Association support the Proposed TIA No. 1552, Reference: 4.13.2 change to the standard. Ohio Firefighters are getting cancer at an alarming rate and need this additional protection.

Yours in Firefighter Cancer Prevention,

Chief Rick Anderson, President
Ohio Fire Chief’s Association.
450 West Wilson Bridge Rd, Suite 150
Worthington, OH 43085
1.800.347.3704

Practice Safety!

Jack B. Rupp Jr.
Fire Chief
Plain Township Fire Department
9500 Johnstown Road
New Albany, Ohio 43054

www.plaintownship.org

“A Leader is someone who knows the way, goes the way and shows the way”
John C. Maxwell
To whom it may concern,

I am writing this comment in favor of the proposed TIA (1552) for NFPA 1403. I understand that there is concern regarding the availability of alternate fuels that are considered safe when performing live fire training respective to the use of OSB. My personal testimony will hopefully demonstrate the efficacy of the TIA. On the heels of the Marsh Overlook LODD involving Technician I Kyle Wilson, Prince William County Department of Fire and Rescue, VA sought to redevelop and improve the Flashover training program it delivered. The existing program paled in comparison to the knowledge that existed, if one looked hard enough, in 2008. The LODD report stated that Fire Behavior knowledge was a weakness. Several members of the department dedicated a tremendous amount of time and energy seeking the knowledge necessary to fill the gaps. During that endeavor, those department members interviewed a retired fire instructor from the UK that had recovered from brain cancer. Anecdotally, he tied his ordeal to the actual measured runoff from the burn packages of the day found to contain 70% formaldehyde. Those fuels were commensurate with our engineered wood products still in use. This includes OSB. By 2008, many of the European countries had switched to a product known affectionately as “soft board”. Today, Prince William County successfully uses two products that are the same as the soft boards found overseas. These products include Homasote and Blue Ridge Fiberboard. Both products are clear of Formaldehyde, a known carcinogen. Their MSDS sheets were a key element in our pledge to reduce exposure while providing cutting edge training. To that end, the products previously listed produce the desired results when used appropriately in conjunction with traditional pallets during our fire behavior training.

Please feel free to contact me if you have any questions or comments.

Sincerely,

James Mirabile
Battalion Chief

Prince William County Government
Department of Fire and Rescue | Public Safety Training Center
13101 Public Safety Drive, Nokesville, Virginia, 20181
www.pwcgov.org | Fire and Rescue Website
To: Secretary, NFPA Standards Council

Date: January 28, 2021

Subject: Re. NFPA 1403, TIA Log No.: 1552 Public Comment

I rise in support of the Proposed TIA No. 1552, as presented by Ryan McGill.

My name is Thomas Verrill, NFPA member #3492624

My credentials include over 45 years of experience in the wood products manufacturing industry as a technical resource for Wood Fiber Industries, International Paper, Masonite, Knight-Celotex, and presently Blue Ridge Fiberboard. I am a voting member in a number of ASTM committees, for which relate to construction materials and their performance properties. I represent the North American Fiberboard Association (NAFA) on the American Wood Council’s Wood Design Standards Committee. I hold a BS degree in Biology from the University of Maine and a MBA from New Hampshire College.

The proposal is supported by the following three key points relating to firefighter health:

1. It is unnecessary to expose firefighters to known hazardous materials emissions during training. While it would be idealistic to think that all materials burned in fire training must be completely devoid of any harmful exposures; the adhesive binders commonly used in OSB (as noted in Ryan McGill’s proposal and the Wood Handbook¹ reference below), clearly represent an undue hazard for firefighter training. The USDA Forest Product Laboratory, Wood Handbook references commonly used adhesive binders used in OSB, generally characterized as synthetic polymers. In a closer look, these synthetic polymer adhesive binders include the isocyanate, polymeric diphenylmethane di-isocyanate (PMDI); as well as the formaldehyde resin, phenol-formaldehyde (PF). Both of these adhesive binders pose health and safety risks in their handling and manufacture of OSB, let along their use in OSB fire training fuel packages.

2. Knowingly exposing firefighters to hazardous materials emissions during training may cause future liability repercussions on departments and their jurisdictions.

3. Third, there are alternatives to OSB use in training fuel packages. Alternative choices which minimize or eliminate firefighter training exposures, include those fiberboard products which use strictly plant-based adhesive binders (vegetable starch) with no added formaldehyde or MDI.

Thank you for the opportunity to comment on TIA No. 1552.
Reference:
Subject: FW: Public Input for NFPA TIA 1552

-------- Original message --------
From: "Swan, Rick"
Date: 1/31/21 21:07 (GMT-05:00)
To: "Bellis, Dawn" <DBellis@nfpa.org>
Cc: "Valencis, Grady"
Subject: Public Input for NFPA TIA 1552

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CAUTION: Always use caution when opening attachments. Make sure you know the sender and are you expecting one.

Attached is the Public Input for NFPA TIA Log No: 1552

Thank you

Rick Swan | Director
Health and Safety Operational Services
INTERNATIONAL ASSOCIATION OF FIRE FIGHTERS
January 31, 2021

NFPA Standards Council
National Fire Protection Association
1 Batterymarch Park
Quincy, MA  02269

Dear Standards Council Members

On behalf of the 320,000 members of the International Association of Fire Fighters (IAFF), We are writing to express our support of:

**NFPA 1403-2018 Edition**

**Standard on Live Fire Training Evolutions**

**TIA Log No.: 1552**

**Reference: Section 4.13.2**

Training fires along with continuing education are a major portion of firefighters' occupational exposures to smoke; however, the magnitude and composition of those exposures were not well understood and may vary by the type of training scenario and the fuel package used. To understand how live fire training contributes to firefighters' and instructors' cancer-causing chemical exposures, a study was conducted and was then published in the International Journal of Hygiene and Environmental Health. The study titled “Firefighters' and instructors’ absorption of PAHs and benzene during training exercises” measured biomarkers and chemical concentrations based on level of exposure to the burning of pallet and straw, oriented strand board (OSB), and simulated smoke. Urine samples were analyzed for metabolites of polycyclic aromatic hydrocarbons (PAHs) and breath samples were analyzed for volatile organic compounds (VOCs) including benzenes. Dermal absorption likely contributed to the biological levels as the respiratory route was well protected. Median concentrations of nearly all PAH metabolites in urine increased from pre-to 3-hr post-training for each scenario and were highest for OSB, followed by pallet and straw, and then simulated smoke. For instructors who supervised three trainings per day, median concentrations increased with collections after each scenario. A single day of OSB exercises led to a 30-fold increase in 1-hydroxypyrene for instructors, culminating in a median end-of-shift concentration 3.5 times greater than median levels measured from firefighters in a previous controlled, residential fire study. Breath concentrations of benzene increased 2 to 7-times immediately after the training exercises except for simulated smoke training. Measured levels of PAHs and VOCs were highest in scenarios where fuel packages contained OSB and instructors’ levels were magnified with accumulated PAHs when taking part in repeated daily exercises.

Further analysis of the make-up of OSB has found that identical chemicals are used in the manufacturing of OSB and polyurethane foam, which has already been banned under NFPA 1403. Polymeric Diphenylmethane Diisocyanate (P-MDI) is noted on the Safety Data Sheet (SDS) for both OSB and the polyurethane foam as the chemical used in the manufacturing process. Polyurethane foam, OSB, and PMDI all have the same CAS number on their SDS
sheet, CAS # 9016-87-9. The SDS documents were provided by Weyerhaeuser and Louisiana Pacific for OSB. The P-MDI SDS document was provided by BASF. Additionally, this information was cross checked for factuality utilizing the Environmental Protection Agencies Methylene Diphenyl Diisocyanate (MDI) and related compounds action plan April 2011.

All supporting documents are being submitted as an attachment. By adding OSB that contains P-MDI to the list of materials banned under 1403 4.13.2 this would help reduce the toxic exposure firefighter are receiving during training. It is our belief that OSB that contains P-MDI was unintentionally left out of previous drafts of NFPA 1403 due to the lack of supporting information relating to P-MDI as used in Polyurethane foam and OSB.

1. What are the hazards of OSB burning?

Oriented strand board (OSB) is made from long flakes or chips of wood that are glued together in perpendicular layers. The layers are bonded together with a synthetic resin. The three main types of resins used in OSB are:

- Urea-formaldehyde (UF) resin: this has a high nitrogen content and used in boards that are not exposed to moisture
- Melamine-formaldehyde (MF) resin: often mixed with UF resins to improve moisture resistance of the boards
- Phenol-formaldehyde (PF) resin: the most durable type of resin

Other waxes, binders, and/or adhesives are often added to the OSB to improve their durability and water resistance. One of the most commonly used binders in OSB is polymeric MDI (polymeric methylene diphenyl diisocyanate, or PMDI).i

The combustion byproducts and smoke content OSB or other engineered wood products, such as particleboard, fiberboard, or plywood, varies based on three main factors:

- The type and amount of the of the resins and binding agents used in the OSB
- The composition of the wood chips used (i.e. hardwood or softwood, moisture content)
- Characteristics of the fire, such as temperature, duration of the burn, and oxygen availability.

The combustion byproducts of engineered wood products and pure untreated wood are similar; however, the combustion of the synthetic resins and binders used in engineered wood may cause the release of additional hazardous vapors.ii Burning PMDI and MDI products causes the release of isocyanate vapors.iii Exposure to these vapors causes irritation of the skin, eyes, and respiratory tract.iv

There has been relatively little research measuring the combustion byproducts of engineered wood. One study found that particleboard and pure wood had similar combustion byproducts, however particleboard combustion produced a higher concentration of nitrogen oxides.v This
can be attributed to the high nitrogen content found in UF, MR, and MDI resins. Another study detected hazardous combustion byproducts of engineered wood that were not detected in the combustion of pure wood, including naphthalene, benzene, 1,2-diol and diethyl phthalate. Peng et al. compared emissions from pure wood to emissions from engineered wood made with PF resins. When exposed to temperatures up to 500°C, the engineered wood samples emitted various vapors that were not detected in the pure wood samples, such as acetaldehyde and furfural, which are hazardous to human health.

2. Are those dangers real to fire fighters?

Fire fighters can be exposed to combustion byproducts through any of the following pathways:

- During the initial release of the hazardous combustion products and subsequent inhalation exposure
- Re-release of hazardous substances during the overhaul phase after the initial fire has been put and subsequent inhalation exposure
- Re-release of hazardous substances during removal of contaminated PPE and turnout gear and subsequent inhalation exposure
- Dermal exposure from penetration of PPE and personal clothing

Exposure to concentrations of combustion byproducts at concentrations above the occupational exposure limits set by OSHA can cause acute or chronic health effects. However, there is little research on measuring the gas and vapor concentrations that fire fighters are exposed to during operational fires or controlled burns, and even less research on exposures to the byproducts of engineered wood combustion.

The New South Wales Fire Brigades in Australia recently conducted a study to measure fire fighters’ exposure to hazardous combustion byproducts from particleboard used during flashover cell trainings. Researchers measured concentrations of volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), formaldehyde, inorganic compounds (metals), and hydrogen cyanide during three flashover cell burn activities to assess fire fighters’ inhalation exposures. Additionally, biological monitoring of PAHs was performed on the four fire fighters participating in the flashover trainings to measure dermal uptake. The protective clothing worn by the four fire fighters was also tested for PAHs, VOCs, and inorganic compounds.

Fire fighters in the study were exposed to small amounts of naphthalene, a PAH, at concentrations well below the occupational exposure limits. The biological monitoring results showed a small increase of urinary PAH metabolites among the participants, which indicate the possibility of dermal exposure to PAHs during the flashover trainings. The fire fighters’ turnout gear was also tested for PAHs and small amounts of naphthalene was found on the inner lining of the garments, suggesting some penetration of naphthalene through protective equipment. Airborne formaldehyde was detected on all three days of the training at concentrations exceeding the short-term exposure limit set by OSHA (STEL). Fire fighters in the study were also exposed to small amounts of hydrogen cyanide; however, these concentrations were well below the occupational exposure limits. VOCs were not detected in the air samples during this
study, possibly because the extremely high temperatures in the flashover cell were high enough to reduce VOC emission.

The authors of the study concluded that significant inhalation exposure to any of the chemicals measured is unlikely given the correct use of PPE and SCBA during training activities. Cross contamination from used PPE may be a source of dermal exposure to PAHs, however, with the correct use and decontamination of PPE, the risk of short- and long-term health effects of this exposure is negligible.

Firefighters in your department may have similar exposures to those measured in this study, since particleboard and OSB are made with similar resins. However, the concentrations of the combustion byproducts will depend on the amount of resins used in the OSB, the duration of the training, and characteristics of the fire environment.

In another study, conducted by the National Institute of Occupational Safety and Health (NIOSH) and the Illinois Fire Science Institute (IFSI)ix, 24 firefighters and 10 fire instructors were put through three live fire training scenarios. The three scenarios differed primarily by fuel package (combustion of pallet and straw, oriented strand board (OSB) or the use of simulated smoke) and type or orientation of the structure. Both the firefighters and instructors were required to wear SCBA while inside the structures during the firefighting simulation.

The most important results of this study are that firefighters and instructors are exposed to combustion byproducts even when wearing SCBA throughout a training exercise, and firefighters and instructors undergoing training exercises involving OSB experienced higher exposures than pallet and straw as the fuel source. Also, there is strong evidence of instructors’ increasing cumulative exposure to PAHs with repeated training exercises.

The authors conclude that live-fire training may expose firefighters and instructors to hazardous chemicals although the dose will depend on the number of training fires and type of fuel package. Efforts should be taken to reduce these exposures, including donning SCBA before approaching the structure, cleaning skin as quickly as possible, laundering turnout gear after live-fire training (or field decontamination if laundering cannot be done), showering as soon as possible following training, and selecting training fuels to provide realistic training while limiting unnecessary exposures for firefighters and instructors.

In conclusion, the combustion of engineered wood products and pure untreated wood produce similar byproducts; however, the combustion of the synthetic resins and binders used in engineered wood may cause the release of additional hazardous vapors. Dangerous levels of these vapors were found to penetrate the inner lining of protective clothing creating a risk for dermal exposure. Airborne concentrations exceeding the short-term exposure limit set by OSHA were also detected, indicating a risk for inhalation exposures.

Many have suggested that since there are no alternative to OSB and it’s importance to live fire training that the risk of exposure to these chemicals and vapors are less than the training value. I suggest that the use of AFFF foam as been stopped because of the hazards presented even
though there is no real alternative available now. Convenience should not be placed in front of safety and we must minimize exposures whenever and wherever possible.

Though proper use of personal protective clothing, equipment and respirators may reduce the risk of exposure, the potential for harm outweighs any benefit of using products other than those stated in NFPA 1403 - Standard on Live Fire Training Evolutions, 2018 Edition (4.13 Fuel Materials.4.13.1* The fuels that are utilized in live fire training evolutions shall only be wood products.

4.13.2 Pressure-treated wood, rubber, and plastic, polyurethane foam, upholstered furniture and chemically treated or pesticide-treated straw or hay shall not be used.

A.4.13.1 Acceptable fuels include pine excelsior, wooden pallets, straw, hay, and other wood-based products).

Please feel free to contact us with any questions.

Sincerely,

[signature]

Director, Health and Safety Operational Services
International Association of Fire Fighters

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As occupational exposures to chemical carcinogens resulting from fireground responses cannot be avoided, every effort should be made to reduce firefighter’s exposures elsewhere. Although interventions such as post-fire decontamination have been shown to reduce exposure (Burgess et al., 2020), these interventions do not completely eliminate exposure to chemical carcinogens. We know that incumbent firefighters demonstrate epigenetic changes associated with increased cancer risk as compared to new recruits (Jeong et al., 2018; Zhou et al., 2019), and in our most recent study following new recruits through their first two years of service these markers were affected by the most recent fire exposure (Jung et al., 2021). In a study by Laitinen et al. (2010), exposure to engineered wood products during training fires was associated with increased exposure as compared to natural wood products, with the following quote taken from their study abstract “The highest excretion of [urinary] 1-pyrenol (sampled 6 h after end of exposure, in average 4.3–9.2 nmol/L) and emissions of benzene (1.0–2.5mg/m3) and hydrogen cyanide (0.2–0.9mg/m3) were measured during the burning of conifer plywood and chipboard, and the lowest when pure pine and spruce wood (1.5 nmol/L, 0.6mg/m3, and 0.05mg/m3) was burned.” As it is in the best interest of the health of firefighters to minimize their exposure, and this can be done by not using engineered wood products, I am in support of NFPA 1403 - TIA 1552.


Jefferey L. Burgess, MD, MS, MPH
Associate Dean for Research and Professor
Mel and Enid Zuckerman College of Public Health
University of Arizona
To whom it may concern,

I am fully in support of halting the use of harmful engineered wood products bonded with synthetic resins in training fires. Our firefighters are exposed to enough toxins in structural fires and do not need the added health risks during burns in training exercises using harmful wood products.

Thank you,

Kristin

Kristin Thompson, EMS Division Chief
City of Newport Beach, Fire Department
100 Civic Center Drive
Newport Beach, CA  92660

"Safety, Service & Professionalism"
To Whom it May Concern,

I wholeheartedly support the Tentative Interim Amendment (TIA) submitted by Ryan McGill. My name is Eric Blaska, I’m a Firefighter Paramedic with the Huntington Beach Fire Department and one of our live burn cadre members. Over a year ago, our department switched to an OSB free fuel package while still providing effective training to our members and recruits. After our first live fire training with the OSB free fuel package an immediate visual difference was noticed as we walked out with less contaminated turnouts and helmets and I didn’t continue to smell my body off gassing the next day.

As firefighters, we respond to our community’s worst nightmares because we are here for them. We can’t always control what we get exposed to during these emergencies and tragically our fire service has continued to lose members due to job related cancers. Multiple studies have shown the effect of high atmospheric concentrations of PAHs and higher concentrations of urinary metabolites of PAHs as result from the use of engineered wood products specifically OSB in live fire training.

Fortunately, live fire training is planned and we can control what we are being exposed to. If we have the opportunity to decrease any incidence of exposure to cancer-causing chemicals and aide in prevention then it is our personal responsibility to see it through.

Please implement Ryan McGill’s revision.

Thank You,

Eric Blaska
Firefighter Paramedic / USAR
HUNTINGTON BEACH FIRE DEPARTMENT
2000 Main Street, Huntington Beach, CA 92648
Good Morning

I am writing to support Ryan McGill’s TIA seeking to halt the use of engineered wood products bonded with synthetic resins in training fires. Ryan has a compelling and very sound argument backed by science to support this TIA. Please let me know if there is anything else I can provide or do to support this TIA.

Respectfully,

Brent Brainard
Captain/Wellness Officer
Health and Safety Office
City of San Diego
Fire-Rescue Department

www.sandiego.gov
Hello,

My name is Dionisio Mitchell and I work with the Kern County Fire Department. I am writing this email in regards to the dangers surrounding live fire burns being conducted utilizing engineered wood products such as OSB. Here in Kern County Fire we have stopped the use of burns being conducted with OSB due to the high level of PAH's being present. This decision was made within our fire department due to the literature and studies that have been conducted in the recent years showing the dangers. I know that the health and wellness of our firefighters always remain number one, so putting them into any anticipated dangers due to our negligence is unacceptable. There is no room to play around within allowing products such as OSB to be utilized in training burns, this practice needs to be stopped, and the correct information needs to be passed on to fire agencies across the Nation.

Thank you for your time,

Dionisio Mitchell
Battalion Chief
Kern County Fire Department
Good afternoon. I stand in support of the proposed TIA 1552 on NFPA 1403. As a 26-year veteran of the fire service and long-time fire instructor, any means to reduce carcinogenic exposures during controlled fires should be implemented. Within my department, we have had three presumptive cancer claims since June 2018. One member has returned to full duty, another was forced to retire, and a third is retiring in April sooner than he would prefer. Quantifying the financial impact on the budget is easy. However, it is difficult to quantify the impact their experience has had on them and their families emotionally, psychologically, and spiritually. While their cumulative exposures and cancers were from years of not knowing the risks associated with modern furnishings and building methods, science has provided us with data designed to reduce risk and preserve health and wellness. I applaud Mr. McGill’s efforts to amend NFPA 1403. His desire to make a difference will pay dividends for current and future fire instructors. His efforts will allow them to fulfill their calling as fire instructors while also being involved with their friends and families without undergoing invasive and painful treatments associated with occupational cancer. Thank you!

Sincerely,

William R. Anderson, MPA, OFE
Assistant Fire Chief, City of Euclid
775 East 222nd St.
Euclid, OH 44123
Hello-

I would like to submit support for TIA Log No. 1552, an amendment to NFPA 1403 Section 4.13.2. The data regarding the use of OSB and the dangerous carcinogens it produces, which would expose firefighters unnecessarily during training exercises, is documented and verified. With so many other types of options available to provide equivalent burn training for firefighters, the NFPA should take heed of this TIA and approve it immediately. With firefighter cancer increasing every year, it is on us, as the leaders in firefighter training for our agencies and also the NFPA, to ensure we are doing right things for our people and providing the safest possible training available. Agencies all over the country follow the NFPA and the guidance and leadership it provides. I feel this is a great opportunity for the NFPA to recognize the inherent dangers of OSB and help provide this information on a national scale, by banning the use of OSB for live fire training exercises.

I appreciate your consideration on this matter.

Thanks,

Justin Fleming
Battalion Chief/Training
Huntington Beach Fire Department
2000 Main Street, Huntington Beach, CA 92648

Humility / Social Awareness / Passion / Exceptionality / Integrity / Legacy
To whom it may concern on the NFPA committee,

SDFD Health & Safety office is fully in support of banning the use of engineered wood products bonded with synthetic resins in training fires. We have already made this change for our training division.

Thank you and feel free to reach out with any questions,

David Picone  
Battalion Chief  
Health and Safety  
City of San Diego  
Fire-Rescue Department

www.sandiego.gov
Good afternoon,

On behalf of Local 1403 President McAllister, please see attached our letter of support.

Regards,

Bianca Rossato-Wolfe, Executive Coordinator to President William McAllister IV
Metro-Dade Firefighters Local 1403
8000 NW 21 Street, Suite 222
Doral, FL 33122

www.local1403.org
Follow us @Local1403
February 1, 2021

RE: NFPA 1403 - TIA 1552 Public Comment

Metro-Dade Firefighters IAFF Local 1403 is in support of the Tentative Interim Amendment (TIA) to the NFPA 1403 Standard on Live Fire Training Evolutions seeking to halt the use of engineered wood products bonded with synthetic resins in training fires.

Please feel free to contact me directly for further comments and/or questions.

Respectfully,

[Signature]

William McAllister IV
President, IAFF Local 1403
Metro-Dade Firefighters
Hello-

I would like to submit support for TIA Log No. 1552, an amendment to NFPA 1403 Section 4.13.2. The data regarding the use of OSB and the dangerous carcinogens it produces, which would expose firefighters unnecessarily during training exercises, is documented and verified. We are asking for our Fire Service leadership to support the future health of our profession and protect those that serve from the unnecessary risk of allowing engineered wood to be an acceptable material to include in a burn package. With firefighter cancer increasing every year, our industry is looking for guidance that acknowledges all of the tremendous work being done by our medical community, local agencies and many of our Fire Service brothers and sisters. Agencies all over the country follow the NFPA and the guidance and leadership it provides. Please join us in making positive change that will reduce the exposure risks associated with burning engineered wood products. There are viable and accessible substitute products that produce high fidelity training opportunities while lessening the danger of doing so.

I appreciate your consideration on this matter.

Thank you,

Tim Andre
Division Chief - Professional Standards
HUNTINGTON BEACH FIRE DEPARTMENT
2000 Main Street, Huntington Beach, CA 92648
Foran, Rosanne

From: Conant, Kevin@CALFIRE
Sent: Monday, February 1, 2021 2:00 PM
To: Shared TIAs
Cc: Ryan P. McGill; Derek Urwin
Subject: Comment on Proposed TIA 1552 on NFPA 1403

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

I am writing in support of TIA 1552 on NFPA 1403.

As a principle curriculum cadre lead developer of the California State Fire Training, Structural Firefighting Live Fire suite of courses, I support TIA 1552 being approved and included in the NFPA 1403 Standard.

Kevin Conant
Fire Training Specialist III

CAL FIRE
Office of the State Fire Marshal
Training Division
I support the Tentative Interim Amendment (TIA) to the NFPA 1403 Standard on Live Fire Training Evolutions (attached) seeking to halt the use of engineered wood products bonded with synthetic resins in training fires.

Thank you,

Chris Fowler
Sacramento, CA
Hello,

I support the Tentative Interim Amendment (TIA) to the NFPA 1403 Standard on Live Fire Training Evolutions (attached) seeking to halt the use of engineered wood products bonded with synthetic resins in training.

Clayton Thomas  
Captain/Peace Officer  
Penn Valley Fire Protection District  
P.O. Box 180  
Penn Valley, CA 95946

"Protecting Our Community With Pride"
As fire fighters, we are exposed to a myriad of carcinogenic agents that leave many of our families without mothers, fathers, sons, and daughters. We face decades of exposure to chemical carcinogens when responding to emergencies without hesitation because it is our sworn duty. As a result, we need to your help as members of the NFPA 1403 Technical Committee in our struggle against cancer in the fire service.

PAHs and other chemical carcinogens result in epi-genetic and genetic changes that ultimately cause cancer. Repair resistant DNA lesions caused by a single PAH (one molecule) can correspondingly result in a pro-carcinogenic mutation. Genomic profiling of cancers commonly suffered by fire fighters indicates that as few as 15 mutations can be the primary drivers of initiation of the corresponding cancer (see References below).

There are a multitude of peer reviewed scientific studies going back over a decade that establish higher PAH exposures occur in training fires using engineered wood products bonded with synthetic resins as compared to non-engineered wood (see References below). Note also that data from combustion regimes involving 4"x4" blocks of wood do not establish what chemical carcinogens are absorbed by fire fighters and are not sufficient for establishing toxicological risk factors.

Any reduction in exposure to chemical carcinogens, and PAHs in particular is essential to fire fighter health and safety. The argument that some types of OSB result in PAH exposures similar to non-engineered wood ignores the biological and molecular mechanisms by which PAHs cause cancer. For example, when examining urinary biomarkers of exposure to PAHs, a difference of 1 microgram of a given PAH-OH per gram of urine indicates that a massive number of additional PAHs have entered the body in the higher sample. For those of us in the fire service that have lost countless friends and colleagues to cancer and seen their children grow up without a parent... that 1 microgram makes a difference.

For these reasons I am writing in support of NFPA 1403 - TIA 1552.

Respectfully,

Derek Urwin
Los Angeles County Fire Fighters Local 1014
MS Chemistry
PhD Candidate Chemistry
Father and Husband

References:


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Fernando et.al. Evaluation of Firefighter Exposure to Wood Smoke during Training Exercises at Burn Houses, Environmental Science and Technology, 2016

Fent et.al. Firefighters' and instructors’ absorption of PAHs and benzene during training exercises, International Journal of Hygiene and Environmental Health, 2019

Fent et.al. Understanding airborne contaminants produced by different fuel packages during training fires, Journal of Occupational and Environmental Hygiene, 2019
Good afternoon

I am writing in support of the tentative Interim Amendment (TIA) to the NFPA 1403 Standard on Live Fire Training Evolutions (attached) seeking to halt the use of engineered wood products bonded with synthetic resins in training fires. As a Medical Services Officer with North County Fire in San Diego and the Health and Services Officer for the agency, we live in the constant shadow of a cancer diagnosis and recently one of our neighboring agencies has had a member diagnosed with stage 4 cancer and given 6 months to live. He’s 33 and has a 2 and a 4-year-old !Anything we can do to reduce unnecessary exposures to those who serve is a must !

Sincerely

Mary Murphy

Mary Murphy | Medical Services Officer
North County Fire Protection District | 330 S. Main Ave – Fallbrook, CA 92028
  | www.ncfire.org

Proudly serving the communities of Fallbrook, Bonsall Rainbow ~ Duty, Integrity and Respect

Discover North County Fire on social media:
Facebook | Twitter | LinkedIn | YouTube

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I support this proposed change.

Matthew Macdonald  
CAL FIRE/Sonoma-Lake-Napa Unit  
Battalion Chief-1403  
Unit Safety Officer
I support the Tentative Interim Amendment (TIA) to the NFPA 1403 Standard on Live Fire Training Evolutions seeking to halt the use of engineered wood products bonded with synthetic resins in training fires.

Thank you,
Caryn R. Petty

Sacramento, California

Sent from my iPhone
To the 1403 technical committee,

I am writing this public comment in full support of the proposed T.I.A. which bans the burning of OSB in training fires. I have been in the Fairfax County Fire and Rescue department for over 25 years and have been in numerous training fires (fire behavior training) where OSB was used as primary fuel source, unknown to me at first. After a few times in these burns, I noticed a trend – sticky residue on our gear and mask that was unlike the effects of other training fires. Because of this residue, people began questioning what fuel we were using in the Draeger simulator and the answer given was OSB. OSB is used as a major structural component in housing (floors, roofs, and walls) and common sense tells us it was never intended to be used as a fuel package in fires of any kind. I then asked different veteran officers in our fire department if they experienced the same effect after being exposed to the burning of OSB in our training fires and every one of them responded similarly. They all said they had NEVER had the effects on their gear or on their person in training fires before. They all complained they took showers for days and STILL had the same smell coming out of their pores and one mentioned that after using the sauna three days after being exposed to OSB, his wet shirt was discolored and he attributed this to the OSB that had absorbed through his skin.

Although anecdotal knowledge is valuable, the science behind the dangers of OSB is far more concerning. I have read the 2019 study of PAH and benzene levels the Illinois Fire Institute put out concerning OSB versus other fuel packages (such as wood pallets). The study was conclusive in showing the dangers of OSB and what stood out to me was the FACT that even after decon, the participants were breathing out VOC’s and excreting high levels of PAHs in urine - 3, 6 and 9 hours later. There have been other studies put out that show very similar results in the comparison of OSB versus natural wood products so the argument that this study is some type of anomaly or outlier is completely false and misleading. The other argument many have made is a classic “straw man” argument where people use the phrase “all things we burn are toxic”. The idea that “all things are toxic” is not at all addressing the real problem and in fact, is a dangerous statement that minimizes how much more toxic some fuels are compared to natural wood or other natural products. The chemicals in OSB include PMDI which is the same chemical already banned in polyurethane foam currently under NFPA 1403. I would like to think that if PMDI was considered harmful enough to ban in polyurethane foam, it would also be banned as a binder in OSB. There is another argument people make for the continued burning of OSB and that is the training need outweighs exposure and OSB is necessary for the desired effect. Let me talk about these individually. First, the idea that the health of our members should ever be compared to a “perceived” need for training is completely antithetical to what we are trying to do in our fight against cancer. We are trying to minimize exposure at any cost, and to allow an unhealthy level of exposure (which OSB represents) should NEVER be accepted. Additionally, the idea that OSB is the only effective fuel source to provide the desired training effect is false and has been disproven by dozens of departments around the country (including Los Angeles County, and around my area, Prince William, Loudoun, and Spotsylvania counties).

Even after considering the anecdotal knowledge and science concerning the dangers of OSB, and the fact that in Virginia the VDFP (Virginia dept. of fire programs) and VPFF (Virginia professional fire fighters) banned the burning of OSB, we are still burning this known carcinogen in Fairfax County during training fires. This is why this T.I.A. is so near and dear to my heart. I have witnessed many firefighters in my own county die of cancer, some of them as young as 50 years old and I recently sent a video to a former co-worker who is in stage 4 cancer and isn’t expected to live. We have learned through time and experience that many past fuel sources have later been found out to be very hazardous to our health. In the past, different chemicals were used in pit fires and other training fires for a “desired effect”, only later to be banned when people inevitably came down with cancer and other health issues and science caught up with common
sense. It seems a very likely outcome that the burning of OSB will be something we will look back on as a mistake that needed to be stopped sooner than later. I would like to think that this committee would want to stay ahead of a problem instead of leading from behind. Any argument that supports the continued burning of OSB is going up against scientific research, practical knowledge, anecdotal knowledge, common sense, cancer prevention, known fuel alternatives, and NFPA 1403 which already bans PMDI, the binder used in OSB.

For the sake of myself, my family, my fellow firefighters, and firefighters around the country, I implore you to vote in favor of this T.I.A and continue the work you’ve already done in putting firefighter’s safety as a priority in the National Fire and Rescue Academy.

Fraternally, Master Technician Kyle B Anderson
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I’m all for FF safety. I don’t want to die early, I don’t want to battle cancer and I don’t want anyone to go through these things as well. I’m married and have 2 kids, I’m the sole income for our family and I put them first in all that I do.

With that said I also do not want to die inside of a fire. That’s why I chose to become a lead live fire instructor, not only to improve my own skill sets but to train the next generation. I think that realistic fire conditions can not be replicated with out the OSB. I believe that our industry has training scares from leaning to fight small fires in concrete structures with the “dont put it out” mentality. In my region we are heavy on the fire behavior lectures and heavy on the live fire days. We also do quite a few acquired structures every year. This is invaluable training that saves firefighter and civilian lives. It’s worth the risk. It’s worth a little exposure to insure every Firefighter has the skill sets to operate inside of a building on fire. It’s worth it to stay proficient in the fire environment so that we can save civilians.

This job is dangerous, this job is dirty and this job has risk. We need to within reason do whatever we can to keep us healthy, but not at the cost of our skill sets and our sworn duty to be professionals on their worst day.

Derek Roberts

Sent from my iPhone
To whom it concerns,

Please keep osb in live fire burns. You have already neutered fire service live training enough. Making live fire training completely unrealistic is going to cause more safety issues than you already have.

Sincerely
Adam Maiers
To whom this may concern,
I hope this email finds you well. I am writing to you with concerns on your proposed change to the 1403 code.

I'll mention now that I understand, OSB has toxic chemicals. I understand the health concerns and the desire to "clean" training up.

But my concern is that by sanitizing the training we do, we are setting our future generations up for failure, namely for LODDs and injuries. By promoting hay fires and gas fed training fires we create a false narrative that all fires will go out with the simple open and close of the bail. Homes are not made of hay, and are not made of gas.

OSB does, indeed, put off toxic chemicals. And so does PPE and our diesel exhaust fumes.

And if our training facilities are doing their jobs by enforcing policy, students should have their SCBA on during all phases of fire involvement.

Please do not deprive future generations of firefighters the knowledge of a closer to real fire in a controlled environment. For their safety, and their lives, I ask you consider these opinions.

Most Respectfully,
Terrence Bayko
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I am opposed to banning OSB for live fire burns. This would drastically reduce the simulated “real experience” students gain during training burns. We utilize OSB, hay, and Pallets for our simulated burns. We do thousands of burns a year in burn containers. Please do not consider banning OSB going forward.

Eric Shaeffer
Monroe, WA

Sent from my iPhone
I want to start off by stating, I believe your intentions regarding the use of OSB in live fire training are good. That being said, we have to provide a realistic training fire for our recruits and our members. In the modern fireground, pallets and straw just do not create the temperatures and smoke conditions they will see in the field. This increasing culture of safety is not in the best interests of those we swore to protect.

NFPA 1403 served a purpose and was fine the way it was initially wrote. It is now growing into something that is slowing robbing our firemen of what they need to be the most effective. Realistic Live Fire Training. The first time our men and women see actual fire conditions should not be at their first structure fire in the field. If you guys really want to tackle cancer concerns, maybe you should address obesity, sleep deprivation, smoking, etc. The amount of live fire trainings using osb is minuscule to the countless other issues that is threatening the health of our firemen. Cancer from osb (no real data proving this) is not what’s killing us. It’s obesity, lack of sleep, cardiac arrest, suicide, etc. That’s not even mentioning the lack of staffing that puts us in danger.

"Don't train until you get it right, train until you can't get it wrong"

Capt. Michael A Smith
McCutchanville Fire Dept
Training Division
NFPA 1403 Committee,

I oppose the revision to section 4.13.2 of NFPA 1403. The revision would place “oriented strand board (OSB)” on the “shall not be used” list of fuels. While I understand the concern that using this fuel exposes firefighters to carcinogens, it must be understood that ALL live fire training exposes firefighters to carcinogens. The UL study cited in no way recommends the removal of OSB as a fuel. Each Instructor, agency and voluntary participant must make a determination of the risk vs. benefit of live fire training.

Live fire training that does not replicate fire condition parameters in a meaningful way creates a carcinogen exposure without the training benefit. It is already very difficult to create realistic fire conditions with the small list of approved fuels. Further limiting that list creates even more of a barrier for agencies who want to provide meaningful and cost-effective live fire training. From a practical point of view, OSB is cheap and easy to use. Banning OSB would create a financial burden beyond what some agencies could bear and live fire training would come to a stop. OSB is also widely used as a construction material in acquired structure burns to plug holes in walls or ceilings or to protect walls and ceilings, or to create easily manipulated ventilation openings. In this role the OSB is often exposed to fire and becomes part of the fuel load. The change in this standard would severely limit the use of OSB by some agencies where it is essential to create safe burning conditions.

I am an advocate that NFPA 1403 should explain the standards upon which it bases its fuel decisions. The 1403 Committee does need to revise Section 4.13 Fuel Materials, but this is a much larger task than a mid-stream addition and should be done when the standard comes up for scheduled revision. For example, section 4.13.1 why are wood products the only fuel allowed? This should have an explanation in the appendix since the fires we are training for are not predominately wood fuel fires and the use of wood as a fuel actually creates many misconceptions about structure fires that instructors have to work hard to counter. In the appendix for 4.13.1 “wood pallets” are allowed, but most organizations pick up wood pallets for free and have no idea what was spilled on those pallets. Shouldn’t the standard state “new wood pallets” or “wood pallets without any chemicals or paint on them”? Why is “tar paper” not allowed? A reason for why it is not allowed should be included. Are fuels being excluded due to high heat release rates, or toxicity, or both, and what is the standard for exclusion being used?

Because of the widespread use of OSB as both an economical and efficient fuel and construction material, I don’t believe that a change to the current edition removing OSB as a fuel would be beneficial to training firefighters, it would in fact, be detrimental to live fire training activities.

James Mendoza
San Jose Fire Department
Good morning.

I am writing in response to proposed TIA 1552 on NFPA 1403.

I certainly understand the concerns raised, however as live burn instructors have already been significantly limited by procedures and allowed materials this adds yet another significant barrier to conducting live fire training evolutions. We have all read the alarming statistics regarding cancer in the fire service, and everyone that has been in or around the fire service for any length of time personally knows someone that has been affected by cancer. We are making significant strides towards reducing exposure in a number of ways, however the statistics regarding the efficacy of our efforts will not be available to review for many years. The focus should be on following proper decontamination procedures after completion of live fire training exercises, and universal use of SCBAs throughout the entire training session.

The incidence of fire is decreasing, which makes live fire training evolutions even more important. Adding another barrier by eliminating the use of oriented strand board (OSB) will limit the number of live fire training evolutions conducted, and in some instances make the training impractical, unrealistic, or even impossible.

Thank you in advance for your consideration of this matter.

Respectfully,

C.W. Potter, Jr.
Good Morning,
I would like to submit that as a live fire instructor for many years I have watched this guideline evolve to protect both instructors and participants. Gone are the days of back to back evolutions where all involved were exposed constantly to off gassing. We now rotate crews and instructors and practice extreme decon measures at the conclusion of each evolution. These were unheard of even 5 years ago. I would like to question the age of information used by the contributor and if it takes into account the new measures that the guideline states.
We have data that shows that OSB is still the best product for exhibiting fire phenomena without risking immediate health of the participant and damage to equipment or PPE.
If required we can submit our data on request.
Thank You,
Michael Langford
Captain Toronto Fire Services
Technical Adviser Firestar Services Inc
Concerning the proposal of eliminating the use of Orientated Strand Board in “Compliant” 1403 Training. The Military and ALL Law Enforcement use LIVE ammunition’s in training under the supervision of qualified Instructors. Simunition is used during “Live Fire” Evolutions, as real as it gets and yes, people do get hurt. Medics and Medical Providers use and stick each other with needles during realistic Mass Casualty Incidents, to adequately learn to preform their jobs, as real as it gets and again, people do get hurt.

As a Nationally Certified Fire Service Instructor II and Live Fire Instructor In Charge, “compliant” 1403 training is an invaluable tool to instruct Firefighters to perform their jobs under “realistic” conditions. NFPA 1403 takes every applicable precaution to protect every participant under the supervision of qualified Instructors during training. As with ALL professions, there is risk and that risk is KNOWN to our personnel.

Every one of our First Responders understand and accepts the known risk. We all appreciate the “Threat” of the products of combustion and take all precautions to mitigate as best as possible. When they stop using OSB, high density foams and other hydrocarbon materials in structures and building construction, then we can eliminate all risk from the products of combustion.

The use of OSB should NOT be eliminated form “Compliant” NFPA 1403 training under the supervision of qualified Instructors.

Thank you for your consideration in this matter,

W J. Hanrahan FSI II
Orchard Park NY Fire District.
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Stop reducing the way firefighters obtain realistic training. NFPA is the reason why firefighters are being killed because they cannot receive hardly any realistic training. Safety is being competent in your job. Online classes, LP burns and smoke machines don’t do firefighters any good. We have to have realistic live burns to maintain a high level of preparedness.

Sent from my iPhone
This is a change that would be better used as a recommendation instead of outright banning the use of OSB.

There is the immediate reaction that we will no longer be able to teach new recruits the different smoke colours as well as be able to teach them how to deal with the heat they would and should be experiencing. Plywood is one of the worst materials to use for this type of training. We have used OSB for quite a while and as long as you wash your gear after that you should be fine. OSB has adhesives in it and when these burn we can properly teach our recruits. We also have a longer working time with OSB and we can be in the cans for longer. We use drager cans for our training and we have been quite successful for teaching new recruits real life fire simulations using OSB.

We use plywood mostly to have the fire crews come in and put out the fire as its uses are quite limited.

We have tried to use plywood to show how new furnishings tables, chairs, ottomans, modern house hold furniture burns. We were unable to do this as the smoke produced is not the best.

Regards
Stanley S
Hello – please see the attached comments from the American Chemistry Council’s Center for the Polyurethanes Industry on TIA Log No.: 1552

Stephen Wieroniey | American Chemistry Council
Director, Center for the Polyurethanes Industry

700 2nd Street, NE | Washington, DC | 20002

https://polyurethane.americanchemistry.com
www.whysprayfoam.org
www.incrediblepolyurethane.com

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February 1, 2021

Standards Council
National Fire Protection Association
1 Batterymarch Park
Quincy, Massachusetts 02169-7471

RE: NFPA 1403 Standard on Live Fire Training Evolutions - TIA Log No.: 1552

The American Chemistry Council (ACC) supports efforts to protect fire fighters from harmful chemicals. First responders are critical to protection of lives, homes, and buildings. Fire fighters often work and train in extreme conditions; therefore, special consideration should be given to their potential exposures to protect their health. A reasonable safety control is to ensure the products used in live fire training exercises do not unnecessarily expose fire fighters to harmful combustion by-products.

ACC’s Center for the Polyurethanes Industry (CPI) and Diisocyanates Panel became aware of concerns with polymeric methylene diphenyl diisocyanate (pMDI) and oriented strand board (OSB) after reviewing the Virginia Department of Fire Program’s (VDFP) ban on the use of OSB with pMDI during live fire training exercises. ACC has reviewed TIA Log No.: 1552. ACC is opposed to a complete ban on OSB during live fire training exercises and is concerned with the language used substantiate the proposed change. Ultimately, ACC suggests that NFPA develop a list acceptable products for live fire training exercises, as opposed to attempting to develop a complete list of unacceptable products.

We respectfully submit the following comments:

1. The NIOSH study was designed to measure emissions from two types of OSB (“alpha” and “bravo”), simulated smoke, and pallet and straw fuel packages. The study did not investigate causes of potential emissions.

We understand that a National Institute for Occupational Safety and Health (NIOSH) study on fire fighter exposure to PAHs and benzene during live training exercises serves as VDFP’s and the proponent’s justification for banning the use of OSB during live fire trainings.1 The substantiating language erroneously cites the study to correlate increased PAH and benzene emissions from bravo OSB to pMDI.

The study concluded that live fire training exercises may expose fire fighters and instructors to hazardous chemicals. The risk is dependent on the duration and frequency of exposure and the type of fuel package. The study does not conclude that pMDI binders cause additional emissions of PAHs or Benzene associated with bravo OSB. The references to pMDI in the substantiating language are not supported by NIOSH’s study or the current scientific research on pMDI.

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2. Polyurethane foam is not an appropriate fuel for fire training exercises due to heat release not due to potential exposure to combustion by-products.

NFPA 1403 prohibits the use of polyurethane foam as a fuel load for live fire training exercises. We understand that the prohibition of polyurethane foam and upholstered furniture was put in place due to the potential heat release of polyurethane foam, not due to potential health impacts from combustion by-products.

The proponent incorrectly links potential health hazards associated combustion by-products associated with OSB with other concerns related to polyurethane foam. We do not believe that NFPA ever intended to ban OSB at the same time as other polyurethane products for live fire training as these items and their fire performance are vastly different. To state otherwise is post-hoc reasoning.

3. Cured polyurethane products do not contain pMDI.

pMDI binders are a raw material input to the OSB manufacturing process. During OSB manufacture, pMDI binders react to form polyurethane and polyurea polymers. pMDI is not present in OSB as a discrete ingredient. No one is exposed to pMDI when handling OSB.

OSB products contain multiple components, including binders, wax, and wood chips or strands. Generally, OSB products are over 95% wood. OSB contains an inner core and an outer layer. pMDI is often used as the binder for the inner core. The outer layer is often bound with phenolic or pMDI binders. Each component in OSB may produce combustion by-products.

Similarly, pMDI is not present in polyurethane foam. pMDI reacts with polyol to form polyurethane.

4. pMDI is not a carcinogen.

pMDI is a mixture of monomeric MDI (MDI) and higher molecular weight species. Scientific evidence from human epidemiology studies of over 17,000 polyurethane foam production workers showed no correlation between occupational exposure to diisocyanates and in increased risk of cancer. Accordingly, numerous authoritative, science-based organizations, including the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP), the World Health Organization (WHO), U.S. Environmental Protection Agency (EPA) and U.S. Occupational Safety and Health Administration (OSHA) consider MDI and pMDI as not carcinogenic under the relevant and primary routes of human exposure, which are via inhalation or dermal contact.

Two cancer bioassays in rats with either pMDI or MDI yielded similar results. At the highest concentration of pMDI tested (6 mg/m³), a low incidence of pulmonary adenomas was seen in male (6/60) and female (2/59) rats, while one pulmonary adenocarcinoma was noted in a male rat (Reuzel et al., 1994)². Similarly, only one pulmonary adenoma (1/80) was observed with MDI (Hoymann et al., 1995)³, again only at the highest test concentration tested (2 mg/m³). In humans, three epidemiological studies with updates, representing the combined long-term mortality experience of more than 17,000 polyurethane foam production workers, failed to find an association between occupational exposure to diisocyanates (pMDI or MDI) and an increased risk of cancer.

Based on these animal and human data:

- the International Agency for Research on Cancer (IARC, 1999) concluded that pMDI and MDI were not classifiable as to their carcinogenicity in humans (Group 3),
- the National Toxicology Program (NTP, 2016) 14th Report on Carcinogens (RoC) that identifies agents, substances, mixtures, and exposure circumstances that are known or reasonably anticipated to cause cancer in humans does not list either pMDI or MDI,
- the World Health Organization Assessment (WHO, 2000) concluded that the available human evidence demonstrated no associations between isocyanates and cancer incidence,
- the US EPA (1998) IRI assessment concluded that available human evidence is inadequate to describe the carcinogenic potential of pMDI and mMDI and that one adenocarcinoma in a chronic study does not constitute clear evidence of a carcinogenic potential, although the possibility cannot be excluded, and
- neither pMDI nor MDI would be classified as a carcinogen under the U.S. Occupational Safety and Health Administration’s Guidance on its Hazard Communication Standard, which implements the Globally Harmonized System of Classifications and labeling of chemicals.

5. Smoke and byproducts from fires are toxic regardless of the source of those fires and what is being burned.

pMDI binders cure to form polyurethane and polyurea polymers. Polyurethane and polyurea polymers do not create unique toxicity risks during fires as compared to other materials. While a range of airborne chemicals may be emitted during fire events involving polyurethane products, all combustible materials produce toxic smoke when burned, including wood. In terms of hazard, carbon monoxide (CO) is typically the most abundant toxicant in fires under almost all combustion conditions.

6. This action is based upon a single study on two very different OSB products

We believe additional research is needed on this issue. One of the two OSB boards used in the NIOSH study – “bravo OSB” – is not representative of typical residential construction OSB. Bravo OSB is specialty OSB that is not certified by an inspection agency for use in residential construction. The other OSB board – “alpha OSB” is more representative of the OSB market.

Bravo OSB is a ¼” non-structural product not intended for building and construction, while alpha OSB is 7/16” inspection agency certified structural product for use in residential wall sheathing. Alpha OSB had

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9 Polyurethane Products In Fires: Acute Toxicity of Smoke and Fire Gases

10 Question and Answer: Smoke Toxicity
emissions that were very similar to the other fuel packages, which are not being proposed for a ban in NFPA 1403.

The OSB industry is considering additional research and hopes this research can be used to inform the NIOSH study and the proponent’s concerns.

7. **This action is not inclusive**

It is difficult to ban all products that may expose fire fighters to hazardous emissions. In fact, the NIOSH study demonstrated that different OSB products produce different emission profiles. There are many other products that are not on the ban list that might be equally or more hazardous to fire fighters than the products listed. ACC suggests that it may be more productive and improve fire fighter safety if NFPA develops a list of suitable and safe materials for the training rather than trying to catalogue all of the materials that are not suitable.

Accordingly, it is premature to ban the use of OSB during live fire training exercises. If you have any questions or need additional information, please contact me at

Sincerely,

Stephen Wieroniey  
Director
From: Timothy Adams  
To: Shared TIAs  
Subject: Comment on Proposed TIA 1552 on NFPA 1403  
Date: Tuesday, December 15, 2020 10:55:41 PM

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In the TIA Log No: 1552, it would be nice to have further back-ground on what decon standards were followed after each burn, are turnout laundered after training or swapped out to be professionally cleaned, and were any type of wipes utilized at face, neck, and hands while doffing PPE for debrief away from PPE and training fire area? This is important information to calculate for the actual exposure.

This will allow further evaluation of exposure and weighing against the options for “safe” live fire training. I am supportive of minimizing or eliminating exposure as long as there are alternative solutions or actions to allow live fire training; if first responders are not allowed to train in like environments, how can we expect them to perform life saving measures, under stress, and mitigate emergencies without maydays or line of duty deaths while serving our populations under the oath of office.

1403 should add approved alternatives which include fuel package set up and modeling of the HHR. This will support the fundamentals of applying TLO and ELO’s in structural firefighting.

It is hard to comment in support or against an item without further back-ground or alternatives as it is only compared to pallets and straw which yield like by-products and not listing the actual concentrations of each in the comparison. I appreciate the important information and time, yet think more information is needed to be evaluated with sound all-risk mitigation practices in a study of exposure so a benefit analysis can be conducted.

Respectfully submitted,

Tim Adams  
Live Fire Instructor / California
Subject: Appealing the decision of the NFPA 1403 technical committee regarding TIA #1552.

Thank you for taking the time to review this appeal for TIA #1552. I have learned a lot about the TIA process over the past few months. I am appealing the decision of the technical committee for several reasons, which are listed below;

1. During the preliminary ballot vote, the committee voted on the TIA prior to the close of public comment. This did not allow for all of the facts to be presented before voting occurred.
2. Committee members openly admitted they did not read the public comments prior to voting.
3. Some members of the committee, whom I mention below, provided misleading information to the rest of the committee. This created a lack of understanding of the scope of the TIA. This prevented members from having complete and accurate information.

Once I was made aware of the misleading information presented to the committee I requested to meet with the technical committee within a week. By the end of the meeting, committee members were requesting to change their initial vote. Some members asked why they were not given all of the information from the onset. The committee chair also suggested I resubmit the TIA. This meeting was recorded and the recording was sent to the committee chair.

Below are examples of comments that committee members wrote that demonstrated a lack of accurate information.

Steven H. Weinstein wrote, “There have not been enough studies done to generate data to support the premise of the TIA. At least one additional, comprehensive study is now in process, and once it is concluded, there may be sufficient information to take action. Until then, it would be premature to completely ban OSB from use in fire training scenarios, especially since there is no current viable alternative. The TIA would effectively end flashover training, which could cause more immediate harm to firefighters than any alleged long-term harm from OSB exposure over time.”

When Mr. Weinstein said this would end flashover training, this statement couldn’t be further from the truth. As we discussed in our meeting, many departments have switched to a safer fuel package and are still delivering high quality training in flashover simulators. Virginia Department of Fire Programs recently placed a prohibition of burning OSB in live fire training. Many departments have already made the switch to a cleaner fuel package. Counties such a Prince William, Loudon, and Spotsylvania in Virginia have already switched. Several fire department in California have already made the change, this
includes Los Angeles County. This is conveyed in the public comments from members of those departments.

Corey Wilson wrote, “While I recognize the risk that live fire training utilizing OSB presents, I do not believe that enough data exists to show that OSB presents more of a hazard than any of the other approved materials. By following proper decon procedures, limiting the exposure, wearing proper respiratory protection and not standing in the smoke without a facepiece, I believe that members can safely train utilizing all approved materials as part of the fuel loads. Once more data becomes available that can better support the technical merits of this TIA then the committee can then re-evaluate OSB as a fuel load in live fire training.”

As discussed in the meeting, the resin used in the manufacturing of OSB is the exact same resin that is used to make Polyurethane Foam, which is already banned in NFPA 1403. There are numerous studies, dating back to the 1960’s, that outline how toxic this resin is when it burns. Several other studies have shown that byproducts of combustion are known to dermally absorb through the skin. According to a 2018 study published in the International Journal of Hygiene and Environmental Heath, firefighters still had high levels of VOC’s in their breath, even while wearing SCBA. Another study by Laitinen published in 2010 found that toxic PAH’s were still excreted in firefighter’s urine six hours after the end of exposure. These firefighters were also wearing SCBA. It is also important to remember that OSB is a 1A Carcinogen meaning, it is known to cause cancer in humans.

W. Edward Buchanan, Jr. wrote, “While I appreciate the sentiment and motivation for this TIA, I do not support the exclusion of OSB without identifying a recommended fuel replacement. Even clean wood fuel produces carcinogens during combustion. Banning OSB without identifying a better replacement does not mitigate the risk. Replacement fuels could cause more risk than OSB. The last revision of NFPA 1403 focused on the importance limiting exposures through rotating personnel and appropriate decon procedures. As research continues, we will look for guidance on improved fuel package recommendations.”

During the same meeting, we informed the committee there are several other options to burnig OSB. One product in particular, fiberboard, has been tested by Los Angeles County Fire Department. An NFPA committee working on the “How clean is clean” project also tested fiberboard at Fairfax County Fire and Rescue training academy. This took place over a two day period in October of 2020. Dan Shaw, a member of the 1403 committee was present for one of the day’s tests. As part of my public comment I submitted a copy of the preliminary test results that indicated OSB had the highest average PAH (carcinogens) count. Fiberboard showed a significant reduction in PAH’s along with complete removal of Diocyanates. These results fall directly in line with the CDC’s recommendation for reduction of carcinogens and (Di)ocyanates in the work place.

Mr. Buchanan’s last point about appropriate decon was addressed in a public comment by Dr. Jeff Burgess. Dr. Burgess is the current director of the ongoing federally funded Firefighter Cancer Cohort study. Dr. Burgess stated, “Although interventions such as post fire decontamination have been shown to reduce exposure these interventions do not completely eliminate exposure to chemical carcinogens.” Dr. Burgess went on to say, “I am in support of TIA #1552.”
Daniel D. Shaw wrote, “While I appreciate the desire and the passion of the submitter for enhancing firefighter safety, I cannot agree with the issuance of the TIA for several reasons. First, the adverse impact of removing this fuel and not replacing it with a suitable replacement would be substantial on firefighter training. If we were to remove and eliminate OSB as a fuel we would severally impact the fidelity and contextual impact of training. Removal of OSB will run the risk of completely eliminating any acquired structure for live training purposes as OSB is a common component of residential construction. The submitter does not offer a suitable replacement to OSB for reasons one can only assume is because there does not exist any data to detail what the byproducts of other fuels are and if they may be more hazardous than he espouses OSB is. In the end, removal of OSB without a replacement fuel with a detailed analysis of the byproducts could result in creating even greater exposure that the submitter is requesting to curtail. In the past 10 years, a minimum of 10 line of duty death reports have listed lack of live fire training as a contributing cause demonstrating the clear importance of this training. Removal of a fuel without a suitable replacement would only enhance this deadly outcome as some would eliminate all live fire training as a solution. Additionally, the occupation of a firefighter is subjected to risk as a daily occupational hazard that we are expected to face and mitigate. The job of a firefighter is inherently dangerous and risk management is a vital aspect of the balance that all must demonstrate. The goal of the standard was to provide the safest means of live fire training. Ultimately, ensuring that the first fire a firefighter may face is not in the uncontrolled environment of an emergency incident with unknown fuels. Rather, it is intended to provide a controlled environment for live fire training in the most realistic conditions yet drastically reducing the risk that would be encountered in the unknown environment. The current version of NFPA 1403 recognized the need to take all relevant, available, and accurate data and make the necessary changes to ensure that the risk faced by our personnel is mitigated and outweighed by the benefit gained. As such, the committee introduced measures to reduce this risk such as them and ated training on proper personal protective equipment (PPE) (4.3.2.1), proper donning of PPE (4.7.9), proper rehabilitation (4.4.1), proper rotation so there is limited exposure (4.4.2) (4.7.6.1), and doffing of PPE after performing these functions (A.4.7.6.1). Lastly, the UL Firefighter Safety Research Institute has recently been granted a DHS grant to perform the proper and in-depth analysis of fuels for live fire training. The information gained from this comprehensive and thorough study will provide the committee, and the fire service, with a relevant and accurate analysis. This information will not only recommend the correct fuels for fidelity in training but also continue to mitigate the risk to an appropriate level for the fire service. Until this study is completed and results shared, I feel the committee has developed a relevant and appropriate standard for conducting live fire training. Eliminating one fuel based on incomplete information would be short sighted and a disservice to fire service training.”

As noted above Mr. Shaw was present during the fuel package testing done at Fairfax County Fire and Rescue as part of the NFPA’s “How Clean is Clean” study. Mr. Shaw was also aware of the use of fiberboard in flashover training in other jurisdictions. If we were to follow Mr. Shaw’s line of thinking on acquired structure training then we wouldn’t be able to conduct live fire training in any acquired structure. Several of the components found in a majority of structures have already been banned under 1403.

For example, in typical building construction there is pressure treated lumber used on every bottom plate where the framing meets concrete. Pressure treated wood is banned under 1403. PVC Piping is
commonly in the walls of structures. Roofing material, such as tar paper, is left on the roof of structures and is also banned under 1403.

Mr. Shaw was privy to the information on the fuel packages being burned due to his attendance at the study conducted in Fairfax County in October of 2020. His attendance would have also made him aware of the other fuel packages that were tested and the results. The preliminary result of the tests were also submitted as part of the public comment for this TIA.

Mr. Shaw stated, “In the past 10 years, a minimum of 10 line of duty death reports have listed lack of live fire training as a contributing cause demonstrating the clear importance of this training”. This is not the first time I have heard this quote from Mr. Shaw. My reply has always been, in one year over 200 names were added to the fallen firefighter memorial due to cancer. Occupational cancer is the leading cause of death in American firefighters. We must act now and not wait until we add 200 more names to the memorial before we make a change. This issue cannot wait until the next revision of 1403.

Daniel Madrzykowski wrote, “Exposure to smoke of any kind is a risk. Two papers have been developed that begin to address the issue of exposures from different training fuels. 1) Kenneth W. Fent, Alexander Mayer, Stephen Bertke, Steve Kerber, Denise Smith & Gavin P. Horn (2019): Understanding airborne contaminants produced by different fuel packages during training fires, Journal of Occupational and Environmental Hygiene 2) Kenneth W. Fent, et al., International Journal of Hygiene and Environmental Health, https://doi.org/10.1016/j.ijheh.2019.06.006 (reptcitcited by TIA) In the papers, the exposures from OSB Alpha and the OSB Bravo are very different, yet both contain PMDI. OSB Alpha – cheap one, had results similar to the results from pallets and straw. OSB Bravo was sourced from Canada, based on FF suggestions this was the “clean one”, under certain circumstances OSB Bravo is considered to be “formaldehyde free”. However those circumstance do not include burning it. OSB Bravo generated higher chemical exposures than OSB Alpha. There are many other materials out there – OSB with soy based glue, wood fiber insulation boards that are being used by some departments in flashover simulators. We just don’t know how they perform. In 2021 UL FSRI will start a 3year DHS funded study to answer those questions.”

Mr. Madrzykowski’s information in not accurate. Alpha OSB and Bravo OSB carry the same APA rating (exposure 1). Their intended uses are the same and one is not cheap and neither type of OSB is considered clean. Further, the results of the tests were not similar between OSB A and pallets and straw. The results were statically important. Unless Mr. Madrzykowski is an industrial hygienist, toxicologist or studies Epigenetics he is not qualified to make these statements. The public comments from the people who are qualified to speak to the toxicity of any type of OSB when burned should be reviewed for accurate information.

I have included a copy of an email from Commander Fent of the CDC. As you will read below, Commander Fent stated the types of OSB used during testing along with OSB was never intended to be burned for training purposes. Commander Fent also stated that, “all types of OSB appear to be problematic when burned”. 
Hi Ryan,

Good talking to you. Here is some more information. Please note that we decided to remove product names from the manuscript for a variety of reasons – the biggest being that this study wasn’t intended to find the worst or best type make/model of OSB, but rather to characterize potential exposures from common types of OSB, and moreover, OSB was never intended to be burned for training purposes. All common types of OSB appears to be problematic when burned. However, there are some natural adhesives (e.g., soy-based) used in some types of construction board that we are interested in studying more. I hope this is helpful. If you share this information, please provide the important disclaimer mentioned above. I’ve copied my colleague, Dr. Gavin Horn, on this email because he was involved in the procurement of the OSB, as well as this and future studies, and he may be able to provide more information. His number is xxx-xxx-xxxx. Gavin, I have not been able to find the SDSs yet. If you have them handy, would you mind sending those by email?

Two different types of OSB were used; Louisiana Pacific (LP) OSB sheathing (Nashville, TN) was used for the alpha training exercises and Norbord Trubord OSB sheathing (Toronto, Canada) was used for the bravo training exercises, each containing the same Engineered Wood Association APA rating for 7/16” thickness (panel grade 24/16, exposure 1). However, because of supply limitations, two 1/4” sheets of the Trubord OSB were stacked together to produce similar overall thickness and ensure an adequate fuel supply for the training fires. According to their safety data sheets (SDS), both OSB sheathing contained phenol formaldehyde adhesive and polymeric methylene bisphenyl diisocyanate (pMDI) adhesive, but the exact volume percentage of each is unknown. The primary difference between the SDS for the two types of OSB was that Trubord reported <0.01% of free formaldehyde, while LP reported <0.1% of free formaldehyde. For simplicity in this paper, the LP OSB is labelled alpha OSB and the Trubord OSB is labelled bravo OSB.

Thanks,

Kenny Fent, PhD, CIH
CDR, USPHS
Research Industrial Hygienist / Team Lead
National Firefighter Registry Program
Centers for Disease Control and Prevention
National Institute for Occupational Safety and Health
Daniel D. Shaw later wrote, “The committee was aware and reviewed all of the approved fuels in our regular revision process. There has not been, nor is there currently a comprehensive and relevant study of the byproducts that was overlooked to compel the removal of OSB as a fuel. Secondly, the burning of any material will create a hazard. This hazard has been known to the fire service and our committee since its inception. The intention of developing and delivering realistic live fire training to a voluntary service is based upon ensuring that the risk encountered is minimalized and the benefit far outweighs it. The committee has worked diligently to be remain cognizant of all hazards faced through comprehensive and relevant data collection. Based upon that information, the current standard mitigates the risk of live fire training to an acceptable level with the immeasurable benefit of preparing firefighters for the unknown environment of an emergency incident.”

If what Mr. Shaw says is true then the committee has been knowingly allowing firefighters to be exposed to high levels of PAH’s, VOC and Diisocyanates for many years. Mr. Shaw consistently said that there is not a comprehensive and relevant study of the byproducts that was overlooked to compel the removal of OSB as a fuel. It is clear Mr. Shaw has not taken the time to read the multiple studies, such as the two mentioned above, or other available information about (Di)isocyanate. Many studies were referenced in the public comments of this TIA along with links to the CDC’s position on carcinogen exposure in the work place and (Di)isocyanate exposure.

For these reasons and many more I ask that the standards council approve TIA 1552. The fire service cannot afford to wait another 3 years while UL conducts further testing to prove what we already know. By the time their study is complete we will most likely be in the 2028 revision of NFPA 1403. That’s seven more years of firefighter being exposed to these toxic chemicals. I ask that you approve this TIA. I am also formally requesting to a meeting with the standards council so more information can be shared.

Respectfully,

Ryan McGill
1. Delete and replace Figure 6.1.14.6(a) with existing figure from 2016 edition to read as follows:

6.1.14.6 Garments shall be closed, laid flat, smoothed, and gently stretched when measured as defined in Section 3.3 and as specified in Section 6.1 and in Figure 6.1.14.6(a) through Figure 6.1.14.6(c).

Figure 6.1.14.6(a) Upper Torso Measurements [to be used with Table 6.1.14.6(a)].
**Substantiation:** The figure in the 2022 proposed standard, and found in the 2nd draft, is not compatible with the table referenced. Table 6.1.14.6(a) contains measurement diagrams for locations A-D and there is no instruction on how to measure the remaining five measurements (E-I). The diagram identified in proposed 2022 standard provides instructions for taking measurements which would impact the requirements in Table 6.1.14.6. For example, the measurement for sleeve length (B) should be shortened in order to align with the new diagram if garments currently on the market are to remain compliant. No explanation for the need to adjust this measurement as a result of this figure change is provided throughout the revision process. Also, measurements for sleeve length (B) and the total length (D) is ambiguous as the arrows point to undefined areas on the garment. The revisions proposed in this TIA intend to resolve these inconsistencies in order to apply the standard consistently and accurately.

**Emergency Nature:** The standard contains an error or an omission that was overlooked during the regular revision process.

The standard cannot be applied as it is proposed in the 2nd draft and therefore certification organizations are not able to certify products as written.
MEMORANDUM

TO: Technical Committee on Wildland Fire Fighting Protective Clothing and Equipment

FROM: Yvonne Smith, Committee Administrator

DATE: March 16, 2021

SUBJECT: NFPA 1977 Proposed TIA No. 1562 FINAL TC BALLOT RESULTS

No comments were received on this TIA, therefore, according to 5.6(a) in the NFPA Regs, the final 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).

Technical Merit: Emergency Nature:

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There are two criteria necessary to pass ballot [(1) simple majority (2) affirmative vote of ¾ of ballots received]. 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.

\[
\text{[23 eligible} \div 2 = 11.5 = (12)]
\]

(2) The number of affirmative votes needed to satisfy the ¾ requirement is 13.

\[
(23 \text{ eligible to vote} - 6 \text{ not returned} - 0 \text{ abstentions} = 17 \times 0.75 = 12.75)
\]

The Regs at 1.6.2.(c) state: An appeal relating to a proposed Tentative Interim Amendment that has been submitted for processing pursuant to Section 5.2 shall be filed no later than 5 days after the notice of the TIA final ballot results are published in accordance with 4.2.6.

**Appeal Closing Date** for this TIA is March 21, 2021.
I AGREE with the TECHNICAL MERITS of the Proposed TIA Log No. 1562 to Delete and replace Figure 6.14.6(a) with.

Eligible to Vote: 23
Not Returned: 6
Jason L. Allen, Joel E. Sipe, Debra G. Robinson, Mark Y. Ackerman, Derrick Davis, Curtis Brown

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<td></td>
<td>New diagram shows how to measure garments per the additional measurement references. The inconsistencies should be resolved.</td>
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<tr>
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<td>DISAGREE</td>
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<td>ABSTAIN</td>
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I AGREE that the subject is of an EMERGENCY NATURE for one or more of the reasons noted in the Instructions box.

Eligible to Vote: 23
Not Returned: 6
Jason L. Allen, Joel E. Sipe, Debra G. Robinson, Mark Y. Ackerman, Derrick Davis, Curtis Brown

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<td>David A. Moore, Jr.</td>
<td></td>
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</tr>
<tr>
<td>Rick L. Swan</td>
<td></td>
<td>A. The standard contains an error or an omission that was overlooked during the regular revision process.</td>
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<td>R. J. Johnson</td>
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MEMORANDUM

TO: Correlating Committee on Fire and Emergency Services Protective Clothing and Equipment

FROM: Yvonne Smith, Committee Administrator

DATE: March 16, 2021

SUBJECT: NFPA 1977 Proposed TIA No. 1562 FINAL CC BALLOT RESULTS

No comments were received on this TIA, therefore, according to 5.6(b) in the NFPA Regs, the final results show this TIA HAS achieved the ¾ majority vote needed on both Ballot Item No. 1 (Correlation Issues) and Ballot Item No. 2 (Emergency Nature).

27 Eligible to Vote
7 Not Returned (Allen, Area, Fargo, Farley, Johnston, Legendre, Morris)

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<td>0 Disagree</td>
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There are two criteria necessary to pass ballot [(1) simple majority (2) affirmative vote of ¾ of ballots received]. 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.

\[27 \text{ eligible} \div 2 = 13.5 = (14)\]

(2) The number of affirmative votes needed to satisfy the ¾ requirement is 15.

\[27 \text{ eligible to vote - 7 not returned - 0 abstentions} = 20 \times 0.75 = 15\]

The Regs at 1.6.2.(c) state: An appeal relating to a proposed Tentative Interim Amendment that has been submitted for processing pursuant to Section 5.2 shall be filed no later than 5 days after the notice of the TIA final ballot results are published in accordance with 4.2.6.

Appeal Closing Date for this TIA is March 21, 2021.
I AGREE there are no CORRELATION ISSUES in accordance with 3.4.2 and 3.4.3 of the NFPA Regs.

Eligible to Vote: 27
Not Returned: 7
Jason L. Allen, Cristine Z. Fargo, Jeff Legendre, John H. Morris, James B. Area, Edmund Farley, Ronald Johnston

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I AGREE that the subject is of an EMERGENCY NATURE for one or more of the reasons noted in the Instructions box.

Eligible to Vote: 27
Not Returned : 7
Jason L. Allen, Cristine Z. Fargo, Jeff Legendre, John H. Morris, James B. Area, Edmund Farley, Ronald Johnston

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

Dick Weise
AGREE
0
ABSTAIN
0
1. Revise section 8.2.5.5 to read as follows:
   8.2.5.5 Test 1.
   8.2.5.5.1 The SCBA shall be cold soaked at $-32^\circ C \pm 1^\circ C (-25^\circ F \pm 2^\circ F)$ the minimum operating temperature specified by the manufacturer for a minimum of 12 hours.
   8.2.5.5.2 The minimum operating temperature specified by the manufacturer shall be $-18^\circ C (0^\circ F)$ or colder.
   8.2.5.5.3 The SCBA shall then be tested for airflow performance as specified in Section 8.1, Airflow Performance Test, at-a with the chamber air temperature of $-32^\circ C \pm 5^\circ C (-25^\circ F \pm 10^\circ F)$ at the minimum operating temperature specified by the manufacturer.

2. Revise section 8.2.5.7 to read as follows:
   8.2.5.7 Test 3.
   8.2.5.7.1 ...
   8.2.5.7.2 Immediately following the 12-hour hot soak, the SCBA shall be transferred to a chamber with an-the air temperature of $-32^\circ C \pm 1^\circ C (-25^\circ F \pm 2^\circ F)$ at the minimum operating temperature specified by the manufacturer.
   8.2.5.7.3 The minimum operating temperature specified by the manufacturer shall be $-18^\circ C (0^\circ F)$ or colder.
   8.2.5.7.4 The SCBA shall then be tested for airflow performance as specified in Section 8.1, Airflow Performance Test, at-a with the chamber air temperature of $-32^\circ C \pm 5^\circ C (-25^\circ F \pm 10^\circ F)$ at the minimum operating temperature specified by the manufacturer.

3. Revise section 8.2.5.8 to read as follows:
   8.2.5.8 Test 4.
   8.2.5.8.1 The SCBA shall be cold soaked at $-32^\circ C \pm 1^\circ C (-25^\circ F \pm 2^\circ F)$ the minimum operating temperature specified by the manufacturer for a minimum of 12 hours.
   8.2.5.8.2 The minimum operating temperature specified by the manufacturer shall be $-18^\circ C (0^\circ F)$ or colder.
   8.2.5.8.3 ...
   8.2.5.8.4 ...
   8.2.5.8.5 ...

4. Revise paragraphs 8.23.5.4 through 8.23.5.6 and add a new 8.23.5.7 to read as follows:
   8.23.5.4 The receiving and donor SCBA shall be cold soaked at $-32^\circ C \pm 1^\circ C (-25^\circ F \pm 2^\circ F)$ the minimum operating temperature specified by the manufacturer for a minimum of 12 hours.
   8.23.5.5 The receiving SCBA shall then be tested for airflow performance as specified in Section 8.1, Airflow Performance Test, with a ventilation rate set at 103 L/min, ±3 L/min, at-a with the...
chamber air temperature of $-32^\circ$C, $\pm 5^\circ$C ($-25^\circ$F, $\pm 10^\circ$F) at the minimum operating temperature specified by the manufacturer.

8.23.5.6 The donor SCBA shall then be tested for airflow performance as specified in Section 8.1, Airflow Performance Test, with a breathing frequency set at 29, $+0/-1$, inhalation/exhalation cycles per minute and a tidal volume set at 3.4 L, $\pm 0.1$ L, at a pressure with the chamber air temperature of $-32^\circ$C, $\pm 5^\circ$C ($-25^\circ$F, $\pm 10^\circ$F) at the minimum operating temperature specified by the manufacturer.

8.23.5.7 The minimum operating temperature specified by the manufacturer shall be $-18^\circ$C ($0^\circ$F) or colder.

**Substantiation:** The committee should consider removing the fixed cold temperature requirement and instead allow each manufacturer to individually specify the low temperature operating limit for each product. This would be in line with the long-standing method that NIOSH has required for SCBA for decades. The current low temperature requirements in NFPA 1986 cause manufacturers to trade off performance capabilities in areas such as breathing and battery performance. A vast number of users will never see conditions of $-25^\circ$F and could benefit from a product designed for their environment which otherwise would not be possible with the current wording in NFPA 1986:2017. The low temperature limit would be required to be stated in the User Instructions for each product so that a user would know the limitations for the product.

It was identified in the development of NFPA 1987 that lens materials of classic firefighting style rigid masks vs. tactical use flexible facepieces would behave differently during the multitude of abrasion tests available. For this reason, the committee agreed to delineate these mask types from one another to allow for these differences. However, there is another main difference between the performance of flexible masks used today for tactical operations versus the rigid masks of classic firefighting SCBA. The flexible masks are typically designed and utilized for multiple mission types with the most common application being as an APR. These flexible APR style masks do typically have restrictions in the breathing path, either in the form of check valves or components to help with airflow management to aid in lessening in-mask fogging. When high flow rates such as NFPA testing rates of 103 lpm are combined with extremely cold temperatures, these airflow management restrictions can cause a slightly lower performance of air delivery. When NFPA 1986:2017 was introduced, the extent of this phenomena may not have been fully understood or appreciated. As of October 2020, three years after the standard was released, there is still no approved product to this standard. However, if the manufacturers are allowed to define the low temperature operating limit of the product in accordance with NIOSH Industrial SCBA protocols in existence, this would be a major obstacle lifted and likely result in approved products available to the user community.

The draft standard of NFPA 1987 also currently has TC agreed language for the cold temperature testing limits to be defined by the manufacturer for each product so long as it is less than or equal to $0^\circ$ F. It is anticipated that the SCBA portion of a CUR could also be used for NFPA 1986 applications and therefore these standards should align as closely as possible. The proposed limit on the manufacturer’s minimum temperature specification is consistent with the proposed criteria for NFPA 1987 CUR testing.
Emergency Nature: 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 of the action.

In the original release of NFPA 1986, the committee did not realize the extent of breathing performance differences for tactical masks vs. traditional firefighting style masks. The user community wishes to utilize tactical mask styles and is still in heavy need of NFPA 1986 approved SCBA but still there is nothing approved to the standard now three years after its original release. Without this change, the user community will be severely limited to the types of products they can use. If the committee waits until the next revision of the standard to enact this change, this could be several years away from taking effect as the dates are still uncertain for the next revision to NFPA 1986. The NFPA amalgamation of standards efforts has moved NFPA 1986 around in the revision cycle and does not have a solid next revision date (as communicated to the TTO committee in Aug 2020 and again via email October 2020).
MEMORANDUM

TO: Technical Committee on Tactical and Technical Respiratory Protection Equipment

FROM: Yvonne Smith, Committee Administrator

DATE: March 24, 2021

SUBJECT: NFPA 1986 Proposed TIA No. 1545 FINAL TC BALLOT RESULTS

The public comment circulation has passed, therefore, according to Section 5.6(a) in the NFPA Regs, the final 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).

24 Eligible to Vote
3 Not Returned (Anderson, Connell, Springer)

<table>
<thead>
<tr>
<th>Technical Merit:</th>
<th>Emergency Nature:</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 Abstentions (Allen, Sanders)</td>
<td>2 Abstentions (Allen, Sanders)</td>
</tr>
<tr>
<td>17 Agree (7 w/ comment; Baxter, Gainey, Montgomery, Newsom, Sell, Sterett, Tekelenburg)</td>
<td>17 Agree (1 w/ comment; Sterett)</td>
</tr>
<tr>
<td>2 Disagree (Morgan, West)</td>
<td>2 Disagree (Morgan, West)</td>
</tr>
</tbody>
</table>

There are two criteria necessary to pass ballot [(1) simple majority (2) affirmative vote of ¾ of ballots received]. 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.

   [24 eligible ÷ 2 = 12 + 1 = (13)]

2) The number of affirmative votes needed to satisfy the ¾ requirement is 15.

   (24 eligible to vote - 3 not returned - 2 abstentions = 19 × 0.75 = 14.25)

Ballot comments are attached for your review.

The Regs at Section 1.6.2.(c) state: An appeal relating to a proposed Tentative Interim Amendment that has been submitted for processing pursuant to Section 5.2 shall be filed no later than 5 days after the notice of the TIA final ballot results are published in accordance with Section 4.2.6.

Appeal Closing Date for this TIA is Monday, March 29, 2021.
I AGREE with the TECHNICAL MERITS of the Proposed TIA Log No. 1545 to revise sections of NFPA 1986, Chapter 8.

Eligible to Vote: 24
Not Returned: 3
Caoimhin P. Connell, Edward Anderson, Sean Michael

<table>
<thead>
<tr>
<th>Vote Selection</th>
<th>Votes</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGREE</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>Beth C. Lancaster</td>
<td></td>
<td>Agree.</td>
</tr>
<tr>
<td>Amanda H. Newsom</td>
<td></td>
<td>I agree with the technical merits of the proposed TIA</td>
</tr>
<tr>
<td>Brian J. Clifford</td>
<td></td>
<td>Agree</td>
</tr>
<tr>
<td>Allen Ira Harkness</td>
<td></td>
<td>Agree</td>
</tr>
<tr>
<td>Jonathan V. Szalajda</td>
<td></td>
<td>I agree</td>
</tr>
<tr>
<td>Robin R. Gainey</td>
<td></td>
<td>The need to address this oversight is needed.</td>
</tr>
<tr>
<td>Robert Sell</td>
<td></td>
<td>Agree; This is also currently being addressed for the next revision of the document.</td>
</tr>
<tr>
<td>Randy Sterett</td>
<td></td>
<td>This corrects an unfortunate oversight.</td>
</tr>
<tr>
<td>Christina M. Baxter</td>
<td></td>
<td>Allowing the manufacturers to dictate the low temperature for a system will allow for a variety of system designs while also allowing the user to select specific systems that are applicable to their operational environment.</td>
</tr>
<tr>
<td>Clint Mayhue</td>
<td></td>
<td>Agree</td>
</tr>
<tr>
<td>Brian Montgomery</td>
<td></td>
<td>During discussion of the TC for a similar standard, it was determined that the cold temperature require should be market driven based on available materials and user requirements. However, it was determined that the cold temperature should still have a limit. This TIA captures that intent.</td>
</tr>
<tr>
<td>Craig Adams</td>
<td></td>
<td>Agree</td>
</tr>
<tr>
<td>Marco Tekelenburg</td>
<td></td>
<td>Agree - Please note that it will be necessary to incorporate a tolerance for the minimum operating test temperature to accommodate test equipment temperature control capability/variability.</td>
</tr>
<tr>
<td>Ed Roncone</td>
<td></td>
<td>Agree</td>
</tr>
<tr>
<td>Ken Lawson</td>
<td></td>
<td>agree</td>
</tr>
</tbody>
</table>
1. This performance requirement for NFPA 1986 has been met by a manufacturer.
2. This performance requirement for SCBAs has been met by ALL manufacturers for the last 34 years. 3.-25F is a realistic, long established, and adequate temperature requirement to protect end users throughout the world. This requirement was established by end users for use in the NFPA 1981 and NFPA 1986 standards. 4. End users will expect a level of performance (-25F) without having to consult the User Instructions. Additional comments attached.

The current temperature parameter[s] of -32c is not an unreasonable of a temperature for tactical operations to occur given the time of year and location on the globe. These temperature ranges have a long standing and established performance within other NFPA Standards. Just like fire personnel whose equipment may be donned in extreme conditions, there is no reason to believe that tactical personnel would be donning equipment in anything less challenging. The first responder donning a tactical SCBA will be expected to rely on their equipment and be satisfied that its operational parameters are well within the environmental conditions they are experiencing without having to understand the manufacturers specifications for temperature ranges. There is no evidence to substantiate that tactical conditions could be any less extreme than those of the fire fighter, if the 1981 Standard temperature ranges have proven to worked for decades, the 1986 Standard temperature ranges should mirror those.

I don't feel as Intertek should weigh in the temperature chosen.

Although covered indirectly through 42 CFR Part 84, the proposed revisions should have included a requirement in Chapter 5.2 (User Instructions) covering the need to have the manufacturer specified cold temperature as part of the User Instructions.
I AGREE that the subject is of an EMERGENCY NATURE for one or more of the reasons noted in the Instructions box.

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<td>AGREE</td>
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<td></td>
</tr>
<tr>
<td>Beth C. Lancaster</td>
<td></td>
<td>F.</td>
</tr>
<tr>
<td>Amanda H. Newsom</td>
<td></td>
<td>F</td>
</tr>
<tr>
<td>Brian J. Clifford</td>
<td></td>
<td>Agree</td>
</tr>
<tr>
<td>Allen Ira Harkness</td>
<td></td>
<td>F</td>
</tr>
<tr>
<td>Jonathan V. Szalajda</td>
<td></td>
<td>I agree</td>
</tr>
<tr>
<td>Robin R. Gainey</td>
<td></td>
<td>The need to move forward on this is required ASAP.</td>
</tr>
<tr>
<td>Robert Sell</td>
<td></td>
<td>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.</td>
</tr>
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</table>

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<table>
<thead>
<tr>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Randy Sterett</td>
<td>This project has already took too long. It needs to be expedited.</td>
</tr>
<tr>
<td>Christina M. Baxter</td>
<td>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 during the revision process.</td>
</tr>
<tr>
<td>Clint Mayhue</td>
<td>F</td>
</tr>
<tr>
<td>Brian Montgomery</td>
<td>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.</td>
</tr>
<tr>
<td>Craig Adams</td>
<td>F</td>
</tr>
<tr>
<td>Marco Tekelenburg</td>
<td>F</td>
</tr>
<tr>
<td>Ed Roncone</td>
<td>Letter &quot;F&quot;</td>
</tr>
<tr>
<td>Ken Lawson</td>
<td>agree</td>
</tr>
</tbody>
</table>
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

2. There is no emergency nature as it has been proven that it is possible to pass this minimum performance requirement. 2. Multiple performance levels for cold temperature within the same standard can result in end users inadvertently using products in environments outside of the products “designed performance range”. This is a minimum performance standard. Additional comments attached

I do not agree that this is of an emergency nature to amend the current 1986 standard as written, based on the reply provided in the TIA.

I wish to abstain as an independent lab for this testing.

I wish to abstain based upon SEI’s position as a certification organization.
I **DISAGREE** with the TECHNICAL MERITS of the Proposed TIA Log No. 1545 to revise sections of NFPA 1986, Chapter 8.

1. This performance requirement for NFPA 1986 has been met by a manufacturer.
2. This performance requirement for SCBAs has been met by ALL manufacturers for the last 34 years.
3. -25F is a realistic, long established, and adequate temperature requirement to protect end users throughout the world. This requirement was established by end users for use in the NFPA 1981 and NFPA 1986 standards.
4. End users will expect a level of performance (-25F) without having to consult the User Instructions.

I **DISAGREE** that the subject is of an EMERGENCY NATURE for one or more of the reasons noted in the Instructions box.

1. There is no emergency nature as it has been proven that it is possible to pass this minimum performance requirement.
2. Multiple performance levels for cold temperature within the same standard can result in end users inadvertently using products in environments outside of the products “designed performance range”. This is a minimum performance standard.

**Substantiation:** Please note comments in red below.

The committee should consider removing the fixed cold temperature requirement and instead allow each manufacturer to individually specify the low temperature operating limit for each product. This would be in line with the long-standing method that NIOSH has required for SCBA for decades.

**3M Response:** This contradicts the performance requirements adopted by the Technical Committee on Protective Equipment for Fire Fighters for the 1987 edition of NFPA 1981. This performance requirement for SCBAs has been met by all manufactures for the last 34 years.

The current low temperature requirements in NFPA 1986 cause manufacturers to trade off performance capabilities in areas such as breathing and battery performance.

**3M Response:** SCBAs have been manufactured which meet these requirements for the past 34 years.

A vast number of users will never see conditions of -25°F and could benefit from a product designed for their environment which otherwise would not be possible with the current wording in NFPA 1986:2017.
3M Response: Please see the weather forecast for next week in Minneapolis MN where 3M is located. -15F is the low for next week. Temperatures of -25F and below have been experienced in the past as shown by the “coldest temperatures recorded” below. Respirators manufactured to the NFPA 1986 Standard will be used worldwide. We believe -25F is a reasonable, long established, and adequate temperature requirement to protect our end users.

The low temperature limit would be required to be stated in the User Instructions for each product so that a user would know the limitations for the product. It was identified in the development of NFPA 1987 that lens materials of classic firefighting style rigid masks vs. tactical use flexible facepieces would behave differently during the multitude of abrasion tests available. For this reason, the committee agreed to delineate these mask types from one another to allow for these differences. However, there is another main difference between the performance of flexible masks used today for tactical operations versus the rigid masks of classic firefighting SCBA. The flexible masks are typically designed and utilized for multiple mission types with the most common application being as an APR. These flexible APR style masks do typically have restrictions in the breathing path, either in the form of check valves or components to help with airflow management to aid in lessening in-mask fogging. When high flow rates such as NFPA testing rates of 103 lpm are combined with extremely cold temperatures, these airflow management restrictions can cause a slightly lower performance of air delivery.

3M Response: Pursuant to comments above, please see excerpt below from the attached ST53 product brochure. The ST53 SCBA utilizes the FM53 flexible facepiece.
When NFPA 1986:2017 was introduced, the extent of this phenomena may not have been fully understood or appreciated. As of October 2020, three years after the standard was released, there is still no approved product to this standard. However, if the manufacturers are allowed to define the low temperature operating limit of the product in accordance with NIOSH Industrial SCBA protocols in existence, this would be a major obstacle lifted and likely result in approved products available to the user community.

3M Response: The low temperature requirements are not a limiting factor for approval. 3M has passed the NFPA 1986 cold temperature testing requirements at Intertek for our submitted SCBA.

The draft standard of NFPA 1987 also currently has TC agreed language for the cold temperature testing limits to be defined by the manufacturer for each product so long as it is less than or equal to 0°F. It is anticipated that the SCBA portion of a CUR could also be used for NFPA 1986 applications and therefore these standards should align as closely as possible. The proposed limit on the manufacturer’s minimum temperature specification is consistent with the proposed criteria for NFPA 1987 CUR testing.

3M Response: The cold temperature requirements for NFPA 1987 were needed for the performance of the PAPR, not the SCBA.

Emergency Nature:

1. There is no emergency nature as it has been proven that it is possible to pass this minimum performance requirement.
2. Multiple performance levels for cold temperature within the same standard can result in end users inadvertently using products in environments outside of the products “designed performance range”. This is a minimum performance standard.

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 of the action.

In the original release of NFPA 1986, the committee did not realize the extent of breathing performance differences for tactical masks vs. traditional firefighting style masks. The user community wishes to utilize tactical mask styles and is still in heavy need of NFPA 1986 approved SCBA but still there is nothing approved to the standard now three years after its original release.

3M Response: There is no emergency nature as it has been proven that it is possible to pass the minimum performance requirements.
Without this change, the user community will be severely limited to the types of products they can use. If the committee waits until the next revision of the standard to enact this change, this could be several years away from taking effect as the dates are still uncertain for the next revision to NFPA 1986.

3M Response: We believe products will be available prior to the next revision.

The NFPA malgamation of standards efforts has moved NFPA 1986 around in the revision cycle and does not have a solid next revision date (as communicated to the TTO committee in Aug 2020 and again via email October 2020).

3M Response: The requestor of this TIA claims that its product meets 103 lpm with an environmental range of -30°C to +60°C [https://www.avon-protection.com/products/st53.htm](https://www.avon-protection.com/products/st53.htm)
NFPA Standards Council,

As a member of the Technical Committee and Technical Correlating Committee, I am submitting the following additional comment to the 3M Scott vote to support the Corelating Committee's actions and to respond to other public comments.

1. 3M has passed the NFPA 1986 cold temperature testing requirements at Intertek for our submitted SCBA.

2. The submitter of the TIA has NIOSH approval at -25F and has published product claims supporting use of their equipment at -25F. The submitter does not currently market a product with NFPA 1981 approvals to the fire services segment. This improper use of the TIA process could set a precedent for manufactures to weaken the test standards in order to certify products.

3. The reasons for the delay in full product certifications are not related to technical aspects of the NFPA 1986 standard but rather:
   a. NIOSH Testing prioritization
   b. NFPA Testing prioritization (NFPA 1981 Ed 2018 products took priority)
   c. Edgewood CBRN testing lab shutdown from March through September 2020 due to Pandemic
   d. Edgewood Lab reported equipment issues January 2021 with no estimated repair timeline.

3M's response to other public input:

“Contrary to the false representations in the comments of committee members, there are no NFPA 1986 approved products on the market that meet the needs of the law enforcement / tactical user groups.”

Response: All comments from 3M Scott are factual. 3M Scott has passed the NFPA 1986 cold temperature testing requirements at Intertek Test Labs.
“In response to the committees comment that there shouldn’t be differences between the 1981 and 1986 standards, the whole premise in having 1986 is to provide the tactical and technical user with an alternative SCBA option. A different type of product. This requires a different kind of standard with differences between the tests.”

Response: 3M Scott agrees that SCBA certified to NFPA 1981 and 1986 standards are different products and have different attributes. We are disagreeing that there should be a lesser performance requirement for temperatures encountered by users of these products.

“As an end user, in a TACTICAL/TECHNICAL not structural firefighting environment I want a mask/facepiece that is flexible, form fitting to the face, provides reduced eye relief when sighting a weapon, etc. Firefighting facepieces that meet the cold temperature testing are historically rigid masks with very large plastic or glass lenses that do not accommodate a tactical / technical user. We wish to have the flexibility to purchase and use a slimmer fitting, more comfortable mask that can be found in a tactical respirator. “

Response: 3M Scott have worked diligently with numerous Law Enforcement agencies over the last several years, including, but not limited to the United States Secret Service (USSS), New York Police Department (NYPD) (to include Emergency Services Unit, Counter Terrorism Unit, and Bomb Squad), and several others to develop equipment that both meets the current NFPA 1986 standard and the end user’s requirements.

“The cold weather challenge to tactical SCBA’s is too extreme. The bottom line is this... there is no way an end user can don an SCBA that has cold soaked to -25F and operate the unit. The -25F facepiece and -25F air would severely damage the users skin.”

Response: The submitter of this TIA claims to have passed NIOSH’s “Determination of Low Temperature Operation – Minimum Temperature per Applicant, Open-Circuit, Self-Contained Breathing Apparatus” See NIOSH test procedure RCT-ASR-STP-0118 . This involves testing where the SCBA is conditioned at -25F for 4 hours and then donned by the human test subject in a -25F chamber for evaluation. This contradicts the paragraph above and demonstrates that the -25F parameter can be met by different facepiece types.

https://www.avon-protection.com/products/st54.htm

The submitter of the TIA's NIOSH approval lists -25F as the approved low operating temperature.
“The respirator must warm up slightly to even be donned by the user and operate. So why not let the tactical users select a respirator that meets our needs and work with the manufacturers to get a product that meets our needs.”

Response: This statement implies that other products, designed with input from tactical users, that are able to also meet the low temperature requirements agreed to by the Technical Committee, of which the submitter is a member, should not have invested in development to meet the test requirements. This dissuades future research & development into high performance products, proposing to place the burden on the users. While the user making this comment may possess the expertise to make these determinations, this is not reflective of universal user needs. Most generally prefer that the standards ensure performance in cold temperatures.

“The TIA doesn’t propose no cold soaking, it merely states the minimum be raised to -OF and have the manufacturer disclose any temperatures below that number. I hope that the vocal minority opposition to the TIA doesn’t derail the process for the very large quiet majority of users who wish to have this change occur.”

Response: As a manufacturer and part of the minority opposing this TIA, we find it unusual to want to lessen the minimum performance requirements to benefit one manufacturer.

The requestor of this TIA claims that its product meets 103 lpm with an environmental range of -30C to +60C https://www.avon-protection.com/products/st53.htm

We strongly request that the Standards Council NOT issue TIA 1545.

Thank you

John

John Morris
Senior Certification Engineer
3M Personal Safety Division
The public comment circulation has passed, therefore, according to 5.6(b) in the NFPA Regs, the final results show this TIA \textbf{HAS NOT} achieved the \( \frac{3}{4} \) majority vote needed on both Ballot Item No. 1 (Correlation Issues) and Ballot Item No. 2 (Emergency Nature).

There are two criteria necessary to pass ballot [(1) simple majority (2) affirmative vote of \( \frac{3}{4} \) of ballots received]. 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.
   \[
   \text{[27 eligible} ÷ 2 = 13.5 = (14)]
   \]

2. The number of affirmative votes needed to satisfy the \( \frac{3}{4} \) requirement is \textbf{17 for Correlation Issues} and \textbf{16 for Emergency Nature}.
   - **Correlation Issues:** (27 eligible to vote - 4 not returned - 1 abstentions = 22 \times 0.75 = 16.5)
   - **Emergency Nature:** (27 eligible to vote - 4 not returned - 2 abstentions = 21 \times 0.75 = 15.75)

   Ballot comments are attached for your review.

The \textit{Regs} at 1.6.2.(c) state: An appeal relating to a proposed Tentative Interim Amendment that has been submitted for processing pursuant to Section 5.2 shall be filed no later than 5 days after the notice of the TIA final ballot results are published in accordance with 4.2.6.

**Appeal Closing Date** for this TIA is \textbf{Monday, March 29, 2021}.
I AGREE there are no CORRELATION ISSUES in accordance with 3.4.2 and 3.4.3 of the NFPA Regs.

Eligible to Vote: 27
Not Returned: 4
Cristine Z. Fargo, Jeff Legendre, Edmund Farley, Ronald Johnston

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<td>Agree</td>
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<tr>
<td>Joseph Arrington</td>
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<tr>
<td>Amanda H. Newsom</td>
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<td>David G. Matthews</td>
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<tr>
<td>Diane B. Hess</td>
<td></td>
<td>Agree with the technical merits of the proposed TIA</td>
</tr>
<tr>
<td>Thomas M. Hosea</td>
<td></td>
<td>I agree.</td>
</tr>
<tr>
<td>Beth C. Lancaster</td>
<td></td>
<td>Agree.</td>
</tr>
<tr>
<td>Jonathan V. Szalajda</td>
<td></td>
<td>agree</td>
</tr>
<tr>
<td>Jeffrey O. Stull</td>
<td></td>
<td>Agree</td>
</tr>
<tr>
<td>William A. Van Lent</td>
<td></td>
<td>AGREED</td>
</tr>
<tr>
<td>Bruce H. Varner</td>
<td></td>
<td>agree</td>
</tr>
<tr>
<td>Robert D. Tutterow, Jr.</td>
<td></td>
<td>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.</td>
</tr>
</tbody>
</table>

Benjamin Mauti: Agree no correlation issues
Dick Weise: Agree
James B. Area: A
Donald B. Thompson: Agree.
Rick L. Swan: Agree. Since this language is currently in NFPA 1987, this will not cause correlation issues in my opinion.

DISAGREE
Karen E. Lehtonen

While I have not had the benefit of the TC discussion on the justification for this change, it does not correlate with existing NFPA Test Methods for respiratory protection. I would not expect Tactical and Technical Operations to occur in climates any different than Firefighting.

Michael F. McKenna

After re-reading the TIA, I am in disagreement and as a former end user I believe it is important that the equipment should be tested in the harshest circumstances to provide a margin of safety for the end user. I believe that testing conditions should be the same for both 1981 and 1986.

Harry P. Winer

I disagree, the current requirement has been around for over 30 years and it can be met by manufacturers. Letting the manufacturer select the temperature they want to test at is totally irresponsible. This requirement change may lead to injuries when the unit fails in the cold.

Douglas Menard

I agree with Judge Morgan and Tim West’s, from the technical committee, assessment to disagree with this TIA. As an end user I believe the equipment we use should be tested to the harshest possible conditions encountered. I also believe this standard should correlate with the temperatures being tested within the 1981 standard.

John H. Morris

1. This TIA creates a different performance requirement than what has been established and followed for the past 34 years in NFPA 1981. 2. This performance requirement for SCBAs has been met by ALL manufacturers for the last 34 years in NFPA 1981. See Attached.

ABSTAIN

Stephen R. Sanders

I wish to abstain based upon SEI's position as a certification organization.

I AGREE that the subject is of an EMERGENCY NATURE for one or more of the reasons noted in the Instructions box.

Eligible to Vote: 27
Not Returned: 4
Cristine Z. Fargo, Jeff Legendre, Edmund Farley, Ronald Johnston

<table>
<thead>
<tr>
<th>Vote Selection</th>
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<th>Comments</th>
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</thead>
<tbody>
<tr>
<td>AGREE</td>
<td>15</td>
<td></td>
</tr>
</tbody>
</table>

- Joseph Arrington: Agree
- Amanda H. Newsom: F
- David G. Matthews: A
- Diane B. Hess: F
- Beth C. Lancaster: F
- Jonathan V. Szalajda: agree
- Jeffrey O. Stull: A
- William A. Van Lent: F
- Bruce H. Varner: A
- Robert D. Tutterow, Jr.: 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.

- Benjamin Mauti: F
- Dick Weise
- James B. Area: A
- Donald B. Thompson: Agree
- Rick L. Swan: 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.
Karen E. Lehtonen

It appears meeting this requirement is technically feasible as there is a product meeting the requirement. Having a variable requirement could also be confusing to the end user and their expectations on operating range. Simply having the operating range in the user information and not on the product itself could create a hazard.

Thomas M. Hosea

This TIA relaxes a standard requirement based on the premise the NFPA 1986 cold weather requirement cannot be met, or that there are considerable trade-offs which should left to procurement authority. It is conceivable gear specified by a purchase authority in one region could be deployed to another, much colder location in the event of a crisis. This situation could create increased risk to end users and warrants further TC discussion as there is, apparently, a potential market place solution to meet this requirement should there be sufficient demand for an NFPA1986 SCBA.

Michael F. McKenna

I do not believe that this is of emergency nature. No formal information was provided to substantiate emergency nature.

Harry P. Winer

There is no emergency nature since manufacturers can meet the requirement of the standard.

Douglas Menard

As stated above. I agree with Judge Morgan and Tim West’s, from the technical committee, assessment to disagree with this TIA. As an end user I believe the equipment we use should be tested to the harshest possible conditions encountered. I also believe this standard should correlate with the temperatures being tested within the 1981 standard.
John H. Morris

1. There is no emergency nature as it has been proven that it is possible to pass this minimum performance requirement. 2. Multiple performance levels for cold temperature within the same standard can result in end users inadvertently using products in environments outside of the products “designed performance range”. This is a minimum performance standard and should not allow manufactures to choose performance levels. See Attached.

ABSTAIN

Jason L. Allen
Stephen R. Sanders

2

I wish to abstain based upon Intertek's position as a independent testing organization.
I wish to abstain based upon SEI's position as a certification organization.
I **DISAGREE** that there are no **CORRELATION ISSUES** in accordance with 3.4.2 and 3.4.3 of the NFPA Regs

1. This TIA creates a different performance requirement than what has been established and followed for the past 34 years in NFPA 1981.
2. This performance requirement for SCBAs has been met by ALL manufacturers for the last 34 years in NFPA 1981.

I **DISAGREE** that the subject is of an **EMERGENCY NATURE** for one or more of the reasons noted in the Instructions box.

1. There is no emergency nature as it has been proven that it is possible to pass this minimum performance requirement.
2. Multiple performance levels for cold temperature within the same standard can result in end users inadvertently using products in environments outside of the products “designed performance range”. This is a minimum performance standard and should not allow manufactures to choose performance levels.

**CORRELATION ISSUES:** Please note comments in red below.

The committee should consider removing the fixed cold temperature requirement and instead allow each manufacturer to individually specify the low temperature operating limit for each product. This would be in line with the long-standing method that NIOSH has required for SCBA for decades.

**3M Response:** This contradicts the performance requirements adopted by the Technical Committee on Protective Equipment for Fire Fighters for the 1987 edition of NFPA 1981. This performance requirement for SCBAs has been met by all manufactures for the last 34 years.

The current low temperature requirements in NFPA 1986 cause manufacturers to trade off performance capabilities in areas such as breathing and battery performance.

**3M Response:** SCBAs have been manufactured which meet these same requirements in NFPA 1981 for the past 34 years.

A vast number of users will never see conditions of -25°F and could benefit from a product designed for their environment which otherwise would not be possible with the current wording in NFPA 1986:2017.

**3M Response:** Temperatures of -25°F and below are not uncommon low temperatures. Respirators manufactured to the NFPA 1986 Standard will be used worldwide. We believe -25°F is a reasonable, long established, and adequate temperature requirement to protect our end users and correlates to the requirements in NFPA 1981.
Emergency Nature:

1. There is no emergency nature as it has been proven that it is possible to pass this minimum performance requirement.
2. The low temperature requirements are not a limiting factor for approval. 3M has passed the NFPA 1986 cold temperature testing requirements at Intertek for our submitted SCBA.
3. Multiple performance levels for cold temperature within the same standard can result in end users inadvertently using products in environments outside of the products “designed performance range”. This is a minimum performance standard.

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 of the action. In the original release of NFPA 1986, the committee did not realize the extent of breathing performance differences for tactical masks vs. traditional firefighting style masks. The user community wishes to utilize tactical mask styles and is still in heavy need of NFPA 1986 approved SCBA but still there is nothing approved to the standard now three years after its original release.

3M Response: There is no emergency nature as it has been proven that it is possible to pass the minimum performance requirements.

Without this change, the user community will be severely limited to the types of products they can use. If the committee waits until the next revision of the standard to enact this change, this could be several years away from taking effect as the dates are still uncertain for the next revision to NFPA 1986.

3M Response: We believe products will be available prior to the next revision.

The NFPA malgamation of standards efforts has moved NFPA 1986 around in the revision cycle and does not have a solid next revision date (as communicated to the TTO committee in Aug 2020 and again via email October 2020).

3M Response: The requestor of this TIA claims that its product meets 103 lpm with an environmental range of -30C to +60C  https://www.avon-protection.com/products/st53.htm
NFPA Standards Council,

As a member of the Technical Committee and Technical Correlating Committee, I am submitting the following additional comment to the 3M Scott vote to support the Corelating Committee’s actions and to respond to other public comments.

1. 3M has passed the NFPA 1986 cold temperature testing requirements at Intertek for our submitted SCBA.
2. The submitter of the TIA has NIOSH approval at -25F and has published product claims supporting use of their equipment at -25F. The submitter does not currently market a product with NFPA 1981 approvals to the fire services segment. This improper use of the TIA process could set a precedent for manufacturers to weaken the test standards in order to certify products.
3. The reasons for the delay in full product certifications are not related to technical aspects of the NFPA 1986 standard but rather:
   a. NIOSH Testing prioritization
   b. NFPA Testing prioritization (NFPA 1981 Ed 2018 products took priority)
   c. Edgewood CBRN testing lab shutdown from March through September 2020 due to Pandemic
   d. Edgewood Lab reported equipment issues January 2021 with no estimated repair timeline.

3M’s response to other public input:

“Contrary to the false representations in the comments of committee members, there are no NFPA 1986 approved products on the market that meet the needs of the law enforcement / tactical user groups.”

Response: All comments from 3M Scott are factual. 3M Scott has passed the NFPA 1986 cold temperature testing requirements at Intertek Test Labs.
“In response to the committees comment that there shouldn’t be differences between the 1981 and 1986 standards, the whole premise in having 1986 is to provide the tactical and technical user with an alternative SCBA option. A different type of product. This requires a different kind of standard with differences between the tests.”

Response: 3M Scott agrees that SCBA certified to NFPA 1981 and 1986 standards are different products and have different attributes. We are disagreeing that there should be a lesser performance requirement for temperatures encountered by users of these products.

“As an end user, in a TACTICAL/TECHNICAL not structural firefighting environment I want a mask/facepiece that is flexible, form fitting to the face, provides reduced eye relief when sighting a weapon, etc. Firefighting facepieces that meet the cold temperature testing are historically rigid masks with very large plastic or glass lenses that do not accommodate a tactical / technical user. We wish to have the flexibility to purchase and use a slimmer fitting, more comfortable mask that can be found in a tactical respirator. “

Response: 3M Scott have worked diligently with numerous Law Enforcement agencies over the last several years, including, but not limited to the United States Secret Service (USSS), New York Police Department (NYPD) (to include Emergency Services Unit, Counter Terrorism Unit, and Bomb Squad), and several others to develop equipment that both meets the current NFPA 1986 standard and the end user’s requirements.

“The cold weather challenge to tactical SCBA’s is too extreme. The bottom line is this... there is no way an end user can don an SCBA that has cold soaked to -25F and operate the unit. The -25F facepiece and -25F air would severely damage the users skin.”

Response: The submitter of this TIA claims to have passed NIOSH’s “Determination of Low Temperature Operation – Minimum Temperature per Applicant, Open-Circuit, Self-Contained Breathing Apparatus” See NIOSH test procedure RCT-ASR-STP-0118 . This involves testing where the SCBA is conditioned at -25F for 4 hours and then donned by the human test subject in a -25F chamber for evaluation. This contradicts the paragraph above and demonstrates that the -25F parameter can be met by different facepiece types.

https://www.avon-protection.com/products/st54.htm

The submitter of the TIAs NIOSH approval lists -25F as the approved low operating temperature.
“The respirator must warm up slightly to even be donned by the user and operate. So why not let the tactical users select a respirator that meets our needs and work with the manufacturers to get a product that meets our needs.”

Response: This statement implies that other products, designed with input from tactical users, that are able to also meet the low temperature requirements agreed to by the Technical Committee, of which the submitter is a member, should not have invested in development to meet the test requirements. This dissuades future research & development into high performance products, proposing to place the burden on the users. While the user making this comment may possess the expertise to make these determinations, this is not reflective of universal user needs. Most generally prefer that the standards ensure performance in cold temperatures.

“The TIA doesn’t propose no cold soaking, it merely states the minimum be raised to -0F and have the manufacturer disclose any temperatures below that number. I hope that the vocal minority opposition to the TIA doesn’t derail the process for the very large quiet majority of users who wish to have this change occur.”

Response: As a manufacturer and part of the minority opposing this TIA, we find it unusual to want to lessen the minimum performance requirements to benefit one manufacturer.

The requestor of this TIA claims that its product meets 103 lpm with an environmental range of -30C to +60C https://www.avon-protection.com/products/st53.htm

We strongly request that the Standards Council NOT issue TIA 1545.

Thank you

John

John Morris
Senior Certification Engineer
3M Personal Safety Division
Dear Corelating Committee,

As a member of the Technical Committee, an end user of the product, and joint submitter of the TIA, I am submitting the following public comment on the Corelating Committee’s actions.

As an end user, in a tactical organization not a structural firefighting organization, WE WANT THIS TIA.

Contrary to the false representations in the comments of committee members, there are no NFPA 1986 approved products on the market that meet the needs of the law enforcement / tactical user groups. In response to the committees comment that there shouldn’t be differences between the 1981 and 1986 standards, the whole premise in having 1986 is to provide the tactical and technical user with an alternative SCBA option. A different type of product. This requires a different kind of standard with differences between the tests.

There are a number of misrepresentations of the facts as presented by the comments on both the Technical Committee and Corelating Committee’s ballots that are posted for public view. The disagreement on the validity of the corelating and emergency nature of the TIA boils down to a very simple matter. One manufacturer trying to block another manufacturer’s product from reaching the end user market. This is very disappointing to me. I can also see from the corelating committees comments that a number of votes have changed. I can only wonder if members of the committee are being improperly influenced by manufacturers to change their votes.

As an end user, in a TACTICAL/TECHNICAL not structural firefighting environment I want a mask/facepiece that is flexible, form fitting to the face, provides reduced eye relief when sighting a weapon, etc. Firefighting facepieces that meet the cold temperature testing are historically rigid masks with very large plastic or glass lenses that do not accommodate a tactical / technical user. We wish to have the flexibility to purchase and use a slimmer fitting, more comfortable mask that can be found in a tactical respirator.
don an SCBA that has cold soaked to -25F and operate the unit. The -25F facepiece and -25F air would severely damage the users skin. The respirator must warm up slightly to even be donned by the user and operate. So why not let the tactical users select a respirator that meets our needs and work with the manufacturers to get a product that meets our needs. The TIA doesn't propose no cold soaking, it merely states the minimum be raised to -0F and have the manufacturer disclose any temperatures below that number.

I hope that the vocal minority opposition to the TIA doesn't derail the process for the very large quiet majority of users who wish to have this change occur.

In conclusion, the tactical/technical end users do feel that there are no corelating issues with this proposed TIA and this is of an emergency nature.

Sincerely,

Brian Clifford

Sent from iCloud
I am writing to urge that the Standards Council issue TIA 1545 on NFPA 1986.

As a member of the Technical Committee (TC), I know that this TIA was submitted to correct an omission that should have been taken care of during the original development of the standard. Every single user on the TC voted in favor of the TIA. In fact, except for two voters that disagreed at the TC level (both of which are competitive manufacturers to the submitter of the TIA), the TIA resoundingly passed.

False statements have been made by negative voters as to the existence of products that meet the requirements within NFPA 1986 as written. The truth is that to date there have been no products that have been certified to the NFPA 1986 standard, which was first issued at the end of 2016 (2017 edition). This leaves end users, primarily law enforcement and military response organizations, that are reliant on SCBA for tactical and technical operations to either use non-certified products or to use existing NFPA 1981 SCBA that have features that are not suitable for the non-firefighting environment that they operate in. This does constitute the basis of why there is an emergency situation that must be addressed.

Furthermore, as a member of the Correlating Committee I believe that the preliminary finding that there is a correlation issue is not correct. The Correlating Committee has not taken into account that the companion document being developed, NFPA 1987 (Standard on Combination Unit Respirator Systems for Tactical and Technical Operations), has the same exact requirement as being proposed as an amendment to this standard. This is not a coincidence, but rather further evidence that the original language was an error.

Again, I strongly ask that the Standards Council agree to issue TIA 1545.

Respectfully,
Beth Lancaster
JPM CBRN Protection
UIPE FoS Glove
The law enforcement and tactical community desperately needs an SCBA certified to NFPA 1986 / NIOSH CBRN that meets the law enforcement tactical and technical needs. No current SCBA has been certified to the standard that meets the community’s needs.

VR,

Carl Makins
Bomb Squad Sgt / SWAT Operator
Charleston County Sheriff’s Office

--

The height of your accomplishments will equal the depth of your convictions.

William F. Scolavino
Foran, Rosanne

From: CRAIG ADAMS
Sent: Monday, March 15, 2021 4:15 PM
To: Shared TIAs
Subject: TIA

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Law enforcement needs and wants to have a certified NFPA SCBA, and the TIA offers a pathway for that to happen.

Sent from my iPad
CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

NFPA Standards Council,

I am in support of the TIA 1545 and recommend removing all non factual comments. The NFPA 1986 and 1987 standards are critical to the operation needs of Tactical Law Enforcement and blended Responder teams. Their equipment needs and the relevant standards are often times NOT the same as Structural Fire Fighting or other endeavors requiring similar Respiratory Protection. Therefore the end user community should have always have the final say as to their needs, and NOT those uninformed or lacking first hand knowledge of the operational differences encountered by the that community. 20 years operating with Tactical Law Enforcement underlined what I learned supporting Law Enforcement with Fire Service SCBA (NFPA 1981, compliant). They needed something different!

When choosing a tool for a job, one must weight the capabilities versus the trade offs offered by those tools. This is one of those cases. The ability to operate at extremely low temperatures is one of those trade offs. If the user community (reflected, I believe in the TC Vote) is comfortable with the difference in low temperature operating limits, then so be it. They have made an informed decision.

I dont believe there are correlating issues or concerns with this decision. In North Texas we have NEVER seen the low temperatures discussed in this TIA, and frankly don't expect to see them. Therefore we would embrace the improved normal temperature performance over extreme cold weather operational capabilities.

NFPA standards have always been considered a minimum standard, not the maximum capability that a manufacturer could provide. Some manufacturers have provided minimally compliant product to the marketplace, while others have provided highly capable products to the same end user base. The beauty of this has been the Capitalist nature of our purchasing environment, you get what you pay for, and can get products with enhanced capabilities if one can allocate the funds.

I appreciate the opportunity to comment, Thanks,

Steve Townsend
Carrollton Fire Rescue
Dear Ms. Foran:

This communication is a public comment supporting the adoption of TIA 1545 that addresses modifications to NFPA 1986, Standard on Respiratory Protection Equipment for Tactical and Technical Operations.

The Standards Council has the unique opportunity to prevent a potential injustice from occurring within its standards development process if they move forward with the agreement to issue the proposed amendment. The voting record on this TIA is peculiar in that the Technical Committee voted with the large majority to approve the amendment both on technical merit and emergency nature, whereas the Correlating Committee had sufficient negative votes on both correlation and emergency nature to represent a failing ballot on both issues.

The development of NFPA 1986 represents the first standard for addressing law enforcement and military-oriented PPE products. In fact, the formation of the Technical Committee on Tactical and Technical Operations Respiratory Protection Equipment was an attempt by NFPA to encourage the participation of law enforcement/military interests within the NFPA system of standards. As a relatively new committee under the fire and emergency services protective clothing and equipment project, this committee sought to create a respiratory protective equipment standard that would specifically address the types of product concerns that law enforcement and military operators (as well as other non-fire service interests) face in using respiratory protective equipment. Unfortunately, the expedient path taken was principally to adopt many of the same requirements that appear in NFPA 1981, removing those criteria that were distinctly unneeded by this user group (for example, the provision for audible alarms). As a consequence, this resulted in the current error within the standard that would be rectified by the proposed TIA.

The statement that other technology is available that meets the current 2017 edition requirements of NFPA 1986 is patently untrue in the fact that there are no current SCBA to have been certified to the standard since its adoption in late 2016. This is particularly problematic because certain other NFPA standards, namely NFPA 1994 for CBRN/Hazmat protective ensembles, require the use of certified SCBA as part of the overall certified ensemble. Hence, there is a dire need for this product to be in place for those operators with special mission needs that are different from those addressed in the NFPA 1981 standard that focuses on firefighter protection.

The issue of correlation has been completely mischaracterized by some voters. The fact that it is the opinion of some members that NFPA 1981, representing fire service use, and NFPA 1986, representing other than fire service use, should be the same is misguided. This is for two reasons: (1) the end user community members participating in the technical committee have the right to assert their interpretation of the hazard assessment, which should be the basis for the design and performance criteria they establish within the standard; therefore, there is not a necessary correlation with the fire service-based hazard assessment for NFPA 1981; and (2) the Technical Committee responsible for NFPA 1986 has already endeavored to use the same language as provided in the proposed amendment as part of the same requirements in its related standard of NFPA 1987, Standard on Combination Unit Respirator Systems for Tactical and Technical Operations, and thus essentially has correspondence of criteria within its own technical committee’s suite of standards. Therefore, at least in my opinion, there is no correlation issue evident in this proposal.
It is my hope that the proposed TIA is approved by the Standards Council for the above reasons.

Jeffrey O. Stull

International Personnel Protection, Inc.

Correspondence: P. O. Box 92493, Austin, TX 78709

Shipping: 7809 Adelaide Drive, Austin, TX 78739

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Hello

I am writing this comment of support of NFPA 1986 TIA LOG 1545. The DoD needs and wants to have certified tactical NFPA SCBA and this TIA addresses a valid need.

V/r
Robin Childs
I am writing to urge that the Standards Council issue TIA 1545 on NFPA 1986.

As a former user, who is now directly responsible for writing requirements and overseeing the procurement of this type of equipment, I know that this TIA should have been approved by all members of the correlating committee and that it will not have any negative effects on NFPA 1981. As a matter of fact, I personally gave a presentation to the NIOSH CBRN Working Group about combination and hybrid breathing apparatus during the winter of 2008 in Pittsburg. NFPA 1986 and 1987 have been discussed for well over a decade and they are greatly needed in the law enforcement and military communities, which is where the certified products will be utilized. Technology has advanced to the point that we can no longer continue down the path of using non-certified products and utilizing workarounds for the procurement of these items.

To date there have been no products that have been certified to the NFPA 1986 standard, which was first issued toward the end of 2016. This leaves end users, primarily law enforcement and specialized military units, that are reliant on SCBAs for tactical and technical operations to either use non-certified products or to use existing NFPA 1981 SCBA that have features that create safety hazards for these users. PASS devices are a major problem for stealth/tactical operations where silence is critical.

Furthermore, the correlating committee has failed to take into account that the companion standard being developed, NFPA 1987 (Standard on Combination Unit Respirator Systems for Tactical and Technical Operations), has the same exact requirement as being proposed as an amendment to this standard.

I strongly urge that the Standards Council agree to issue TIA 1545.

Respectfully,

Jon Nelson

CRE PPE | UIPE FoS Gloves, JPM CBRN Protection
Mrs. Foran,
I submitted my comments regarding the NFPA 1986 TIA log 1545 FAE-TTO but do not see them on the list of comments, nor did I receive an email confirming the submission. My comments are below, if it is not too late; I am sorry for the confusion. I can be reached at the cell number in my signature line for further questions, thank you in advance for helping me square this.

I am in support of the TIA and am refuting these comments that are not factual

It was identified in the development of NFPA 1987 (Combination Respirator Standard) that flexible masks used today for tactical operations versus the rigid masks of classic firefighting SCBA have check valves or components to help with airflow management to aid in lessening in-mask fogging. When high flow rates such as NFPA testing rates of 103 lpm are combined with extremely cold temperatures, these airflow management restrictions can cause a slightly lower performance of air delivery. Because of this there is still no approved product to NFPA 1986 end users are forced to use NFPA 1981 SCBA. However, if the manufacturers are allowed to define the low temperature operating limit of the product in accordance with NIOSH there could be a NFPA 1986 certified tactical SCBA. The draft standard of NFPA 1987 already has this language and since the SCBA portion of a CUR will also be used for NFPA 1986 applications the standards should align as closely as possible.

Very Respectfully,
Master Sergeant
Gary Beals
Platoon Commander CBRN Alpha
Chemical Biological Incident Response Force
1) Name: Clint Mayhue  
   Affiliation: Avon Protection Systems  
   Member of FAE-TTO; FAE-RPE; & FAE-ELS Technical Committees  
   Office address:  
   8140 Corporate Drive  
   Suite 300  
   Baltimore, MD 21236

2) Statement identifying the particular action to which the appeal relates

This appeal relates to the recent split decision occurring from the balloting of TIA 1545. The TC voted in the affirmative on both Technical Merit and Emergency Nature. The CC voted in the affirmative on Correlation but missed passing on Emergency Nature by getting 15 of the 15.75 required votes.

3) Argument setting forth the grounds for appeal

TIA 1545 moves the minimum temperature requirement in line with current language in the second draft NFPA 1987 (CUR) and the draft next edition of NFPA 1986. The user community continues to demand tactical style masks for their missions. Such masks can provide more flexibility in protection types (for example the ability to be used with filters as well as self-contained breathing apparatus) and are optimized for integration with tactical apparel and for tasks such as weapon sighting. To meet the needs of this user group, tactical masks therefore typically have connection ports on the left and/or right-hand side rather than at the front and have a flexible construction rather than the large, rigid visors used in the fire and industrial communities. This results in tradeoffs related to currently specified NFPA cold tests which require a 103 lpm breathing machine test following 12-hour cold soaks at -25°F as part of the test regime.

Regarding correlation:

- The FAE-TTO Tactical and Technical Operations Respiratory Protection Equipment TC was created to develop standards for the Law Enforcement (LE) community since their needs, challenges, and operating scenarios are quite different than the Firefighting community represented through the FAE-RPE TC.
- The TTO TC is currently responsible for two standards: NFPA 1986 and NFPA 1987. Both standards are written for Tactical and Technical Operations.
- The proposed TIA (1545) matches what is currently written in NFPA 1986 draft out for second draft public comment which allows for a 0°F minimum temperature requirement.
- The TIA also falls in line with current NFPA 1987 draft language for Combination Unit Respirators (CUR) which allows for a 0°F minimum temperature requirement.
Regarding the emergency nature:

- The Emergency Nature selection of responses can fall into more than one of the categories but selection ‘F’ is the most appropriate:
  *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.*
- The NFPA 1986 standard was first released as the 2017 edition with an effective date of December 1, 2016. **Over 4 years** after the release of the standard, and as of the writing of this appeal on March 29, 2021 there are still no products **certified to NFPA 1986**.
- Products such as the ST53 SCBA have been deployed by the LE user community since at least 2009 and these products carry a NIOSH SCBA approval. These NIOSH approvals state a manufacturer defined low temperature operating limit as required by NIOSH.
- Certain grant funding requires the recipient to buy CBRN approved SCBA to receive funding. LE Users CANNOT currently purchase a NIOSH SCBA CBRN approved product since this certification also requires NFPA 1986 approval. The only way around this is for LE and other tactical end users to purchase a system approved to NFPA 1981 for structural firefighting use which defeats the purpose of creating the unique NFPA 1986 standard for this specific user community.
- In order for tactical users to use SCBA units with certified NFPA 1994 Class 1 and 2 Hazmat/CBRN ensembles (which include the suit, gloves, footwear, and respirators that provide full system protection), the SCBA must be compliant to NFPA 1986. Therefore, no approvals are currently in place for these ensembles due to the inability of current SCBA with tactical flexible facepieces to meet the 1986 standard. Users are forced to utilize equipment combinations to meet critically important mission requirements, without official testing and certification, raising safety, legality and procurement funding issues.
- The majority of negative votes on Emergency Nature from the CC (4 out of 6) indicate they believe the reason this is not an Emergency is that the requirements of the current cold test can be achieved. This is because one manufacturer has shown test data which suggests they have passed this test. While no information was given on the model tested, it is anticipated that this product does not utilize a tactical style flexible mask, which is the subject of this TIA. We agree this test can be passed if a manufacturer utilizes a rigid visor, center mounted firefighting style mask as has traditionally been done in NFPA 1981. Rigid firefighting masks with front modules are more conducive to passing cold temperature testing and have a long history of performing well from all SCBA manufacturers. However, it has been noted several times over the many years of the TTO TC's history, plus in the recent public comments, that end users need a flexible tactical mask for missions that require the capability of sighting a weapon.
4) **Statement of the precise relief requested**

We request the Standards Council to listen to the needs of the users within the law enforcement community. We believe the CC was not fully informed of the reasons for and impacts of mask type differences when stating ‘if one product type can pass this test then it is not an emergency’. The user community has spoken loudly through a variety of public comments about their desire to have a fully approved and certified SCBA system which is designed for their unique missions and compatible with their ensembles. Without this TIA passing, it will be additional years until the LE market is able to purchase products and receive grant money for the products that adequately meet their mission requirements.

5) A hearing on the subject is respectfully requested. Thank you.
1. Name, Organization and Address.
   John Morris
   3M
   4320 Goldmine Road
   Monroe, NC 28110

2. Action to Which Appeal Relates.
   This appeal is made under Section 1.6 of the “Regulations Governing the Development of NFPA Standards”. This appeal opposes the adoption of the proposed TIA No. 1545 to NFPA 1986, “Standard on Respiratory Protection Equipment for Tactical and Technical Operations”.

3. Arguments Setting Forth Grounds for Appeal.
   a. TIA did not meet the minimum requirements to be advanced for consideration.
      The TIA did not meet the minimum requirements for advancement to the Technical Committee under Paragraph 5.3 of Section 5 of the Regulations Governing the Development of NFPA Standards. The assertions made in the TIA are not supported by facts. The TIA stated that it is addressing an issue that was overlooked in the NFPA 1986 standard. That assertion is contrary to base facts. NFPA 1986, as a SCBA performance standard, set the cold temperature performance to correlate with the existing NFPA 1981 SCBA standard. This performance requirement for SCBAs has been met by ALL manufacturers claiming approval to NFPA 1981 for the last 34 years.

      Clint Mayhue, Avon Protection Systems states on page 3 of TIA 1545 “When high flow rates such as NFPA testing rates of 103 lpm are combined with extremely cold temperatures, these airflow management restrictions can cause a slightly lower performance of air delivery”. A manufacturer’s inability to “manage airflow restriction” should not constitute reason to change the minimum performance level of the standard.

   b. 5.4 Evaluation of Emergency Nature
      (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.”

      The TIA asserts that it was advanced because of the emergency nature of the issue at hand. Again, this is contrary to base facts. The TIA itself claims it “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 of the action.” Sections 8.2.5.5, 8.2.5.7, 8.2.5.8, 8.23.5.4 through 8.23.5.6 and 8.23.5.7 of NFPA 1986 have NOT been revised. They are the original requirements in 1986 which all members of the Technical Committee, including the submitter of the TIA, agreed should and could be met.
There is no emergency nature as it has been proven that it is possible to pass this minimum performance requirement. Please note the compliant status of the section 8.2 testing in the Intertek Test Report for 3M Scott.

By failing to address any new issue and failing to address any emergency, the TIA failed to meet the minimum requirements for it to be advanced to the Technical Committee for consideration.
Additionally, Clint Mayhue, Avon Protection Systems claims on page 3 of TIA 1545 “When NFPA 1986:2017 was introduced, the extent of this phenomena may not have been fully understood or appreciated. As of October 2020, three years after the standard was released, there is still no approved product to this standard. “

Please note the completion date on the Intertek test report of March 23, 2020. The reasons for the delay in full certification are not related to the NFPA 1986 standard but rather:

a. NIOSH Testing prioritization.
b. NFPA Testing prioritization (NFPA 1981 Ed 2018 products took priority)
c. Edgewood CBRN testing lab shutdown from March through September 2020 due to Pandemic
d. Edgewood Lab equipment failure January 2021 with no estimated repair timeline.

4. Precise Relief Requested. The relief requested is for the Standards Council to decline to advance the TIA.
   This improper use of the TIA process could set a precedent for manufactures to weaken the test standards to certify products.

5. Hearing. A hearing on this appeal is requested.

Thank you

John Morris

John Morris

3M Science. 
Applied to Life.

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