### Standards Council Meeting
#### SUPPLEMENTAL AGENDA

**Boston Marriott Quincy**  
1000 Marriott Drive  
Quincy, MA 02169  
(617) 472-1000  

**August 13-15, 2018**

<table>
<thead>
<tr>
<th><strong>18-8-1</strong></th>
<th>Act on the issuance of NFPA 13, <em>Standard for the Installation of Sprinkler Systems</em>, with an issuance date of August 14, 2018 and an effective date of September 3, 2018, as acted on at the NFPA Technical Meeting, with six amendments and one appeal.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>18-8-1-a</strong></td>
<td>Amendment No. 13-1 (CAM 13-1): Accept Public Comment No. 54. CAM 13-1 passed on the floor of the NFPA Technical Meeting. <strong>PASSED</strong> TC Ballot – 33 voting members/17 agree/8 disagree/0 abstained/8 ballots not returned and <strong>PASSED</strong> CC Ballot – 20 voting members/10 agree/1 disagree/0 abstained/9 ballots not returned. See Attachment 18-8-1-a [SA18-8-1-a]</td>
</tr>
<tr>
<td><strong>18-8-1-b</strong></td>
<td>Amendment No. 13-2 (CAM 13-2): Accept Public Comment No. 53. CAM 13-2 passed on the floor of the NFPA Technical Meeting. <strong>PASSED</strong> TC Ballot – 33 voting members/18 agree/7 disagree/0 abstained/8 ballots not returned and <strong>PASSED</strong> CC Ballot – 20 voting members/10 agree/1 disagree/0 abstained/9 ballots not returned. Final CC Ballot due July 25, 2018. See Attachment 18-8-1-b [SA18-8-1-b]</td>
</tr>
<tr>
<td><strong>18-8-1-c</strong></td>
<td>Amendment No. 13-3 (CAM 13-3): Accept Public Comment No. 55. CAM 13-3 passed on the floor of the NFPA Technical Meeting. <strong>PASSED</strong> TC Ballot – 33 voting members/17 agree/8 disagree/0 abstained/8 ballots not returned and <strong>PASSED</strong> CC Ballot – 20 voting members/10 agree/1 disagree/0 abstained/9 ballots not returned. See Attachment 18-8-1-c [SA18-8-1-c]</td>
</tr>
<tr>
<td><strong>18-8-1-d</strong></td>
<td>Amendment No. 13-4 (CAM 13-5): Reject Second Revision No. 386 and any related portions of First Revision No. 751. CAM 13-5 passed on the floor of the NFPA Technical Meeting. Pursuant to Section 4.6 and Table 1 of the <em>Regulations Governing the Development of NFPA Standards (Revs.)</em>, balloting is not required for this CAM. See Attachment 18-8-1-d</td>
</tr>
<tr>
<td><strong>18-8-1-e</strong></td>
<td>Amendment No. 13-5 (CAM 13-6): Reject Second Correlating Revision No. 9. CAM 13-6 passed on the floor of the NFPA Technical Meeting. <strong>FAILED</strong> TC Ballot – 33 voting members/14 agree/12 disagree/0 abstained/7 ballots not returned and <strong>PASSED</strong> CC Ballot – 20 voting members/11 agree/0 disagree/0 abstained/9 ballots not returned. See Attachment 18-8-1-e</td>
</tr>
</tbody>
</table>

**APPEAL**

| **18-8-1-e-1** | Appeal of L. Taylor, Schindler Elevator Corporation, requesting the NFPA Standards Council overturn the Technical Committee action and Reject Second Correlating Revision No. 9 (CAM 13-6). This Motion passed on the floor of the NFPA Technical Meeting. See Attachment 18-8-1-e-1 |
| **18-8-1-e-2** | Appeal of B. Schultheis, Hesperia, CA, requesting the NFPA Standards Council overturn the Technical Committee action and Reject Second Correlating Revision No. 9 (CAM 13-6). This Motion passed on the floor of the NFPA Technical Meeting. \[SA 18-8-1-e-2\] |
| **18-8-1-e-3** | Appeal of T. Parrish, Telgian Holdings, Inc., requesting the NFPA Standards Council overturn the Technical Committee action and Reject Second Correlating Revision No. 9 (CAM 13-6). This Motion passed on the floor of the NFPA Technical Meeting. \[SA18-8-1-e-3\] |
| **18-8-1-e-4** | **APPEAL** | Appeal of S. Lewis, RFI Enterprises, requesting the NFPA Standards Council overturn the Technical Committee action and Reject Second Correlating Revision No. 9 (CAM 13-6). This Motion passed on the floor of the NFPA Technical Meeting. | **SA18-8-1-e-4** ADDITION |
| **18-8-1-e-5** | **APPEAL** | Appeal of D. McColl, Worldwide Codes Development, requesting the NFPA Standards Council overturn the Technical Committee action and Reject Second Correlating Revision No. 9 (CAM 13-6). This Motion passed on the floor of the NFPA Technical Meeting. | **SA18-8-1-e-5** ADDITION |
| **18-8-1-e-6** | **APPEAL** | Appeal of J. Darmanian, San Francisco, CA, requesting the NFPA Standards Council overturn the Technical Committee action and Reject Second Correlating Revision No. 9 (CAM 13-6). This Motion passed on the floor of the NFPA Technical Meeting. | **SA18-8-1-e-6** ADDITION |
| **18-8-1-e-7** | **APPEAL** | Appeal of S. Weiss-Ishai, San Francisco Fire Department, requesting the NFPA Standards Council overturn the Technical Committee action and Reject Second Correlating Revision No. 9 (CAM 13-6). This Motion passed on the floor of the NFPA Technical Meeting. | **SA18-8-1-e-7** ADDITION |
| **18-8-1-e-1 thru 7** | **Comments received by K. Linder, Correlating Committee Chair, Automatic Sprinkler Systems, and R. Grill, Technical Committee Chair, Sprinkler System Installation Criteria, on CAM 13-6 appeals.** | **SA 18-8-1-e-1 thru 7** ADDITION |
| **18-8-1-f** | **Amendment No. 13-6 (CAM 13-8): Reject Second Revision No. 429 and any related portions of First Revision No. 658. CAM 13-8 passed on the floor of the NFPA Technical Meeting. Pursuant to Section 4.6 and Table 1 of the Regulations Governing the Development of NFPA Standards (Regs.), ballotling is not required for this CAM. See Attachment 18-8-1-f** | |
| **18-8-2** | **Act on the issuance of NFPA 13D, Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes, with an issuance date of August 14, 2018 and an effective date of September 3, 2018, as acted on at the NFPA Technical Meeting, with one amendment and no appeals.** | |
| **18-8-2-a** | **Amendment No. 13D-1 (CAM 13D-1): Reject Second Revision No. 7. CAM 13D-1 passed on the floor of the NFPA Technical Meeting. Pursuant to Section 4.6 and Table 1 of the Regulations Governing the Development of NFPA Standards (Regs.), ballotling is not required for this CAM. See Attachment 18-8-2-a** | |
| **18-8-3** | **Act on the issuance of NFPA 72, National Fire Alarm and Signaling Code, with an issuance date of August 14, 2018 and an effective date of September 3, 2018, with five amendments no appeals.** | |
| **18-8-3-a** | **Amendment No. 72-1 (CAM 72-1): Accept Public Comment Nos. 386 and 387. CAM 72-1 passed on the floor of the NFPA Technical Meeting. **FAILED** TC Ballot – 23 voting members/6 agree/16 disagree/0 abstained/1 ballot not returned and **PASSED** CC Ballot – 19 voting members/16 agree/0 disagree/0 abstained/3 ballots not returned. See Attachment 18-8-3-a** | |
| **18-8-3-a-1** | **APPEAL** | Appeal of J. Kapis, Coffman Engineers, Inc., requesting the NFPA Standards Council overturn the Technical Committee action and Accept Public Comment Nos. 386 and 387 (CAM 72-1). This Motion passed on the floor of the NFPA Technical Meeting. | **SA18-8-3-a-1** ADDITION |
| **18-8-3-a-2** | **APPEAL** | Appeal of S. Weiss-Ishai, San Francisco Fire Department, requesting the NFPA Standards Council overturn the Technical Committee action and Accept Public Comment Nos. 386 and 387 (CAM 72-1). This Motion passed on the floor of the NFPA Technical Meeting. | **SA18-8-3-a-2** ADDITION |

**CPWR Research and Training Report:** *Deaths and Injuries Involving Elevators and Escalators, is available for review at the following link:* [https://www.cpwr.com/sites/default/files/publications/elevator_escalator_BLSapproved_2.pdf](https://www.cpwr.com/sites/default/files/publications/elevator_escalator_BLSapproved_2.pdf)
<table>
<thead>
<tr>
<th>18-8-3-b</th>
<th>Amendment No. 72-2 (CAM 72-2): Accept Public Comment No. 388. CAM 72-2 passed on the floor of the NFPA Technical Meeting. <strong>FAILED</strong> TC Ballot – 23 voting members/7 agree/14 disagree/0 abstained/2 ballots not returned and <strong>PASSED</strong> CC Ballot – 19 voting members/15 agree/0 disagree/0 abstained/4 ballots not returned. See Attachment 18-8-3-b</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>APPEAL</strong></td>
<td>Appeal of J. Kapis, Coffman Engineers, Inc., requesting the NFPA Standards Council overturn the Technical Committee action and Accept Public Comment No. 388 (CAM 72-2). This Motion passed on the floor of the NFPA Technical Meeting. See Attachment 18-8-3-b-1 <strong>(See SA18-8-3-a-1)</strong></td>
</tr>
<tr>
<td>18-8-3-b-2</td>
<td>Amendment No. 72-3 (CAM 72-4): Accept Public Comment Nos. 155 and 156. CAM 72-4 passed on the floor of the NFPA Technical Meeting. <strong>FAILED</strong> TC Ballot – 23 voting members/8 agree/13 disagree/0 abstained/2 ballots not returned and <strong>PASSED</strong> CC Ballot – 19 voting members/15 agree/0 disagree/0 abstained/4 ballots not returned). See Attachment 18-8-3-c-1 <strong>(See SA18-8-3-a-2)</strong></td>
</tr>
<tr>
<td><strong>APPEAL</strong></td>
<td>Appeal of Sagiv Weiss-Ishai, San Francisco Fire Department, requesting the NFPA Standards Council overturn the Technical Committee action and Accept Public Comment Nos. 155 and 156. This Motion passed on the floor of the NFPA Technical Meeting. <strong>(See SA18-8-3-a-2)</strong></td>
</tr>
<tr>
<td>18-8-3-c-2</td>
<td>Appeal of J. Darmanin, San Francisco, CA, requesting the NFPA Standards Council overturn the Technical Committee action and Accept Public Comment No. 458. This Motion passed on the floor of the NFPA Technical Meeting. See Attachment 18-8-3-d-1 <strong>(See SA18-8-3-a-1)</strong></td>
</tr>
<tr>
<td>18-8-3-d-1</td>
<td>Appeal of J. Kapis, Coffman Engineers, Inc., requesting the NFPA Standards Council overturn the Technical Committee action and Accept Public Comment No. 458. This Motion passed on the floor of the NFPA Technical Meeting. <strong>(See SA18-8-3-a-1)</strong></td>
</tr>
<tr>
<td>18-8-3-d-2</td>
<td>Appeal of J. Darmanin, San Francisco, CA, requesting the NFPA Standards Council overturn the Technical Committee action and Accept Public Comment No. 458. This Motion passed on the floor of the NFPA Technical Meeting. <strong>(See SA18-8-3-b-3)</strong></td>
</tr>
<tr>
<td>18-8-3-d-3</td>
<td>Appeal of S. Weiss-Ishai, San Francisco Fire Department, requesting the NFPA Standards Council overturn the Technical Committee action and Accept Public Comment No. 458. This Motion passed on the floor of the NFPA Technical Meeting. <strong>(See SA18-8-3-a-2)</strong></td>
</tr>
<tr>
<td>18-8-3-d-4 APPEAL</td>
<td>Appeal of S. Lewis, RFI Enterprises, requesting the NFPA Standards Council overturn the Technical Committee action and Accept Public Comment No. 458. This Motion passed on the floor of the NFPA Technical Meeting. See Attachment 18-8-3-d-4  (See SA18-8-1-e-4)</td>
</tr>
<tr>
<td>18-8-3-e</td>
<td>Amendment No. 72-5 (CAM 72-6): Accept Public Comment No. 6. CAM 72-6 passed on the floor of the NFPA Technical Meeting. FAILED TC Ballot – 23 voting members/9 agree/11 disagree/1 abstained/2 ballots not returned and PASSED CC Ballot – 19 voting members/14 agree/1 disagree/0 abstained/4 ballot not returned. See Attachment 18-8-3-e  SA18-8-3-e</td>
</tr>
<tr>
<td>18-8-3-e-1 APPEAL</td>
<td>Appeal of R. Simpson, Vector Security, requesting the NFPA Standards Council overturn the Technical Committee action and Accept Public Comment No. 6. This Motion passed on the floor of the NFPA Technical Meeting.  SA18-8-3-e-1 ADDITION</td>
</tr>
<tr>
<td>18-8-3-e-1-a</td>
<td>Comments received by W. Olsen, Technical Committee Chair, Supervising Station Fire Alarm and Signaling Systems, on CAM 72-6 appeal.  SA18-8-3-e-1-a ADDITION</td>
</tr>
<tr>
<td>18-8-4</td>
<td>Act on the issuance of NFPA 101A, <em>Guide on Alternative Approaches to Life Safety</em>, with an issuance date of August 14, 2018 and an effective date of September 3, 2018, with no amendments and no appeals. No Attachment</td>
</tr>
<tr>
<td>18-8-5</td>
<td>Act on the issuance of NFPA 110, <em>Standard for Emergency and Standby Power Systems</em>, with an issuance date of August 14, 2018 and an effective date of September 3, 2018, with two amendments and two appeals.</td>
</tr>
<tr>
<td>18-8-5-a</td>
<td>Amendment No. 110-1 (CAM 110-1): Accept Public Comment No. 3. CAM 110-1 passed on the floor of the NFPA Technical Meeting. FAILED TC Ballot – 29 voting members/4 agree/22 disagree/0 abstained/3 ballots not returned and PASSING CC Ballot – 12 voting members/10 agree/2 disagree/0 abstained/0 not returned. See Attachment 18-8-5-a  SA18-8-5-a</td>
</tr>
<tr>
<td>18-8-5-a-1 APPEAL</td>
<td>Appeal of W. Vernon, Mazzetti, requesting the NFPA Standards Council overturn the Technical Committee action and Accept Public Comment No. 3 (CAMs 110-1). See Attachment 18-8-5-a-1  SA18-8-5-a-1/b-1</td>
</tr>
<tr>
<td>18-8-5-b</td>
<td>Amendment No. 110-2 (CAM 110-2): Accept Public Comment No. 4. CAM 110-2 passed on the floor of the NFPA Technical Meeting. FAILED TC Ballot – 29 voting members/4 agree/22 disagree/0 abstained/3 ballots not returned and PASSING CC Ballot – 12 voting members/9 agree/3 disagree/0 abstained/0 not returned). See Attachment 18-8-5-b  SA18-8-5-b</td>
</tr>
<tr>
<td>18-8-5-b-1 APPEAL</td>
<td>Appeal of W. Vernon, Mazzetti, requesting the NFPA Standards Council overturn the Technical Committee action and Accept Public Comment No. 4 (CAMs 110-2). See Attachment 18-8-5-b-1  SEE SA18-8-5-a-1/b-1</td>
</tr>
<tr>
<td>18-8-5-a-1-a/b-1-a</td>
<td>Comments received by, M. Johnston, Correlating Committee Chair, National Electrical Code, and D. Chisholm, Technical Committee Chair, Emergency Power Supplies, on CAM 110-1 and 110-2 Appeals.  SA18-8-5-a-1-a/b-1-a ADDITION</td>
</tr>
<tr>
<td>18-8-6</td>
<td>Act on the issuance of NFPA 241, <em>Standard for Safeguarding Construction, Alteration, and Demolition Operations</em>, with an issuance date of August 14, 2018 and an effective date of September 3, 2018, with no amendments and no appeals. No Attachment</td>
</tr>
<tr>
<td>18-8-7</td>
<td>Act on the issuance of NFPA 289, <em>Standard Method of Fire Test for Individual Fuel Packages</em>, with an issuance date of August 14, 2018 and an effective date of September 3, 2018, with one amendment and no appeals.</td>
</tr>
<tr>
<td>18-8-7-a</td>
<td>Amendment No. 289-1 (CAM 289-2): Reject an Identifiable Part of Second Revision No. 2 and any related portions of First Revision No. 19. CAM 289-2 passed on the floor of the NFPA Technical Meeting. Pursuant to Section 4.6 and Table 1 of the Regulations Governing the</td>
</tr>
<tr>
<td>18-8-8</td>
<td>Act on the issuance of NFPA 400, <em>Hazardous Materials Code</em>, with an issuance date of August 14, 2018 and an effective date of September 3, 2018, with no amendment and no appeals. No Attachment</td>
</tr>
<tr>
<td>18-8-9</td>
<td>Act on the withdrawal of NFPA 720, <em>Standard for the Installation of Carbon Monoxide (CO) Detection and Warning Equipment</em>. NFPA 720 requirements have been incorporated into NFPA 72, <em>National Fire Alarm and Signaling Code</em>. See Attachment 18-8-9 (See related SC 18-8-52-b)</td>
</tr>
<tr>
<td>18-8-10</td>
<td>Act on the issuance of NFPA 1001, <em>Standard for Fire Fighter Professional Qualifications</em>, with an issuance date of August 14, 2018 and an effective date of September 3, 2018, with two amendments with two appeals.</td>
</tr>
<tr>
<td>18-8-10-a</td>
<td>Amendment No. 1001-1 (CAM 1001-1): Accept Public Comment No. 66. CAM 1001-1 passed on the floor of the NFPA Technical Meeting. FAILED TC Ballot – 30 voting members/16 agree/10 disagree/0 abstained/4 ballots not returned and PASSED CC Ballot – 20 voting members/15 agree/2 disagree/0 abstained/3 not returned). CC ballot circulation July 25, 2018. See Attachment 18-8-10-a SA18-8-10-a</td>
</tr>
<tr>
<td>18-8-10-a-1</td>
<td>APPEAL Appeal of N. Trench, requesting the NFPA Standards Council overturn the Technical Committee action and Accept Public Comment No. 66 (CAM 1001-1). This Motion passed on the floor of the NFPA Technical Meeting. See Attachment 18-8-10-a-1</td>
</tr>
<tr>
<td>18-8-10-a-1-a</td>
<td>Comments received by W. Peterson, CC Chair, Professional Qualifications and J. Cunningham, TC Chair, Fire Fighter Professional Qualifications, on CAM 1001-1 appeal. See SA18-8-10-a-1-a and b-1-a ADDITION</td>
</tr>
<tr>
<td>18-8-10-a-1-b</td>
<td>Seven Comments received on CAM 1001-1 Appeal See SA18-8-10-a-1-b and b-1-b ADDITION</td>
</tr>
<tr>
<td>18-8-10-b</td>
<td>Amendment No. 1001-2 (CAM 1001-3): Accept Public Comment No. 17. CAM 1001-3 passed on the floor of the NFPA Technical Meeting. FAILED TC Ballot – 30 voting members/15 agree/11 disagree/0 abstained/4 ballots not returned and PASSED CC Ballot – 20 voting members/15 agree/2 disagree/0 abstained/3 not returned). CC ballot circulation July 25, 2018. See Attachment 18-8-10-b SA18-8-10-b</td>
</tr>
<tr>
<td>18-8-10-b-1</td>
<td>APPEAL Appeal of J. Crawford, 20/20, requesting the NFPA Standards Council overturn the Technical Committee action and Accept Public Comment No. 17 (CAM 1001-3). This Motion passed on the floor of the NFPA Technical Meeting. See Attachment 18-8-10-b-1</td>
</tr>
<tr>
<td>18-8-10-b-1-a</td>
<td>Comments received by W. Peterson, CC Chair, Professional Qualifications and J. Cunningham, Technical Committee Chair, Fire Fighter Professional Qualifications, on CAM 1001-3 appeal. See SA18-8-10-a-1-a and b-1-a ADDITION</td>
</tr>
<tr>
<td>18-8-10-b-1-b</td>
<td>Eight Comments received on CAM 1001-3 Appeal See SA18-8-10-a-1-b and b-1-b ADDITION</td>
</tr>
<tr>
<td>18-8-11-a</td>
<td>Amendment No. 1730-1 (CAM 1730-2): Accept Public Comment No. 1. CAM 1730-2 passed on the floor of the NFPA Technical Meeting. FAILED TC Ballot – 30 voting members/12 agree/10 disagree/0 abstained/8 ballots not returned. See Attachment 18-8-11-a</td>
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<tr>
<td>Date</td>
<td>Action</td>
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<tr>
<td>18-8-12</td>
<td>Act on the issuance of NFPA 1981, <em>Standard on Open-Circuit Self-Contained Breathing Apparatus (SCBA) for Emergency Services</em>, with an issuance date of August 14, 2018 and an effective date of September 3, 2018, with no amendment and no appeals. No Attachment</td>
</tr>
<tr>
<td>18-8-13</td>
<td>Act on the issuance of proposed Tentative Interim Amendment (TIA) to add a new section 42.12 to the 2018 edition of NFPA 1, <em>Fire Code</em> (TIA No. 1362)</td>
</tr>
<tr>
<td>18-8-13-a</td>
<td>Text of proposed TIA No. 1362. See Attachment 18-8-13-a</td>
</tr>
<tr>
<td>18-8-13-b</td>
<td>Ballot results of TIA No. 1362. <strong>PASSED TC</strong> Ballot on both technical merit and emergency nature – 29 voting members/24 agree on technical merit/1 disagree/1 abstained/22 agree on emergency nature/3 disagree/1 abstained/3 ballots not returned. See Attachment 18-8-13-b</td>
</tr>
<tr>
<td>18-8-13-c</td>
<td>One comment was received. See Attachment 18-8-13-c</td>
</tr>
<tr>
<td>18-8-14</td>
<td>Act on the issuance of proposed Tentative Interim Amendment (TIA) to revise sections 3.3.10, 6.1.3.3.1, 6.1.3.3.2, 6.1.5, 7.2.2, A.3.3.10 and Delete Section 7.2.4.2.2 and renumber subsequent paragraph of the 2018 edition of NFPA 10, <em>Standard for Portable Fire Extinguishers</em> (TIA No. 1378).</td>
</tr>
<tr>
<td>18-8-14-a</td>
<td>Text of proposed TIA No. 1378. See Attachment 18-8-14-a</td>
</tr>
<tr>
<td>18-8-14-b</td>
<td>Ballot results of TIA No. 1378. <strong>FAILED TC</strong> Ballot on both technical merit and emergency nature – 28 voting members/3 agree on technical merit/21 disagree/0 abstained/3 agree on emergency nature/21 disagree/0 abstained/4 ballots not returned. See Attachment 18-8-14-b</td>
</tr>
<tr>
<td>18-8-14-c</td>
<td>Three comments were received.</td>
</tr>
<tr>
<td>18-8-14-d</td>
<td>Appeal of J. McSheffrey, en-Gauge, Inc. requesting the NFPA Standards Council overturn the Technical Committees action and issue TIA 1378. <strong>SA18-8-14-d ADDITION</strong></td>
</tr>
<tr>
<td>18-8-14-d-1</td>
<td>One comment received on TIA 1378, NFPA 10. <strong>SA18-8-14-d-1 ADDITION</strong></td>
</tr>
<tr>
<td>18-8-15</td>
<td>Act on the issuance of proposed Tentative Interim Amendment (TIA) to revise section 17.3.1.17 and delete Table 17.3.1.17 of the 2016 edition of NFPA 13, <em>Standard for the Installation of Sprinkler Systems</em> (TIA No. 1367).</td>
</tr>
<tr>
<td>18-8-15-a</td>
<td>Text of proposed TIA No. 1367. See Attachment 18-8-15-a</td>
</tr>
<tr>
<td>18-8-15-b</td>
<td>Ballot results of TIA No. 1367. <strong>FAILED TC</strong> Ballot: Passed on technical merit but Failed emergency nature – 34 voting members/30 agree on technical merit/2 disagree/1 abstained/23 agree on emergency nature/10 disagree/0 abstained/1 ballot not returned. <strong>FAILED CC</strong> Ballot: Passed on correlation but Failed emergency nature – 20 voting members/13 agree on correlation/2 disagree/0 abstained/7 agree on emergency nature/8 disagree/0 abstained/5 ballots not returned. See Attachment 18-8-15-b</td>
</tr>
<tr>
<td>18-8-15-c</td>
<td>No comments were received.</td>
</tr>
<tr>
<td>18-8-16</td>
<td>Act on the issuance of proposed Tentative Interim Amendment (TIA) to revise various sections of Chapter 25 of the proposed 2019 edition of NFPA 13, <em>Standard for the Installation of Sprinkler Systems</em> (TIA No. 1384).</td>
</tr>
<tr>
<td>18-8-16-a</td>
<td>Text of proposed TIA No. 1384. See Attachment 18-8-16-a</td>
</tr>
<tr>
<td>18-8-16-b</td>
<td>Final ballot results of TIA No. 1384. <strong>PASSED TC</strong> Ballot on both technical merit and emergency nature – 34 voting members/29 agree on technical merit/0 disagree/0 abstained/29 agree on emergency nature/0 disagree/0 abstained/5 ballots not returned. <strong>PASSED CC</strong> Ballot on both correlation and emergency nature – 20 voting members/14 agree on correlation/0 disagree/0 abstained/14 agree on emergency nature/0 disagree/0 abstained/6 ballots not returned. See Attachment 18-8-16-b <strong>SA18-8-16-b</strong></td>
</tr>
<tr>
<td>18-8-16-c</td>
<td>No comments were received.</td>
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<tr>
<td>Date</td>
<td>Description</td>
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<tr>
<td>18-8-17</td>
<td>Act on the issuance of proposed Tentative Interim Amendment (TIA) to revise sections 7.10.1 and 7.8.1 of the 2016 and proposed 2019 editions respectively of NFPA 13, <em>Standard for the Installation of Sprinkler Systems</em> (TIA No. 1385).</td>
</tr>
<tr>
<td>18-8-17-a</td>
<td>Text of proposed TIA No. 1385. See Attachment 18-8-17-a</td>
</tr>
<tr>
<td>18-8-17-b</td>
<td>Ballot results of TIA No. 1385. <em>FAILED</em> TC Ballot on both technical merit and emergency nature – 33 voting members/10 agree on technical merit/16 disagree/0 abstained/10 agree on emergency nature/16 disagree/0 abstained/7 ballots not returned. <em>FAILED</em> CC Ballot on both correlation and emergency nature – 20 voting members/8 agree on correlation/7 disagree/0 abstained/0 agree on emergency nature/15 disagree/0 abstained/5 ballots not returned. See Attachment 18-8-17-b.</td>
</tr>
<tr>
<td>18-8-17-c</td>
<td>Two comments were received. See Attachment 18-8-17-c</td>
</tr>
<tr>
<td>18-8-18</td>
<td>Act on the issuance of proposed Tentative Interim Amendment (TIA) to revise sections 15.2.1, 16.1.2.1, 16.4.4, 16.5.1 and 16.5.10 of the 2018 edition of NFPA 22, <em>Standard for Water Tanks for Private Fire Protection</em> (TIA No. 1358).</td>
</tr>
<tr>
<td>18-8-18-a</td>
<td>Text of proposed TIA No. 1358. See Attachment 18-8-18-a</td>
</tr>
<tr>
<td>18-8-18-b</td>
<td>Ballot results of TIA No. 1358. <em>PASSED</em> TC Ballot on both technical merit and emergency nature – 29 voting members/24 agree on technical merit/0 disagree/0 abstained/24 agree on emergency nature/1 disagree/0 abstained/5 ballots not returned. See Attachment 18-8-18-b.</td>
</tr>
<tr>
<td>18-8-18-c</td>
<td>One comment was received. See Attachment 18-8-18-c</td>
</tr>
<tr>
<td>18-8-19</td>
<td>Act on the issuance of proposed Tentative Interim Amendment (TIA) to revise various sections of the 2011 and 2014 editions of NFPA 25, <em>Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems</em> (TIA No. 1364).</td>
</tr>
<tr>
<td>18-8-19-a</td>
<td>Text of proposed TIA No. 1364. See Attachment 18-8-19-a</td>
</tr>
<tr>
<td>18-8-19-b</td>
<td>Ballot results of TIA No. 1364. <em>PASSED</em> TC Ballot on both technical merit and emergency nature – 34 voting members/26 agree on technical merit/3 disagree/0 abstained/25 agree on emergency nature/4 disagree/0 abstained/5 ballots not returned. See Attachment 18-8-19-b.</td>
</tr>
<tr>
<td>18-8-19-c</td>
<td>No comments were received.</td>
</tr>
<tr>
<td>18-8-20</td>
<td>Act on the issuance of proposed Tentative Interim Amendment (TIA) to revise Chapter 6 and Chapter 7 the proposed 2019 edition of NFPA 30B, <em>Code for the Manufacture and Storage of Aerosol Products</em> (TIA No. 1359).</td>
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<tr>
<td>18-8-20-a</td>
<td>Text of proposed TIA No. 1359. See Attachment 18-8-20-a</td>
</tr>
<tr>
<td>18-8-20-b</td>
<td>Ballot results of TIA No. 1359. <em>PASSED</em> TC Ballot on both technical merit and emergency nature – 28 voting members/24 agree on technical merit/2 disagree/0 abstained/2 ballots not returned/24 agree on emergency nature/1 disagree/1 abstained/2 ballots not returned. See Attachment 18-8-20-b.</td>
</tr>
<tr>
<td>18-8-20-c</td>
<td>Six comments was received. See Attachment 18-8-20-c</td>
</tr>
<tr>
<td>18-8-21</td>
<td>Act on the issuance of proposed Tentative Interim Amendment (TIA) to delete section 6.4.3.3.1 and renumber subsequent paragraphs of the 2018 edition of NFPA 68, <em>Standard on Explosion Protection by Deflagration Venting</em> (TIA No. 1370).</td>
</tr>
<tr>
<td>18-8-21-a</td>
<td>Text of proposed TIA No. 1370. See Attachment 18-8-21-a</td>
</tr>
<tr>
<td>18-8-21-b</td>
<td>Final ballot results of TIA No. 1370. <em>PASSED</em> TC Ballot on both technical merit and emergency nature – 29 voting members/18 agree on technical merit/1 disagree/0 abstained/17 agree on emergency nature/2 disagree/0 abstained/10 ballots not returned. See Attachment 18-8-21-b.</td>
</tr>
<tr>
<td>18-8-21-c</td>
<td>No comments were received.</td>
</tr>
<tr>
<td>18-8-22</td>
<td>Act on the issuance of proposed Tentative Interim Amendment (TIA) to revise section 695.14(F) of the 2017 edition of NFPA 70, <em>National Electrical Code</em> (TIA No. 1357).</td>
</tr>
</tbody>
</table>

**August 7, 2018**

**Supplemental Agenda Standards Council Meeting August 13-15, 2018**

**Page 7 of 1900**
18-8-22-a  Text of proposed TIA No. 1357. See Attachment 18-8-22-a

18-8-22-b  Ballot results of TIA No. 1357. **PASSED** Panel Ballot on both technical merit and emergency nature – 22 voting members/18 agree on technical merit/1 disagree/0 abstained/19 agree on emergency nature/0 disagree/0 abstained/3 ballots not returned. **PASSED** CC Ballot on both correlation and emergency nature – 12 voting members/11 agree on correlation/0 disagree/0 abstained/11 agree on emergency nature/0 disagree/0 abstained/1 ballot not returned. See Attachment 18-8-22-b

18-8-22-c  Two comments were received. See Attachment 18-8-22-c

18-8-23  Act on the issuance of proposed Tentative Interim Amendment (TIA) to revise section 29.8.3.4(5) of the 2016 edition of NFPA 72, National Fire Alarm and Signaling Code (TIA No. 1345)

18-8-23-a  Text of proposed TIA No. 1345. See Attachment 18-8-23-a

18-8-23-b  Ballot results of TIA No. 1345. **FAILED** TC Ballot on both technical merit and emergency nature – 19 voting members/13 agree on technical merit/5 disagree/0 abstained/14 agree on emergency nature/4 disagree/0 abstained/1 ballot not returned. **FAILED** CC Ballot on both correlation and emergency nature – 19 voting members/13 agree on correlation/3 disagree/0 abstained/11 agree on emergency nature/5 disagree/0 abstained/3 ballots not returned. See Attachment 18-8-23-b

18-8-23-b-1  Comment of R. Schifiliti, R.P. Schifiliti Associates, Inc., regarding TIA No. 1345. See Attachment 18-8-23-b-1

18-8-23-c  Two comments were received. See Attachment 18-8-23-c  SA18-3-23-c

18-8-24  Act on the issuance of proposed Tentative Interim Amendment (TIA) to delete section 29.7.3 in its entirety of the 2016 edition of NFPA 72, National Fire Alarm and Signaling Code (TIA No. 1346)

18-8-24-a  Text of proposed TIA No. 1346. See Attachment 18-8-24-a

18-8-24-b  Ballot results of TIA No. 1346. **PASSED** TC Ballot on both technical merit and emergency nature – 19 voting members/17 agree on technical merit/1 disagree/0 abstained/17 agree on emergency nature/1 disagree/0 abstained/1 ballot not returned. **FAILED** CC Ballot: passed on correlation but failed emergency nature – 19 voting members/12 agree on correlation/3 disagree/1 abstained/9 agree on emergency nature/6 disagree/1 abstained/3 ballots not returned. See Attachment 18-8-24-b

18-8-24-b-1  Comment of R. Schifiliti, R.P. Schifiliti Associates, Inc., regarding TIA No. 1346. See Attachment 18-8-24-b-1

18-8-24-c  Two comments were received. See Attachment 18-8-24-c  SEE SA18-8-23-c

18-8-24-d  **APPEAL** Appeal of Wendy Gifford, Consultant, requesting the NFPA Standards Council overturn the Correlating Committees action and issue TIA 1346. See Attachment 18-8-24-d

18-8-25  Act on the issuance of proposed Tentative Interim Amendment (TIA) to revise section A.24.3.10 of the proposed 2019 edition of NFPA 72, National Fire Alarm and Signaling Code (TIA No. 1377)

18-8-25-a  Text of proposed TIA No. 1377. See Attachment 18-8-25-a

18-8-25-b  Final ballot results of TIA No. 1377. **PASSED** TC Ballot on both technical merit and emergency nature – 27 voting members/21 agree on technical merit/1 disagree/0 abstained/20 agree on emergency nature/1 disagree/1 abstained/5 ballots not returned. **PASSED** CC Ballot on both correlation and emergency nature – 19 voting members/19 agree on correlation/0 disagree/0 abstained/19 agree on emergency nature/0 disagree/0 abstained/0 ballots not returned. See Attachment 18-8-25-b  SA18-8-25-b

18-8-25-c  Two comments were received. See Attachment 18-8-25-c
<table>
<thead>
<tr>
<th>18-8-26</th>
<th>Act on the issuance of proposed Tentative Interim Amendment (TIA) to revise section 4.3.7.2 of the 2018 edition of NFPA 90A, <em>Standard for the Installation of Air-Conditioning and Ventilating Systems</em> (TIA No. 1360)</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-8-26-a</td>
<td>Text of proposed TIA No. 1360. See Attachment 18-8-26-a</td>
</tr>
<tr>
<td>18-8-26-b</td>
<td>Ballot results of TIA No. 1360. <strong>FAILED</strong> TC Ballot on both technical merit and emergency nature – 24 voting members/10 agree on technical merit/10 disagree/8 agree on emergency nature/12 disagree/1 abstained/3 ballots not returned. See Attachment 18-8-26-b</td>
</tr>
<tr>
<td>18-8-26-c</td>
<td>No comments were received.</td>
</tr>
<tr>
<td>18-8-27-a</td>
<td>Text of proposed TIA No. 1298. See Attachment 18-8-27-a</td>
</tr>
<tr>
<td>18-8-27-b</td>
<td>Preliminary ballot results of TIA No. 1298. <strong>FAILED</strong> TC Ballot on both technical merit and emergency nature – 30 voting members/17 agree on technical merit/7 disagree/1 abstained/16 agree on emergency nature/9 disagree/0 abstained/5 ballots not returned. <strong>Failing</strong> CC Ballot on both correlation and emergency nature – 10 voting members/5 agree on correlation/2 disagree/0 abstained/3 agree on emergency nature/4 disagree/0 abstained/3 ballots not returned. <strong>Comment circulation due August 10 2018.</strong> See Attachment 18-8-27-b <strong>SA18-8-27-b</strong></td>
</tr>
<tr>
<td>18-8-27-c</td>
<td>No comments were received.</td>
</tr>
<tr>
<td>18-8-28</td>
<td>Act on the issuance of proposed Tentative Interim Amendment (TIA) to revise sections 14.2.2.2.4, A.14.2.2.2.4, A.14.2.2.2.4.1 (new), A.14.2.2.2.4.2 (new), and A.14.2.2.2.4.4 (new) of the 2018 edition of NFPA 101, <em>Life Safety Code®</em> (TIA No. 1311)</td>
</tr>
<tr>
<td>18-8-28-a</td>
<td>Text of proposed TIA No. 1311. See Attachment 18-8-28-a</td>
</tr>
<tr>
<td>18-8-28-b</td>
<td>Preliminary ballot results of TIA No. 1311. <strong>FAILED</strong> TC Ballot on both technical merit and emergency nature – 22 voting members/8 agree on technical merit/10 disagree/0 abstained/8 agree on emergency nature/10 disagree/0 abstained/4 ballots not returned. <strong>Failing</strong> CC Ballot on both correlation and emergency nature – 10 voting members/5 agree on correlation/3 disagree/0 abstained/2 agree on emergency nature/6 disagree/0 abstained/2 ballots not returned. See Attachment 18-8-28-b <strong>SA18-8-28-b</strong></td>
</tr>
<tr>
<td>18-8-28-c</td>
<td>No comments were received.</td>
</tr>
<tr>
<td>18-8-29</td>
<td>Act on the issuance of proposed Tentative Interim Amendment (TIA) to revise sections 15.2.2.2.4, A.15.2.2.2.4, A.15.2.2.2.4 (new), and A.15.2.2.2.4.4 (new) of the 2018 edition of NFPA 101, <em>Life Safety Code®</em> (TIA No. 1312)</td>
</tr>
<tr>
<td>18-8-29-a</td>
<td>Text of proposed TIA No. 1312. See Attachment 18-8-29-a</td>
</tr>
<tr>
<td>18-8-29-b</td>
<td>Preliminary ballot results of TIA No. 1312. <strong>FAILED</strong> TC Ballot on both technical merit and emergency nature – 22 voting members/8 agree on technical merit/10 disagree/0 abstained/8 agree on emergency nature/10 disagree/0 abstained/4 ballots not returned. <strong>Failing</strong> CC Ballot on both correlation and emergency nature – 10 voting members/5 agree on correlation/3 disagree/0 abstained/2 agree on emergency nature/6 disagree/0 abstained/2 ballots not returned. See Attachment 18-8-29-b <strong>SA18-8-29-b</strong></td>
</tr>
<tr>
<td>18-8-29-c</td>
<td>No comments were received.</td>
</tr>
<tr>
<td>18-8-30</td>
<td>Act on the issuance of proposed Tentative Interim Amendment (TIA) to revise sections 16.2.2.2.6, A.16.2.2.2.6, and A.16.2.2.2.6.4 (new), of the 2018 edition of NFPA 101, <em>Life Safety Code®</em> (TIA No. 1313)</td>
</tr>
<tr>
<td>18-8-30-a</td>
<td>Text of proposed TIA No. 1313. See Attachment 18-8-30-a</td>
</tr>
</tbody>
</table>
| 18-8-30-b | Preliminary ballot results of TIA No. 1313. **FAILED** TC Ballot on both technical merit and emergency nature – 22 voting members/8 agree on technical merit/10 disagree/0 abstained/7 agree on emergency nature/11 disagree/0 abstained/4 ballots not returned. **Failing** CC
<table>
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<tr>
<th>Ballot on both correlation and emergency nature – 10 voting members/5 agree on correlation/3 disagree/0 abstained/2 agree on emergency nature/6 disagree/0 abstained/2 ballots not returned. See Attachment 18-8-30-b SA18-8-30-b</th>
</tr>
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<tr>
<td><strong>18-8-31</strong> Act on the issuance of proposed Tentative Interim Amendment (TIA) to revise sections 17.2.2.2.6, A.17.2.2.2.6, and A.17.2.2.2.6.4 (new), of the 2018 edition of NFPA 101, <em>Life Safety Code</em>® (TIA No. 1314)</td>
</tr>
<tr>
<td><strong>18-8-31-a</strong> Text of proposed TIA No. 1314. See Attachment 18-8-31-a</td>
</tr>
<tr>
<td><strong>18-8-31-b</strong> Preliminary ballot results of TIA No. 1314. <strong>FAILED TC</strong> Ballot on both technical merit and emergency nature – 22 voting members/8 agree on technical merit/10 disagree/0 abstained/7 agree on emergency nature/11 disagree/0 abstained/4 ballots not returned. <strong>Failing CC</strong> Ballot on both correlation and emergency nature – 10 voting members/5 agree on correlation/3 disagree/0 abstained/2 agree on emergency nature/6 disagree/0 abstained/2 ballots not returned. See Attachment 18-8-31-b SA18-8-31-b</td>
</tr>
<tr>
<td><strong>18-8-31-c</strong> No comments were received.</td>
</tr>
<tr>
<td><strong>18-8-32</strong> Act on the issuance of proposed Tentative Interim Amendment (TIA) to add definition 3.3.13 Calcium Ammonium Nitrate (new), revise section 11.1.1.2, and add section A.3.3.13 (new) to the 2016 and the proposed 2019 editions of NFPA 400, <em>Hazardous Materials Code</em> (TIA No. 1361)</td>
</tr>
<tr>
<td><strong>18-8-32-a</strong> Text of proposed TIA No. 1361. See Attachment 18-8-32-a</td>
</tr>
<tr>
<td><strong>18-8-32-b</strong> Ballot results of TIA No. 1361. <strong>FAILED TC</strong> Ballot on both technical merit and emergency nature – 31 voting members/14 agree on technical merit/9 disagree/3 abstained/12 agree on emergency nature/12 disagree/2 abstained/5 ballots not returned. See Attachment 18-8-32-b</td>
</tr>
<tr>
<td><strong>18-8-32-c</strong> Two comments were received. See Attachment 18-8-32-c</td>
</tr>
<tr>
<td><strong>18-8-33</strong> Act on the issuance of proposed Tentative Interim Amendment (TIA) to revise sections 2.3.4, 5.3.2, revise various sections of Chapter 7, revise sections of Chapter 8 and add section 8.33 to the 2018 edition of NFPA 1994, <em>Hazardous Materials Protective Clothing and Equipment</em> (TIA No. 1371)</td>
</tr>
<tr>
<td><strong>18-8-33-a</strong> Text of proposed TIA No. 1371. See Attachment 18-8-33-a</td>
</tr>
<tr>
<td><strong>18-8-33-b</strong> Ballot results of TIA No. 1371. <strong>PASSED TC</strong> Ballot on both technical merit and emergency nature – 30 voting members/20 agree on technical merit/1 disagree/1 abstained/21 agree on emergency nature/1 disagree/0 abstained/8 ballots not returned. <strong>PASSED CC</strong> Ballot on both correlation and emergency nature – 30 voting members/25 agree on correlation/0 disagree/0 abstained/25 agree on emergency nature/0 disagree/0 abstained/5 ballots not returned. See Attachment 18-8-33-b</td>
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<td><strong>18-8-33-c</strong> No comments were received.</td>
</tr>
<tr>
<td><strong>18-8-34</strong> Act on the issuance of proposed Tentative Interim Amendment (TIA) to add sections 7.1.2.6.1 (new), 7.1.2.8.4.1 (new), 7.3.2.5.1 (new), and 7.3.2.8.3.1 (new) to the 2018 edition of NFPA 1994, <em>Hazardous Materials Protective Clothing and Equipment</em> (TIA No. 1372)</td>
</tr>
<tr>
<td><strong>18-8-34-a</strong> Text of proposed TIA No. 1372. See Attachment 18-8-34-a</td>
</tr>
<tr>
<td><strong>18-8-34-b</strong> Ballot results of TIA No. 1372. <strong>PASSED TC</strong> Ballot on both technical merit and emergency nature – 30 voting members/22 agree on technical merit/1 disagree/1 abstained/22 agree on emergency nature/1 disagree/1 abstained/6 ballots not returned. <strong>PASSED CC</strong> Ballot on both correlation and emergency nature – 30 voting members/24 agree on correlation/0 disagree/0 abstained/24 agree on emergency nature/0 disagree/0 abstained/6 ballots not returned. See Attachment 18-8-34-b</td>
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<tr>
<td><strong>18-8-34-c</strong> No comments were received</td>
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<td>18-8-35</td>
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<td>18-8-38-b</td>
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</table>
| 18-8-39 | Act on the issuance of proposed Tentative Interim Amendment (TIA) to revise title of subsection 8.1.3, revise title of Table 8.1.3.4, revise paragraphs 8.1.3.6 and 8.1.3.6.1, delete
subsection 8.1.5 and revise section 8.3.3.2 of the 2018 edition of NFPA 1999, *Standard on Protective Clothing and Ensembles for Emergency Medical Operations* (TIA No. 1376)

18-8-39-a | Text of proposed TIA No. 1376. See Attachment 18-8-39-a
---|---
18-8-39-b | Ballot results of TIA No. 1376. **PASSED** TC Ballot on both technical merit and emergency nature – 17 voting members/14 agree on technical merit/2 disagree/0 abstained/16 agree on emergency nature/0 disagree/0 abstained/1 ballot not returned. **PASSED** CC Ballot on both correlation and emergency nature – 30 voting members/23 agree on correlation/1 disagree/1 abstained/24 agree on emergency nature/0 disagree/1 abstained/5 ballots not returned. See Attachment 18-8-39-b
18-8-39-c | No comments were received

### 18-8-40

Act on the issuance of proposed Tentative Interim Amendment (TIA) to revise section 11.2.1.6.2 of the 2018 edition of NFPA 5000, *Building Construction and Safety Code®* (TIA No. 1379)

18-8-40-a | Text of proposed TIA No. 1379. See Attachment 18-8-40-a
18-8-40-b | Preliminary ballot results of TIA No. 1379. **FAILED** TC Ballot on both technical merit and emergency nature – 30 voting members/17 agree on technical merit/7 disagree/1 abstained/16 agree on emergency nature/9 disagree/0 abstained/5 ballots not returned. **Failing** CC Ballot on both correlation and emergency nature – 17 voting members/6 agree on correlation/6 disagree/0 abstained/1 agree on emergency nature/11 disagree/0 abstained/5 ballots not returned. See Attachment 18-8-40-b
18-8-40-c | No comments were received

### 18-8-41

Act on the issuance of proposed Tentative Interim Amendment (TIA) to revise sections 17.2.2.2.4, A.17.2.2.2.4 and A.17.2.2.2.4.4 (new) of the 2018 edition of NFPA 5000, *Building Construction and Safety Code®* (TIA No. 1380)

18-8-41-a | Text of proposed TIA No. 1380. See Attachment 18-8-41-a
18-8-41-b | Preliminary ballot results of TIA No. 1380. **FAILED** TC Ballot on both technical merit and emergency nature – 22 voting members/8 agree on technical merit/10 disagree/0 abstained/8 agree on emergency nature/10 disagree/0 abstained/4 ballots not returned. **Failing** CC Ballot on both correlation and emergency nature – 17 voting members/6 agree on correlation/6 disagree/0 abstained/1 agree on emergency nature/11 disagree/0 abstained/5 ballots not returned. See Attachment 18-8-41-b
18-8-41-c | No comments were received

### 18-8-42

Act on the issuance of proposed Tentative Interim Amendment (TIA) to revise sections 18.2.2.2.8, A.18.2.2.2.8 (new), and A.18.2.2.2.8.4 (new) of the 2018 edition of NFPA 5000, *Building Construction and Safety Code®* (TIA No. 1381)

18-8-42-a | Text of proposed TIA No. 1381. See Attachment 18-8-42-a
18-8-42-b | Preliminary ballot results of TIA No. 1381. **FAILED** TC Ballot on both technical merit and emergency nature – 22 voting members/7 agree on technical merit/10 disagree/0 abstained/7 agree on emergency nature/10 disagree/0 abstained/5 ballots not returned. **Failing** CC Ballot on both correlation and emergency nature – 17 voting members/6 agree on correlation/6 disagree/0 abstained/1 agree on emergency nature/11 disagree/0 abstained/5 ballots not returned. See Attachment 18-8-42-b
18-8-42-c | No comments were received

### 18-8-43

The following 2018 Annual Revision Cycle Standards passed letter ballot of the Council as Consent Standards with the following issuance dates and effective dates:

**NFPA 51B Standard for Fire Prevention During Welding, Cutting, and Other Hot Work**
| 18-8-44 | At the August 2014 Council Meeting, the Technical Committee on Aircraft Rescue and Fire Fighting submitted a revised scope for Council approval. The Council rejected the proposed scope and directed that NFPA Staff revise the proposal to specify the duties of the Committee. The NFPA Staff is submitting the following revised scope for the Council’s consideration:

**Current Scope:** This Committee shall have primary responsibility for documents on aircraft rescue and fire-fighting (ARFF) documents used by organizations providing ARFF services for operational procedures; training; foam testing and application; specialized equipment; and planning for aircraft emergencies; services and equipment, for procedures for handling aircraft fire emergencies, and for specialized vehicles used to perform these functions at airports, with particular emphasis on saving lives and reducing injuries coincident with aircraft fires following impact or aircraft ground fires. This Committee also shall have responsibility for documents on aircraft hand fire extinguishers and accident prevention and the saving of lives in future aircraft accidents involving fire.

**Proposed Scope:** This Committee shall have primary responsibility for documents on aircraft rescue and fire-fighting (ARFF) documents used by organizations providing ARFF services for operational procedures; training; foam testing and application; specialized equipment; and planning for aircraft emergencies; services and equipment, for procedures for handling aircraft fire emergencies, and for specialized vehicles used to perform these functions at airports, with particular emphasis on saving lives and reducing injuries coincident with aircraft fires following impact or aircraft ground fires. This Committee also shall have responsibility for documents on aircraft hand fire extinguishers and accident prevention and the saving of lives in future aircraft accidents involving fire. See Attachment 18-8-44 |

| 18-8-45 | Consider the request of the Technical Committee on Aerosol Extinguishing Technology to revise the Committee scope as follows: |
| Current Scope: | This committee shall have primary responsibility for documents on design, installation, operation, testing, maintenance, and use of fire extinguishing systems that utilize aerosol extinguishing agents. It shall not address documents on safeguarding against the fire and explosion hazards associated with the manufacturing, handling, and storage of combustible or flammable aerosol products covered by other committees. |
| Proposed Scope: | This committee shall have primary responsibility for documents on design, installation, operation, testing, maintenance, and use of fire extinguishing systems, handheld fire extinguishing units, and portable fire extinguishing units that utilize aerosol extinguishing agents. It shall not address documents on safeguarding against the fire and explosion hazards associated with the manufacturing, handling, and storage of combustible or flammable aerosol products covered by other committees. |

**See Attachment 18-8-45**

| 18-8-46 | At the April 2016 Standards Council Meeting, the Council reviewed a request from the Technical Committee on Hanging and Bracing of Water-Based Fire Protection Systems to develop a new project for hanging and bracing requirements for a myriad of water-based systems, not merely sprinkler systems.  
After a review of all the material provided, the Council took no action and requested NFPA Staff to come back to the Council with additional information on how this new project would affect the scopes of current documents and to get input from the Committees that would be effected.  
After conducting a survey of all affected Committees, the NFPA is presenting to the Council their findings for the Council’s review along with a proposed committee scope. |
| Proposed Committee Title: | Technical Committee on Hanging and Bracing for Fire Protection Suppression Systems |
| Proposed Committee Scope: | This committee shall have responsibility for developing criteria for the use and installation of components and devices used for the support of fire protection systems and for developing criteria for the protection of fire protection systems against seismic events. This document shall not address the installation of Fire Alarm Systems. |
| See Attachment 18-8-46 SA18-8-46 |

| 18-8-47 | Consider the request of the Technical Committee on Fire Department Rescue Tools to enter new document NFPA 1937, Standard for the Selection, Care, and Maintenance of Rescue Tools, into the Fall 2020 revision cycle. The Council approved the establishment of this proposed document at the April 2014 Council Meeting. See Attachment 18-8-47 |

| 18-8-48 | At the April 2018 Council Meeting, the Council voted to approve the request of William Fiske, Chair of the Technical Committee on Electrical Equipment in Chemical Atmospheres to appoint a task group to correlate the definitions, requirements, and scopes of NFPA 70 (Article 506), NFPA 652, NFPA 484, and NFPA 499 to provide clear guidance of responsibility for determining when combustible dusts are a hazard to ensure the standards are complementary to one another.  
The Task Group has met and is reporting back to the Council with the results of the Task Group Meeting. See Attachment 18-8-48 |
18-8-49  Consider the request of Jason Scott of NASA to develop a standard to establish guidance on the construction and operation of facilities used to house, maintain, and deploy rockets (solid and liquid), spaceplanes, and other similar vehicles. The scope should also include standards for static stands used for testing and development of such vehicles. This project is still soliciting comments. Comments will be shown in the Supplemental Agenda. See Attachment 18-8-49

18-8-50  Consider requests from NFPA Committees to change revision cycles for the following documents:

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<td>3 to 3 ½ rev cycle</td>
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</tr>
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<tr>
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<td>A2021</td>
<td>1 time move</td>
<td>4 to 5 rev cycle</td>
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</tbody>
</table>

* Proposed Issuance at August 2018 Meeting

See Attachment 18-8-50  See SA 18-8-50

18-8-51  At the April 2018 Council Meeting, the Council voted to approve the request of Bassem Khalil, Abu Dhabi Civil Defense, to develop a standard to establish protocols and practices for the use of remote inspections of existing buildings, buildings under construction, and building systems for code compliance. Four comments were received.

At that meeting, the Council directed a call for members interested in serving on the new Committee to establish protocols and practices for the use of remote inspections of existing buildings, buildings under construction, and building systems for code compliance and NFPA Staff to report back to the Council with a committee roster and a scope for the committee.

The Technical Committee on Remote Inspections members were surveyed for their opinion on whether remote inspections should be included in the existing committee’s scope and whether additional committee expertise may be required. NFPA Staff have developed a proposed scope if the Council determines to combine these two projects.

**Proposed Title: Technical Committee on Inspections**

**Proposed Scope:** This Committee shall have primary responsibility for documents establishing the requirements for professional qualifications, professional competence, training, procedures, and equipment used for remote inspections of construction sites; system installations; commissioning and acceptance tests; building life cycle occupancy inspections; and other required inspections; as well as electrical plans examinations. Additionally, this Committee shall have primary responsibility for the application, performance, requirements, protocols and use of remote methodologies, systems and components (including digital video, digital images, digital audio, among others) whether live or submitted as an uploaded file for subsequent review) to:
1. Conduct remote inspections of buildings, structures, and premises, including underground spaces and aerial areas;
2. Protect property during construction and at times when management is not present; and
3. Carry out the procedures for orderly conduct of various operations at the property.

Requirements for collection, custody and maintenance of the data available from remote inspections shall also be the responsibility of this Technical Committee.

See Attachment 18-8-51

<table>
<thead>
<tr>
<th>18-8-52</th>
<th>Report of the Committee Membership Task Group (J. Golinveaux, Chair).</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-8-52-a</td>
<td>Act on pending applications for Committee Members. No Attachment</td>
</tr>
<tr>
<td>18-8-52-b</td>
<td>Disband the Technical Committee on Signaling System – Carbon Monoxide Detection. With the incorporation of NFPA 720 requirements into NFPA 72, the responsibilities of the Technical Committee on Carbon Monoxide Detection are being assumed by existing Signaling System committees. No Attachment</td>
</tr>
<tr>
<td>18-8-52-c</td>
<td>Disband current members of the Technical Committee on Fire Investigation and review the proposed roster for the reorganized Technical Committee on Fire Investigation. No Attachment</td>
</tr>
<tr>
<td>18-8-52-c-1</td>
<td>Four additional comments regarding the reorganization of the Technical Committee on Fire Investigations. No Attachment</td>
</tr>
<tr>
<td>18-8-52-d</td>
<td>Proposed Roster for the Technical Committee on Fire Investigation Units. No Attachment</td>
</tr>
</tbody>
</table>

18-8-53 Report of the Policy and Procedures Task Group (D. O’Connor, Chair). No Attachment

18-8-54 Hear a report from the Recording Secretary on the April 2018 Minutes, which were approved with editorial corrections. No Attachment

18-8-55 The Council will review the dates and locations of upcoming Council meetings, as follows:

- December 6-7, 2018 (Revised)
- TBD

No Attachment
NFPA 400-2016 and Proposed 2019 Editions

Hazardous Materials Code

TIA Log No.: 1361

Reference: 3.3.13 Calcium Ammonium Nitrate (new), 11.1.1.2, and A.3.3.13 (new)

Comment Closing Date: May 17, 2018

Submitter: Gary Vogen, Yara North America, Inc.

www.nfpa.org/400

1. Add a new definition to read as follows:
   
   3.3.13* Calcium Ammonium Nitrate (CAN). A fertilizer containing, as its only essential ingredients, calcium carbonate (e.g., limestone) and/or magnesium carbonate and calcium carbonate (e.g., dolomite), in addition to ammonium nitrate, prepared as a homogenous prill or granule with a minimum carbonates content of 20 percent by weight, a minimum carbonates purity level of 90 percent by weight, and a maximum combustible material content, expressed as carbon, of 0.4 percent by weight.

2. Revise 11.1.1.2 scope as follows:
   
   11.1.1.2 This chapter shall apply to solid ammonium nitrate in the form of crystals, flakes, grains or prills, including fertilizer grade and industrial grade or other mixtures containing 60 percent or more by weight of ammonium nitrate unless otherwise indicated in this chapter. 11.1.1.2.1 Paragraphs 11.1.4.1, 11.1.4.2, 11.1.5.1, 11.2.5, and 11.3.2.3.1 shall not apply when the applicable product is designated as calcium ammonium nitrate (CAN) and meets the definition of 3.3.13.

3. Add new Annex A.3.3.13 as follows:
   
   A.3.3.13 Calcium Ammonium Nitrate (CAN). In the CAN production process, the carbonates are added as a fine powder with a minimum of 80 percent of the powder smaller than 250 microns. Carbonates are either added directly to the CAN granulator or premixed with a concentrated ammonium nitrate solution to produce a homogeneous slurry that is fed into the granulation or prilling section. The solid CAN that is produced contains an intimate homogenous mixture in which each single particle has a similar ammonium nitrate/carbonates ratio.

   Different CAN product blends fall under the scope of this definition, whereas a physical blend of fertilizer grade ammonium nitrate granules or prills with carbonates (e.g., limestone granules or chips) giving the same average chemical composition as CAN does not qualify as CAN in this code if any of its individual blended constituents containing ammonium nitrate have more than 80 percent by weight of ammonium nitrate or are not intimate mixtures of ammonium nitrate and carbonates. CAN designation is exclusively reserved for a fertilizer matching the defined criteria of composition and production.

Substantiation: The current edition of NFPA 400 and previous editions of NFPA 490 determined only one standard of definition for the treatment of all Agricultural grade AN or AN-based products that contain 60% or more AN in their composition. The timing and circumstances surrounding the establishment of this threshold is uncertain and not well documented or substantiated. It is best described today as having been established at the time as a level providing an abundance of caution for AN-based products. The historical records for its establishment are not present and/or do not present scientific support for the threshold level.
Calcium Ammonium Nitrate (CAN) has been produced since 1927 and is a non-oxidizer, non-hazardous fertilizer. CAN is a specifically manufactured form of an AN-based homogenous fertilizer designed expressly to exhibit safety characteristics in transportation, storage and handling that are not present in pure Agricultural grade AN. The specific addition of a prescribed amount of Calcium Carbonate (20%) during the manufacturing process provides the resulting product with a pH balancing quality that will limit the acidity-based risks that are normally present in AN during a fire. This property is not found in any other AN-based product. It clearly cannot be substantiated that CAN was reviewed or tested as an alternative product to determine if its characteristics differed from AN during the establishment of the base threshold.

Because of the specific safety enhancements that CAN contains, we believe that CAN should be treated differently in the NFPA 400 Code from standard agricultural grade AN. When tested in accordance with globally accepted UN test protocol, the product does not contain oxidizing properties, nor is it capable of self-sustaining decomposition. As such, some of the NFPA 400 requirements which restrict the storage structure type should not be necessary when properly storing CAN.

As stated previously, it is our belief that the current NFPA Code 400 and previous NFPA codes providing guidance for storage of AN never properly evaluated the safeguards present in the CAN product. The White Paper and supporting documentation and chemical property analysis that has been provided by Yara North America over the past two years to the NFPA AN Task Group and the NFPA 400 Committee have provided the historical purpose in creating CAN as a safer version of Ag grade AN as well as the supporting documentation, reference and proof of the scientific basis for the safety of the product. In addition, we have obtained and presented as requested a specific definition to properly identify and differentiate CAN from other products, as well as the manufacturing criteria necessary to provide the specific safety qualities of the product. This definition has been endorsed by the members of Fertilizers Europe which includes a high majority of all of the CAN manufacturers in the world.

The current NFPA 400 guidance assumes that the same hazards for AN exist and are present when handling CAN. Using this uniform approach to all AN-based products is incorrect and is restricting the choice of the agricultural sector in promoting the use of a safe alternative crop nutrient in CAN. We think this is inappropriate as pointed out in the literature review and is inconsistent with the product’s treatment in other markets across the globe.

**Emergency Nature:** 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 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.

We have provided the governing bodies with the proper evidence and background to substantiate the need for CAN to be viewed differently from Ag grade AN in certain sections of the NFPA 400 Code. Therefore, it is our request that the NFPA 400 recognize the omission of the specific safety qualities of CAN and issue a Temporary Interim Amendment based on the substantiation provided. The issuance of the TIA would provide immediate and proper guidance to local and jurisdictional agencies on the necessary requirements for CAN as a stored product. It will further allow the industry to provide better access to a safe product necessary for proper nutrition in agricultural production.
MEMORANDUM

TO: Technical Committee on Hazardous Chemicals

FROM: Yvonne Smith, Project Administrator

DATE: June 5, 2018

SUBJECT: NFPA 400 Proposed TIA No. 1361 FINAL TC BALLOT RESULTS

The public comment circulation has passed, therefore, according to 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).

31 Eligible to Vote
5 Not Returned (Buc, Kreitman, Nehmer, Thomas, Wallace)

<table>
<thead>
<tr>
<th>Technical Merit:</th>
<th>Emergency Nature:</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 Abstentions (DerKinderen, LaBerge, Sameth)</td>
<td>2 Abstentions (DerKinderen, Sameth)</td>
</tr>
<tr>
<td>14 Agree</td>
<td>12 Agree (1 w/comment: Mitchell)</td>
</tr>
<tr>
<td>9 Disagree (Dossett, Franklin, Kelly, Kilpatrick, Gresho, James, Ordille, Reilly, Villanueva)</td>
<td>12 Disagree (Cope, Dossett, Franklin, Howell, Kelly, Kilpatrick, Gresho, James, LaBerge, Ordille, Reilly, Villanueva)</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.

\[ 31 \text{ eligible} \div 2 = 15.5 = (16) \]

(2) The number of affirmative votes needed to satisfy the ¾ requirement is 18.

Technical Merit: (31 eligible to vote - 5 not returned - 3 abstentions = 23 \times 0.75 = 17.25)

Emergency Nature: (31 eligible to vote - 5 not returned - 2 abstentions = 24 \times 0.75 = 18)

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 June 10, 2018.

Attachment
Supplemental Agenda Standards Council Meeting August 13-15, 2018

TECHNICAL COMMITTEE LETTER BALLOT
PROPOSED TENTATIVE INTERIM AMENDMENT LOG NO. 1361
of the 2016 and Proposed 2019 Editions of
NFPA 400, Hazardous Materials Code

Ballot Item No. 1:
I agree with the TECHNICAL MERITS of the Proposed TIA to 3.3.13 Calcium Ammonium Nitrate (new), 11.1.1.2, and A.3.3.13 (new)

_____ X _____ AGREE  ___________ DISAGREE*  ___________ ABSTAIN*

EXPLANATION OF VOTE - Please type or print your comments:

*An explanation shall accompany a “disagree” or “abstain” vote.

Ballot Item No. 2:
I AGREE that the subject is of an EMERGENCY NATURE* for one or more of the following reasons (Check all that apply):

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

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

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

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

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

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

_____ ABSTAIN

_____ X _____ DISAGREE The TIA does not meet any of the regulations above warranting a TIA, therefore the TIA is NOT of emergency nature

EXPLANATION OF VOTE - Please type or print your comments:

* An explanation must accompany a “disagree” or “abstain” vote.

I do not feel that substantiation has been provided to show that the changes requested are of an emergency nature and believe that the best way to make these changes is to have them submitted through the Public Input process and allow them to be thoroughly discussed by the committee.
Name (Please Print)
Please return the ballot on or before April 13, 2018.

PLEASE RETURN TO:
Yvonne Smith, Project Administrator
NFPA
1 Batterymarch Park
Quincy, MA 02169

FAX: (617) 984-7110
E-mail: vsmith@nfpa.org
TECHNICAL COMMITTEE LETTER BALLOT
PROPOSED TENTATIVE INTERIM AMENDMENT LOG NO. 1361
of the 2016 and Proposed 2019 Editions of
NFPA 400, Hazardous Materials Code

Ballot Item No. 1:
I agree with the TECHNICAL MERITS of the Proposed TIA to 3.3.13 Calcium Ammonium
Nitrate (new), 11.1.1.2, and A.3.3.13 (new)

________ AGREE ________ DISAGREE*   X    ABSTAIN*

EXPLANATION OF VOTE - Please type or print your comments:

*An explanation shall accompany a “disagree” or “abstain” vote.

Not sufficiently comfortable with knowledge of the
material, industry practice, and notifications of this amendment to make an informed vote.

Ballot Item No. 2:
I AGREE that the subject is of an EMERGENCY NATURE* for one or more of the following reasons
(Check all that apply):

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

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

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situation.

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safeguarding property or life where an alternative method is not in current use or
is unavailable to the public.

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

X   ABSTAIN

________ DISAGREE The TIA does not meet any of the regulations above warranting a TIA, therefore the
TIA is NOT of emergency nature

EXPLANATION OF VOTE - Please type or print your comments:

* An explanation must accompany a “disagree” or “abstain” vote.

See explanation of vote for ballot item No. 1.
Name (Please Print)
Dirk Der Kinderen

Signature

Please return the ballot on or before April 13, 2018.

PLEASE RETURN TO:
Yvonne Smith, Project Administrator
NFPA
1 Batterymarch Park
Quincy, MA 02169

FAX: (617) 984-7110

E-mail: vsmith@nfpa.org
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__________ AGREE  X DISAGREE*  __________ ABSTAIN*

EXPLANATION OF VOTE - Please type or print your comments:

*An explanation shall accompany a “disagree” or “abstain” vote.

Having a product specific chapter is bad enough but including a totally separate product in it because some may think its name sound the same, will make Ch 11 even more confusing. For Ammonium Nitrate, the hazard is severe and so are the requirements – accordingly. This change attempts to included Calcium Ammonium Nitrate in with actual AN and that is a mistake. CAN is not hazardous and the calcium is mixed with AN prior to prilling process so the granules are not AN – they are CAN, which is completely different.

Ballot Item No. 2:
I AGREE that the subject is of an EMERGENCY NATURE* for one or more of the following reasons (Check all that apply):

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

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

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

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

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

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

__________ ABSTAIN  X DISAGREE The TIA does not meet any of the regulations above warranting a TIA, therefore the TIA is NOT of emergency nature

EXPLANATION OF VOTE - Please type or print your comments:

* An explanation must accompany a “disagree” or “abstain” vote.
This TIA is significantly misguided and does not meet any of the regulations warranting a TIA.

Signature

Date 12 MAR 2018

Name (Please Print) MARK DUSSELL

Please return the ballot on or before April 13, 2018.

PLEASE RETURN TO:
Yvonne Smith, Project Administrator
NFPA
1 Batterymarch Park
Quincy, MA 02169

FAX: (617) 984-7110 E-mail: ysmith@nfpa.org
TECHNICAL COMMITTEE LETTER BALLOT
PROPOSED TENTATIVE INTERIM AMENDMENT LOG NO. 1361
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Ballot Item No. 1:
I agree with the TECHNICAL MERITS of the Proposed TIA to 3.3.13 Calcium Ammonium
Nitrate (new), 11.1.1.2, and A.3.3.13 (new)

_________ AGREE   _______X____ DISAGREE*   __________ ABSTAIN*

EXPLANATION OF VOTE - Please type or print your comments:

*An explanation shall accompany a “disagree” or “abstain” vote.
While the AN task group reviewed chemical composition data and explosive tests for CAN
compared to AN that could be used to argue that CAN is less explosive or detonable than AN,
these risks still exist because there is not sufficient calcium carbonate to react with all the nitric
acid that could be generated in event of decomposition of CAN in a fire. Elimination of the
calcium carbonate via acid neutralization during decomposition reactions would still leave a
majority of the original AN available for further decomposition that could lead to an explosion in
fire conditions. Therefore, I believe the scope of applicability for Chapter 11 in section 11.1.1.2
should include (not exclude) CAN.

Ballot Item No. 2:
I AGREE that the subject is of an EMERGENCY NATURE* for one or more of the following reasons
(Check all that apply):

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

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

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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.

_________ ABSTAIN

_________ X________ DISAGREE The TIA does not meet any of the regulations above warranting a TIA, therefore
the TIA is NOT of emergency nature

EXPLANATION OF VOTE - Please type or print your comments:
* An explanation must accompany a “disagree” or “abstain” vote.

The substantiation in the proposed TIA asserts that it 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. I disagree that an alternative method of safeguarding property or life in not in current use or is unavailable to the public. The safeguards in Chapter 11 for storage and handling of ammonium nitrate, which include requiring buildings and bins storing ammonium nitrate to be constructed of non-combustible materials and/or use of automatic fire sprinkler systems, are in current use and available to the public.

The substantiation in the proposed TIA asserts that 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. I disagree with this assertion. The adverse impact of the NFPA Chapter 11 revisions on storage requirements for CAN was not inadvertently overlooked in total revision process. The AN task group has been looking at the issue of CAN, its properties and risks, after the matter was brought to the committee’s attention for some time and the AN task group gave an update of its work at the last NFPA 400 committee meeting held on September 19-21, 2017 as reflected in the minutes of this meeting. However, the task group was still reviewing information on CAN and had not completed its review or made any recommendations to the full committee regarding changing the scope of applicability of Chapter 11 for CAN. There was not time sufficient in the 2019 edition review cycle to introduce any changes to Chapter 11 for CAN for consideration and review by the full committee and the public, and I believe that the committee thought that any potential changes would have to be addressed in the next version (2022) of NFPA 400. The exemption of CAN from important safeguards in Chapter 11 is something that merits further debate and review and should not be incorporated into the standard without having the benefit of public review and full discussion at a committee meeting, which is not possible by incorporating changes to Chapter 11 via a technical interim amendment.

Likewise, I disagree that the assertion that inclusion of CAN in Chapter 11 was without adequate technical (safety) justification. While the basis of 60% AN level can be debated, I don’t believe disregarding it for only CAN (which by its new proposed definition could contain 80% AN) is justified without fuller review by the full committee and the public.

Also note that the proposed TIA creates a new paragraph 11.1.1.2.1 which references paragraph 11.1.5.1, which does not exist. I assume it meant to reference paragraph 11.1.5.

Signature
Kathleen Franklin

Date
4-2-18

Name (Please Print)
Kathleen Franklin

Please return the ballot on or before April 13, 2018.

PLEASE RETURN TO:
Yvonne Smith, Project Administrator
NFPA
1 Batterymarch Park
Quincy, MA 02169

FAX: (617) 984-7110
E-mail: ysmith@nfpa.org
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Nitrate (new), 11.1.1.2, and A.3.3.13 (new)

_________ AGREE  ________ X  DISAGREE*  ________ ABSTAIN*

EXPLANATION OF VOTE - Please type or print your comments:

*An explanation shall accompany a “disagree” or “abstain” vote.
CAN is not ammonium nitrate. CAN is safe and AN is not. If fact the substantiation states that
CAN is nonhazardous. During TG deliberations I asked for CAN to be characterized per NFPA
400 which can prove that it is nonhazardous. This was not done, but if it were, I expect CAN would not
meet any of the thresholds to be considered a hazardous material and thus none of NFPA 400 applies.

Making the changes requested will pull CAN into Chapter 11 (with the requested exemptions) which is
intended for AN which is very hazardous. This is a mistake. The use of CAN should be encouraged as a
low hazard option to high hazard AN by clearly explaining (in annex) that Ch 11 and all of NFPS 400
does not apply.

Ballot Item No. 2:
I AGREE that the subject is of an EMERGENCY NATURE* for one or more of the following reasons
(Check all that apply):

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

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

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

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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.

_________ ABSTAIN

_____ X  DISAGREE The TIA does not meet any of the regulations above warranting a TIA, therefore
the TIA is NOT of emergency nature
EXPLANATION OF VOTE - Please type or print your comments:
* An explanation must accompany a “disagree” or “abstain” vote.

The current text, if erroneously interpreted to apply to CAN, is conservative. No emergency exists.

Signature
Martín Gresko

Name (Please Print)

Date

Please return the ballot on or before April 13, 2018.

PLEASE RETURN TO:
Yvonne Smith, Project Administrator
NFPA
1 Batterymarch Park
Quincy, MA 02169

FAX: (617) 984-7110

E-mail: vsmith@nfpa.org
TECHNICAL COMMITTEE LETTER BALLOT
PROPOSED TENTATIVE INTERIM AMENDMENT LOG NO. 1361
of the 2016 and Proposed 2019 Editions of
NFPA 400, Hazardous Materials Code

Ballot Item No. 1:
I agree with the TECHNICAL MERITS of the Proposed TIA to 3.3.13 Calcium Ammonium
Nitrate (new), 11.1.1.2, and A.3.3.13 (new)

_________ AGREE _______X____ DISAGREE* _________ ABSTAIN*

EXPLANATION OF VOTE - Please type or print your comments:

*An explanation shall accompany a “disagree” or “abstain” vote.

I was not part of the technical committee at the time of the First and Second DRAFT
meetings, and therefore am unaware of the discussion or debates at that time in response to
the technical information presented by Yara. Nonetheless, NFPA 400 already makes the
point that Ammonium Nitrate containing products are primarily regulated by their hazard
level not by their name (see A.11.1.1). Therefore, if CAN or any other AN containing
product does not meet the criteria to be regulated as an oxidizer or unstable reactive or
other hazardous materials, then the current code already provides a mechanism for proper
treatment. A future update to the Appendix entry to mention CAN explicitly may be
worthwhile.

Ballot Item No. 2:
I AGREE that the subject is of an EMERGENCY NATURE* for one or more of the following reasons
(Check all that apply):

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

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

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

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

__________ ABSTAIN

____ x _____ DISAGREE The TIA does not meet any of the regulations above warranting a TIA, therefore the TIA is NOT of emergency nature

EXPLANATION OF VOTE - Please type or print your comments:
* An explanation must accompany a “disagree” or “abstain” vote.

The code already has sufficient language to properly address substances that appear hazardous by their name, but do not exhibit the actual hazards for which the code is intended to be applied.

__________________________  ____________________________
Signature  Date

Alwin A. Kelly
Name (Please Print)

Please return the ballot on or before April 13, 2018.

PLEASE RETURN TO:
Yvonne Smith, Project Administrator
NFPA
1 Batterymarch Park
Quincy, MA 02169  FAX: (617) 984-7110  E-mail: ysmith@nfpa.org

April 22, 2018
TECHNICAL COMMITTEE LETTER BALLOT
PROPOSED TENTATIVE INTERIM AMENDMENT LOG NO. 1361
of the 2016 and Proposed 2019 Editions of
NFPA 400, Hazardous Materials Code

Ballot Item No. 1:
I agree with the TECHNICAL MERITS of the Proposed TIA to 3.3.13 Calcium Ammonium Nitrate (new), 11.1.1.2, and A.3.3.13 (new)

_______ AGREE ______ X______ DISAGREE* _________ ABSTAIN*

EXPLANATION OF VOTE - Please type or print your comments:

*An explanation shall accompany a “disagree” or “abstain” vote.
CAN is not ammonium nitrate. CAN is safe and AN is not. In fact the substantiation states that CAN is nonhazardous. During TG deliberations at least one TC member asked for CAN to be characterized per NFPA 400 which can prove that it is nonhazardous. This was not done, but if it were, I expect CAN would not meet any of the thresholds to be considered a hazardous material and thus none of NFPA 400 applies.

Making the changes requested will pull CAN into Chapter 11 (with the requested exemptions) which is intended for AN which is very hazardous. This is a mistake. The use of CAN should be encouraged as a low hazard option to high hazard AN by clearly explaining (in annex) that Ch 11 and all of NFPA 400 does not apply.

Ballot Item No. 2:
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_____ 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.

_______ ABSTAIN ______ X______ DISAGREE The TIA does not meet any of the regulations above warranting a TIA, therefore the TIA is NOT of emergency nature.
EXPLANATION OF VOTE - Please type or print your comments:

* An explanation must accompany a “disagree” or “abstain” vote.

The current text, if erroneously interpreted to apply to CAN, is conservative. No emergency exists.

Signature

Date

Name (Please Print)

Please return the ballot on or before April 13, 2018.

PLEASE RETURN TO:

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1 Batterymarch Park
Quincy, MA 02169

FAX: (617) 984-7110
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**TECHNICAL COMMITTEE LETTER BALLOT**
**PROPOSED TENTATIVE INTERIM AMENDMENT LOG NO. 1361**
of the 2016 and Proposed 2019 Editions of
NFPA 400, Hazardous Materials Code

**Ballot Item No. 1:**
I agree with the TECHNICAL MERITS of the Proposed TIA to 3.3.13 Calcium Ammonium
Nitrate (new), 11.1.1.2, and A.3.3.13 (new)

[ ] AGREE [ ] DISAGREE* [ ] ABSTAIN*

**EXPLANATION OF VOTE - Please type or print your comments:**

*An explanation shall accompany a “disagree” or “abstain” vote.

**Ballot Item No. 2:**
I AGREE that the subject is of an EMERGENCY NATURE* for one or more of the following reasons
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B. The NFPA Standard contains a conflict within the NFPA Standard or with
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C. The proposed TIA intends to correct a previously unknown existing hazard.

D. The proposed TIA intends to offer to the public a benefit that would lessen a
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   inadvertently overlooked in the total revision process or was without adequate
   technical (safety) justification for the action.

[ ] ABSTAIN

[ ] DISAGREE The TIA does not meet any of the regulations above warranting a TIA, therefore the
TIA is NOT of emergency nature

**EXPLANATION OF VOTE - Please type or print your comments:**

* An explanation must accompany a “disagree” or “abstain” vote.

I can not agree that removing safeguards,
even if unjustified, is an emergency

Signature

PETER HOWELL

Name (Please Print)

Please return the ballot on or before April 13, 2018.

PLEASE RETURN TO:
Yvonne Smith, Project Administrator
NFPA
1 Batterymarch Park
Quincy, MA 02169
FAX: (617) 984-7110
E-mail: vsmith@nfpa.org
TECHNICAL COMMITTEE LETTER BALLOT
PROPOSED TENTATIVE INTERIM AMENDMENT LOG NO. 1361
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Ballot Item No. 1:
I agree with the TECHNICAL MERITS of the Proposed TIA to 3.3.13 Calcium Ammonium Nitrate (new), 11.1.1.2, and A.3.3.13 (new)

_________ AGREE       _____ DISAGREE*       _________ ABSTAIN*

EXPLANATION OF VOTE - Please type or print your comments:

*An explanation shall accompany a “disagree” or “abstain” vote.
I agree that this technical issue should be reviewed, but I feel it should be presented and made available for full public review and process. I understand this approach follows NFPA regulations for process but I feel this change should not be submitted as a TIA. Regarding the few technical questions, Section 11.1.4.1, 11.1.4.2, and 11.3.2.3.1 regarding use of non-combustible construction materials for new building and bins used to store the CAN material needs to be reviewed. I agree that testing that was shared with the committee tested the CAN material supported the idea that CAN material does not appear to be capable of self-sustaining decomposition, within a combustible structure supporting the fire. I am not sure what reaction will occur. Additional information and studies of fire involving CAN in combustible building would be helpful. For these reasons, I do not feel this change has the needed technical merits to move forward at this time.

Ballot Item No. 2:
I AGREE that the subject is of an EMERGENCY NATURE* for one or more of the following reasons (Check all that apply):

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_________ ABSTAIN

_____ DISAGREE The TIA does not meet any of the regulations above warranting a TIA, therefore the TIA is NOT of emergency nature
EXPLANATION OF VOTE - Please type or print your comments:
* An explanation must accompany a “disagree” or “abstain” vote.

I agree that this change needs to be reviewed and that further discussion is needed through the technical committee and the industry regarding future modification for this highlighted material. I do not agree that this change requires emergency action. As indicated these regulation appeared in earlier editions of NFPA 400 as well as NFPA 490 (the base document used to develop NFPA 400) and that CAN has been produced since 1927. So I support the submitting of this or similar proposals for future considerations in future editions.

Signature ___________________________ 04/11/2018

Date

Robert James
Name (Please Print)
Please return the ballot on or before April 13, 2018.

PLEASE RETURN TO:

Yvonne Smith, Project Administrator
NFPA
1 Batterymarch Park
Quincy, MA 02169  FAX: (617) 984-7110  E-mail: ysmith@nfpa.org
TECHNICAL COMMITTEE LETTER BALLOT
PROPOSED TENTATIVE INTERIM AMENDMENT LOG NO. 1361
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Ballot Item No. 1:
I agree with the TECHNICAL MERITS of the Proposed TIA to 3.3.13 Calcium Ammonium
Nitrate (new), 11.1.1.2, and A.3.3.13 (new)

_________ AGREE _________ DISAGREE* _________ ABSTAIN*

EXPLANATION OF VOTE - Please type or print your comments:

*An explanation shall accompany a “disagree” or “abstain” vote.
After reviewing this issue and the relevant Code sections, I believe that I am not sufficiently educated
on the hazards of AN vs. CAN to render a judgment. I defer to my more experienced colleagues. I
appear that this warrants further Committee review and public input.

Ballot Item No. 2:
I AGREE that the subject is of an EMERGENCY NATURE* for one or more of the following reasons
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______ A. The standard contains an error or an omission that was overlooked during the
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________ ABSTAIN

______ DISAGREE The TIA does not meet any of the regulations above warranting a TIA, therefore the
TIA is NOT of emergency nature

EXPLANATION OF VOTE - Please type or print your comments:

* An explanation must accompany a “disagree” or “abstain” vote.

This issue was discussed, and is still being reviewed by the Committee as I recall from the
September 2017 meeting. This does not seem to warrant an emergency status.
Signature
Todd LaBerge

Name (Please Print)

Please return the ballot on or before April 13, 2018.

PLEASE RETURN TO:
Yvonne Smith, Project Administrator
NFPA
1 Battymarch Park
Quincy, MA 02169

FAX: (617) 984-7110

E-mail: vsmith@nfpa.org
TECHNICAL COMMITTEE LETTER BALLOT
PROPOSED TENTATIVE INTERIM AMENDMENT LOG NO. 1361

Ballot Item No. 1:
I agree with the TECHNICAL MERITS of the Proposed TIA to 3.3.13 Calcium Ammonium Nitrate (new), 11.1.1.2, and A.3.3.13 (new)

__________ AGREE  __________ X _______ DISAGREE*  __________ ABSTAIN*

EXPLANATION OF VOTE - Please type or print your comments:

*An explanation shall accompany a “disagree” or “abstain” vote.

Upon review of the commentary on the submitted ballots, I am now in agreement with some of the submitted negative ballots that if CAN is not a hazardous material, perhaps all that is needed is Annex material explaining the difference in hazards and risks between AN and CAN and a statement that the requirements of Chapter 11 are not applicable to CAN. I would also not like to see a precedence set involving definitions of non-hazardous materials being including in Chapter 3 of the document. I believe the forum for how CAN should be addressed in the document would be at the next TC meeting where an open discussion can take place. Submitting the issue in a TIA format with ensuing revisions during the balloting time period is not the forum for this subject.

Ballot Item No. 2:
I AGREE that the subject is of an EMERGENCY NATURE* for one or more of the following reasons (Check all that apply):

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__________ ABSTAIN  

__________ X _______ DISAGREE  The TIA does not meet any of the regulations above warranting a TIA, therefore the TIA is NOT of emergency nature.
EXPLANATION OF VOTE - Please type or print your comments:
* An explanation must accompany a "disagree" or "abstain" vote.

_It is not like CAN is a new material on the market; it has been out there for a considerable number of years. I would agree that with the emphasis now being placed on AN there is a need to differentiate between AN and CAN, but I do not see it meeting any of the EMERGENCY NATURE criteria at this time._

________________________________________
Signature

________________________________________
Date

_Anthony M. Ordile_  
Name (Please Print)  
Please return the ballot on or before **April 13, 2018**.

**PLEASE RETURN TO:**  
Yvonne Smith, *Project Administrator*  
NFPA  
1 Battery March Park  
Quincy, MA 02169  
FAX: *(617) 984-7110*  
E-mail: vsmith@nfpa.org
TECHNICAL COMMITTEE LETTER BALLOT
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Nitrate (new), 11.1.1.2, and A.3.3.13 (new)

xxxxx AGREE xxxxx DISAGREE* xxxxx ABSTAIN*

EXPLANATION OF VOTE - Please type or print your comments:

* An explanation shall accompany a disagree or abstain vote.

By NFPA definition, segregated storage would allow storage, with an MAQ, of
incompatible materials in the same room separated by distance, partitions, etc. I
believe this is an unsafe practice and a far leap from current requirements.

Ballot Item No. 2:
I AGREE that the subject is of an EMERGENCY NATURE* for one or more of the following reasons
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technical (safety) justification for the action.

xxxxx ABSTAIN

x DISAGREE The TIA does not meet any of the regulations above warranting a TIA, therefore the
TIA is NOT of emergency nature

EXPLANATION OF VOTE - Please type or print your comments:

* An explanation must accompany a “disagree” or “abstain” vote.

By NFPA definition, segregated storage would allow storage, with an MAQ, of
incompatible materials in the same room separated by distance, partitions, etc. I
believe this is an unsafe practice and a far leap from current requirements.
4/13/2018

Signature
Michael T. Reilly

Date

Name (Please Print)
Please return the ballot on or before April 13, 2018.

PLEASE RETURN TO:
Yvonne Smith, Project Administrator
NFPA
1 Batterymarch Park
Quincy, MA 02169

FAX: (617) 984-7110

E-mail: ysmith@nfpa.org
TECHNICAL COMMITTEE LETTER BALLOT
PROPOSED TENTATIVE INTERIM AMENDMENT LOG NO. 1361
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Ballot Item No. 1:
I agree with the TECHNICAL MERITS of the Proposed TIA to 3.3.13 Calcium Ammonium Nitrate (new), 11.1.1.2, and A.3.3.13 (new)

_________ AGREE _________ DISAGREE* _______x____ ABSTAIN*

EXPLANATION OF VOTE - Please type or print your comments:

*An explanation shall accompany a “disagree” or “abstain” vote.
___CGA did not establish a consensus position on this issue.

Ballot Item No. 2:
I AGREE that the subject is of an EMERGENCY NATURE* for one or more of the following reasons (Check all that apply):

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

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_____   x____ ABSTAIN

_________ DISAGREE The TIA does not meet any of the regulations above warranting a TIA, therefore the TIA is NOT of emergency nature

EXPLANATION OF VOTE - Please type or print your comments:

* An explanation must accompany a “disagree” or “abstain” vote.

CGA did not establish a consensus position on this issue.
Jerrold D. Sameth

Signature

Date: March 28, 2018

Jerrold D. Sameth
Name (Please Print)
Please return the ballot on or before April 13, 2018.

PLEASE RETURN TO:
Yvonne Smith, Project Administrator
NFPA
1 Batterymarch Park
Quincy, MA 02169

FAX: (617) 984-7110

E-mail: ysmith@nfpa.org
TECHNICAL COMMITTEE LETTER BALLOT
PROPOSED TENTATIVE INTERIM AMENDMENT LOG NO. 1361
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Ballot Item No. 1:
I agree with the TECHNICAL MERITS of the Proposed TIA to 3.3.13 Calcium Ammonium
Nitrate (new), 11.1.1.2, and A.3.3.13 (new)

________ AGREE    _______ DISAGREE*    _______ ABSTAIN*

EXPLANATION OF VOTE - Please type or print your comments:

*An explanation shall accompany a “disagree” or “abstain” vote.

The TIA indicates that the hazard of CAN is less than AN. It then proposes to only exclude certain sections
of Chapter 11, specifically allowing the material to be stored in a combustible building (11.1.4.1) and in
combustible compartments (11.1.4.2); allowing storage without sprinkler protection or at least without
providing any guidance on sprinkler protection (11.1.5.1, 11.2.5) and finally to be stored in combustible
bins (11.3.2.3.1). Just the presents of combustible construction would justify the installation of automatic
sprinkler protection and there is no real justification for using a combustible building. No other elements of
Chapter 11 are excluded. Also, none of the supporting technical documentation was provided with TIA.
The proposed approach appears only somewhat thought through. Why does the majority of Chapter 11
apply to a material that is claimed to be limited or no hazard? Why only target requirements that would
make sense for any type of storage regardless of hazard. If CAN is a reduced hazard from AN, it would
make sense to develop a technically sound technical change to Chapter 11 were potentially lesser protection
requirements are provided. If no protection is needed, then technical documentation should be provided
indicating that the material is noncombustible. If combustible construction is used, sprinklers are needed to
protect the construction. Finally, since not all parties were around during the reported two years of
discussion surrounding the hazards presented by CAN, all technical documentation that would support the
TIA should be provided with the submittal.

Ballot Item No. 2:
I AGREE that the subject is of an EMERGENCY NATURE* for one or more of the following reasons
(Check all that apply):

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- C. The proposed TIA intends to correct a previously unknown existing hazard.
- D. The proposed TIA intends to offer to the public a benefit that would lessen a
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  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.
ABSTAIN

X DISAGREE The TIA does not meet any of the regulations above warranting a TIA, therefore the TIA is NOT of emergency nature

EXPLANATION OF VOTE - Please type or print your comments:
* An explanation must accompany a "disagree" or "abstain" vote.

If the discussions around the hazards of CAN have been going on for two years, there is no reason these changes should not have been handled through the normal committee process. The uncertain impact of the proposed changes suggests this should be handled during the next cycle of the committee and since this material has been around for a very long time and covered by at least two documents in a similar fashion, there does not seem to be any large justification for the emergency nature of this change.

Signature 04/12/2018

Irene Uriarte Villanueva
Name (Please Print)
Please return the ballot on or before April 13, 2018.

PLEASE RETURN TO:
Yvonne Smith, Project Administrator
NFPA
1 Batterymarch Park
Quincy, MA 02169

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E-mail: ysmith@nfpa.org
TECHNICAL COMMITTEE LETTER BALLOT
PROPOSED TENTATIVE INTERIM AMENDMENT LOG NO. 1361
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Ballot Item No. 1:

I agree with the TECHNICAL MERITS of the Proposed TIA to 3.3.13 Calcium Ammonium Nitrate (new), 11.1.1.2, and A.3.3.13 (new)

✓ AGREE □ DISAGREE* □ ABSTAIN*

EXPLANATION OF VOTE - Please type or print your comments: *An explanation shall accompany a “disagree” or “abstain” vote.

Ballot Item No. 2:
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 B. The NFPA Standard contains a conflict within the NFPA Standard or with another NFPA Standard.

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 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.

 ABSTAIN

 DISAGREE The TIA does not meet any of the regulations above warranting a TIA, therefore the TIA is NOT of emergency nature
EXPLANATION OF VOTE - Please type or print your comments: * An explanation must accompany a “disagree” or “abstain” vote.

I support the Technical Merits presented by the submitter, proponents and supporting commenter. However, I do not support the first cited EMERGENCY NATURE of TIA 1361, f"The proposed TIA intends to accomplish a recognition of an advance in the art of safe guarding property or life where an alternative method is not in current use or is unavailable to the public."} for the following reason: a). As cited in the Appendix Text, CAN has been produced since 1927; therefore, it (CAN) is not a notable current advancement in the art of safe-guarding property at this form of AN has been used for many years. I do, however, agree with and support the submitters 2nd purported EMERGENCY NATURE citation (SF).

Signature Date

Kirk Mitchell

Name (Please Print)

Please return the ballot on or before April 13, 2018.

PLEASE RETURN TO:
Yvonne Smith, Project Administrator
NFPA
1 Batterymarch Park
Quincy, MA 02169 FAX: (617) 984-7110 E-mail: ysmith@nfpa.org
May 17, 2018

NFPA 400-2016 and Proposed 2019 Editions

Hazardous Materials Code

Re: TIA Log No.: 1361

Reference: 3.3.13 Calcium Ammonium Nitrate (new), 11.1.1.2; and A.3.3.13 (new)

The Agricultural Retailers Association (ARA) writes in support of the proposed amendments (TIA Log No.: 1361) to the NFPA 400 regarding Calcium Ammonium Nitrate (CAN). ARA is a not-for-profit trade association that represents the nation’s agricultural retailers and distributors. ARA members provide goods and services to farmers and ranchers which include: fertilizer, crop protection chemicals, seed, crop scouting, soil testing, custom application of pesticides and fertilizers, and development of comprehensive nutrient management plans. Retail and distribution facilities are scattered throughout all 50 states and range in size from small family-held businesses or farmer cooperatives to large companies with multiple outlets.

Ammonium nitrate (AN) is a unique fertilizer that has important purposes in the agricultural industry. Certain regions in the country require AN in order for the crops to yield their potential. However, as you know, AN is an oxidizer and has the capacity to be an explosive. The product deserves special attention to how it is stored and handled.

ARA shares the goal of NFPA to create consistent and predictable standards to properly handle products. ARA is constantly looking to improve the workplace safety and security for our members and their employees. The Association supports scientifically proven products that will help protect the industry, its workers, and the surrounding communities.

ARA has worked diligently to provide the industry with resources to safely and securely handle AN products. ARA is a committed partner to ResponsibleAg, which was created to assist ag retailers comply with environmental, health, safety and security rules regarding the safe handling and storage
of fertilizer products, especially AN. Furthermore, ARA has produced the “Safety and Security Guidelines for the Storage and Transportation of Fertilizer Grad Ammonium Nitrate at Fertilizer Retail and Distribution Facilities” in conjunction with The Fertilizer Institute and ResponsibleAg.

ARA continues to advocate for consistent definitions of AN and AN mixtures within U.S. government agencies. For example, the Department of Homeland Security defines the product differently from the Occupational Safety and Health Administration, which defines the product differently from the Department of Transportation.

CAN has a different chemical makeup than AN products that are regulated by Chapter 11 of the NFPA 400. This chemical difference provides for an enhanced level of safe storage and handling of the product. Unlike AN, CAN is considered a non-oxidizer. It has been manufactured since 1927 and has never been involved in an accidental explosion resulting from fire. The NFPA 400 should reflect the industrial safety enhancement characteristics of CAN. ARA supports the proposed amendments to the NFPA 400 to observe the safety benefits of CAN.

Sincerely,

Kyle Liske
Public Policy Counsel
Agricultural Retailers Association
May 16, 2018

Secretary, Standards Council NFPA
1 Batterymarch Park
Quincy, MA 02169-7471

Re: Public Comment - TIA #1361, NFPA 400

Submitted by: Gary Vogen, VP Corporate Affairs
Yara North America, Inc.

Yara North America, Inc. is providing the following comments and additional supporting documentation in support of the NFPA 400 Proposed TIA No. 1361.

As the petitioner for this Amendment, Yara followed the guidance of the NFPA and presented a White Paper, broad historic literature review and supporting scientific test documentation regarding the chemical properties and safety characteristics designed into the manufacturing process for Calcium Ammonium Nitrate (CAN). That instruction included working with the NFPA 400 Ammonium Nitrate (AN) Task Group to review the documented evidential scientific findings for understanding the safety of CAN.

Following the instructions of the NFPA staff we presented significant detailed information to the AN Task Group but only a limited overview to the Technical Committee as a whole. Had we better understood the TIA review and balloting process, we would have submitted all of this information earlier along with our TIA request to all involved in this review. Attached hereto, is a copy of the White Paper which outlines the specific scientific characteristics of CAN, its clear differences from solid AN, its historical global testing and literature review and its recognition and treatment as a safe product by other jurisdictions around the globe. This paper served as a basis for the discussion and subsequent material presentation to the Task Group. Additional technical information raised throughout the discussion with the Task Group is incorporated herein.

We also understand that there are questions as to whether the current process is appropriate for a review of this product and the safety standards that should be applied. The Task Force and the Technical Committee are charged with having to make an “emergency determination” and several reviewers, while acknowledging the greater safety CAN provides over AN, concluded that our application fails to satisfy this requirement. While we acknowledge that no emergency exists in terms of a threat to the community by the failure to ease the classification of this product, we submit that a failure to do so will result in a harm not only to the companies that manufacture CAN but to farmers and retailers who would be severely restricted in their access to a fertilizer product that is the most efficient and agronomically beneficial fertilizer available for certain applications and which our research demonstrates has a much higher level of safety than AN.
The Designed Safety of CAN

Calcium Ammonium Nitrate (CAN) is a safe fertilizer. Produced and sold since 1927, CAN is a specifically manufactured form of AN-based homogenous fertilizer expressly designed to be a non-oxidizing, non-hazardous fertilizer and to exhibit safety characteristics in transportation, storage and handling that are not present in pure Agricultural grade AN. There is no other reason to manufacture CAN other than to produce a safer form of AN. The specific addition of a prescribed amount of Calcium Carbonate (20%) during the manufacturing process provides the resulting product with a pH balancing quality that will limit the acidity-based risks that are normally present in AN during a fire. This property is not found in any other AN-based product. Over the past 91 years that this product has been manufactured, there is no recorded report of an accidental explosion of CAN originating as a result of fire.

A key component to accepting and endorsing the safety of CAN is in recognizing that it is a unique and individual product with specific manufacturing requirements necessary to create the inherent characteristics that will buffer an acidic reaction of the product and eliminate the risk of explosion in the event of fire. These specific formula requirements are fully recognized and required by international and national transportation safety organizations for proper safety classification during transport and are now also incorporated into the market by the manufacturing community in a specific definition endorsed by the members of Fertilizers Europe which includes a large majority of all of the CAN manufacturers in the world. This definition will help to properly identify CAN and allow for the differentiation from imitation products which do not have the inherent safety characteristics present in CAN. We are recommending that this definition be added to the NFPA Code and the manufacturing criteria be specified in the Annex in order to continue the uniformity, consistency and clarity necessary for the proper reference and identification of this product. Attached are the recommended additions to the Definitions of NFPA 400 Code and Annex A which we feel would ensure safety, uniformity and clarity for the proper reference and identification of this product.

The Inherent Risk Reduction Safety Characteristics of CAN

In order to understand the behavior of CAN when exposed to fire, one must consider its inherent properties. The addition of limestone (the “C") during manufacture reduces the exothermic decomposition of the AN in a fire and prevents uncontrolled decomposition. The key point is obviously that AN decomposition is acid-catalyzed. With limestone or dolomite being alkaline compounds, their presence significantly slows down any decomposition reaction. When decomposition is slowed down, the bubbling (gassing) or aeration of molten material is exponentially reduced. Since aeration is a significant factor in increasing the explosion sensitivity of the material, the result is a decrease or elimination of the risk of explosion. So it is not just that the decomposition reactions are slowed down which in itself is a chemical safeguard, it is also that bubbling (gassing) is decreased. The reduced aeration equates to a higher density and increases the physical safety of the material.

The reaction mechanism of AN involving limestone and/or dolomite is explained in our attached White Paper which references several test studies. In summary the key points are that:

- Adding limestone or dolomite in specified amounts, results in a pH buffering effect whereby all reactions are slowed down. (see ref. Oxley ; NFPA report 4994 (Burns et al., 1953)
- Reaction with the filler, results in some of the AN being consumed in producing calcium or calcium/magnesium salts further reducing the remaining AN concentration to less than 60 percent which is then considered non-detonable and below NFPA and other accepted industry standards.
Regarding stoichiometry of the ingredients, part of the AN gets consumed by reacting with the carbonaceous material, part of the AN is also dissociating in ammonia and nitric acid which can evaporate at high temperatures involved in a fire, at the difference to calcium or magnesium nitrate being formed. Said differently, the theoretical consumption of carbonaceous material leads to a conservative value of remaining AN, true value being lower.

For formulations containing 80% AN and 20% CaCO3, this results stoichiometrically to ~59% remaining AN (with the rest being calcium nitrate), while 80% AN and 20% dolomite would lead to ~56% remaining AN (the rest being calcium and magnesium carbonates). Both formulations result in mixtures with less than 60% AN, which is not capable of explosion and also below the cautionary NFPA guidance threshold.

Further, consumption of calcium carbonate by AN in a fire generates the release of ammonia gas. Therefore, in a molten pool of CAN, the limestone may settle but the ammonia gases bubbling up are actually ammoniating back the potentially acidic AN of the “pool” above. More importantly, in the melt remaining pH buffer, the catalytic effect of acid is neutralized. The same applies to chloride as a well-known contaminant and strong accelerator of AN decomposition. However, this effect is only true providing acidic conditions, so in the case of CAN the alkalinity supplied by the limestone also tackles other decomposition catalysts that require acidic conditions to get a negative effect.

**Testing Results Proving the Safety of CAN**

Our White Paper discusses the effect of limestone under a test explosion. (See the demonstration of the explosive effect of adding various concentrations of calcium carbonate to AN on page 16). These tests show that, in the event of an externally caused explosion, an AN-based product which contains 20% limestone causes an endothermic decomposition of (some of the) CaCO3 resulting in less heat thus helping to let the explosion dissipate. Testing under the standard EC Resistance to Detonation test also proved that CAN would not detonate: (1) under extreme conditions such as degradation and excessive thermo-cycling of the product; or (2) even during a large scale detonation test that sought to force CAN to detonate.

Yara also presented research results to the Task Group which are referenced in the NFPA 400 Annex E, to the U.S. Bureau of Mines Report of Investigations 4994, “Investigations on the Explosibility of Ammonium Nitrate.” In this report, the Bureau outlines the findings from tests conducted on the effect of adding certain inert diluents, such as chalk, limestone and dolomite to AN. These tests were performed using an intentional booster in an attempt to detonate the product and then measure the effect. So while these tests do not actually monitor the product during a fire scenario, they do present proven tests results which highlight the acidity limiting/ buffering effect that the calcium carbonate has on the AN and the subsequent reduction of explosibility. Two excerpts from the report’s conclusion are recorded below.

- “The data from these tests (table 6) show that addition of about 25 percent of chalk, dolomite, magnesite, or diatomite-limestone mixture to ammonium nitrate will render it nonexplosive.”
- “Conclusion: The explosion hazard of ammonium nitrate can be materially decreased by adding 25 percent, by weight, of some inert diluent, such as limestone.”

The information and history provided in support of the safety of CAN is consistent and undeniable and the technical merit is well substantiated.
Changes necessary to promote the use of a safer product

Regarding the emergency nature of the request, while CAN has obviously been available as a safe product for many years, the historic enforcement threshold set within the NFPA seems to not have considered this scientific data and evaluation when the threshold was set. The current edition of NFPA 400 and previous editions of NFPA 490 determined only one standard of definition for the treatment of all Agricultural grade AN or AN-based products that contain 60% or more AN in their composition. While the circumstances surrounding the establishment of this threshold are not well substantiated, the threshold has been best described today by NFPA as having been established at the time as a level providing an abundance of caution for AN-based products. The historical records for its establishment are not present and/or do not present scientific support for the threshold level.

For many years, this abundance of caution standard was on the books but not enforced. In an era of heightened sensitivity, government agencies have recently imposed more rigorous enforcement of this standard and that is significantly affecting the availability of CAN even though CAN has never been shown to have been involved in any explosion or fire where CAN contributed to the risk. For example, sales of FGAN and CAN have declined dramatically by 40% and 30% percent, respectively, from 2014 to present. The effect of full enforcement of the current standard is resulting in a loss to the agricultural community not only of AN, but also other products, like CAN which have been shown to be much safer but are caught up in the rush to provide a higher level of protection. While this is understandable given the risk that AN poses, it is hard to understand why CAN, a fertilizer created to address the inherent risks of AN, should also be captured.

This current guidance in NFPA 400 assumes that the same hazards for AN exist and are present when handling CAN. We believe that using this uniform approach to all AN-based products is incorrect and is restricting the choice of the agricultural sector in promoting the use of a safe alternative crop nutrient in CAN. This is an inappropriate standard and inconsistent with the product’s treatment in other markets across the globe. Globally accepted UN test protocols establish that CAN does not contain oxidizing properties and is not capable of self-sustaining decomposition. Because of the specific safety enhancements that CAN contains, we believe that CAN should be treated differently in the NFPA 400 Code from standard agricultural grade AN. Further, in reviewing the preliminary ballot comments of the members of the Technical Committee, who voted on Yara’s TIA proposal, it is clear that an overwhelming majority of those experts tasked with this issue believe CAN is a non-hazardous product. Of the 25 members of the Technical Committee who voted on Yara’s TIA proposal, 18 expressed a view that CAN is safer than AN. Only one member of the technical committee who voted on the Yara TIA proposal explicitly expressed reservations about the proposition that CAN is less explosive or detonable than AN. That question was specifically answered in the Task Group and is explained above in the discussion on stoichiometry. The votes against the Yara proposal were overwhelmingly due to procedural concerns, specifically about whether this constituted an emergency.

It is important that CAN be properly identified and established within the guidance documents as a safe product which clearly should be viewed differently than AN and should not be unduly restricted in its storage and handling requirements. Setting the proper guidance for CAN that promotes an increased safety level and risk mitigation within the framework of minimum standards for product storage and handling should encourage the supply chain to freely choose the option of a proven safer alternative.

Therefore, at a minimum, some of the NFPA 400 requirements which restrict the storage structure type should not be necessary when properly storing CAN.
We respectfully request that the applicable safety standards be modified to allow for an easing of the standards not necessary for the safe storage of CAN. Such an approach would be consistent with how other jurisdictions around the globe and even other agencies of the federal government treat CAN. Further, based on the substantiation provided, the issuance of the TIA would provide immediate and proper guidance to local and state jurisdictional agencies on the necessary requirements for storage of CAN that will allow the industry to provide continued access to a safe product which provides necessary, proper and efficient plant nutrition in agricultural production.

Respectfully Submitted,

Gary Vogen

Yara North America, Inc.
Yara North America, Inc.

Proposed Revisions to the NFPA 400 Code

NFPA 400 Proposed TIA No. 1361

1. Revise 11.1.1.2 scope as follows:

Scope

11.1.1.2 This chapter shall apply to solid ammonium nitrate in the form of crystals, flakes, grains or prills, including fertilizer grade and industrial grade or other mixtures containing 60 percent or more by weight of ammonium nitrate unless otherwise indicated in this chapter.

2. Revise 11.1.1.2.1 as follows:

11.1.1.2.1 When the applicable product is designated as Calcium Ammonium Nitrate (CAN) and meets the requirements of the 3.3.13 definition for CAN, the following paragraphs shall not apply:

- 11.1.4.1
- 11.1.4.2
- 11.1.5.1
- 11.2.5
- 11.3.2.3.1

Definition - 3.3.13 Calcium Ammonium Nitrate (CAN). A fertilizer containing, as its only essential ingredients, calcium carbonate (e.g., limestone) and/or magnesium carbonate and calcium carbonate (e.g., dolomite), in addition to ammonium nitrate, prepared as a homogeneous prill or granule with a minimum carbonates content of 20 percent by weight, a minimum carbonates purity level of 90 percent by weight, and a maximum combustible material content, expressed as carbon, of 0.4 percent by weight.

Annex A - A.3.3.13 Calcium Ammonium Nitrate (CAN). In the CAN production process, the carbonates are added as a fine powder with a minimum of 80 percent of the powder smaller than 250 microns. Carbonates are either added directly to the CAN granulator or premixed with a concentrated ammonium nitrate solution to produce homogeneous slurry that is fed into the granulation or prilling section. The solid CAN that is produced contains an intimate homogeneous mixture in which each single particle has a similar ammonium nitrate/carbonates ratio.

Different CAN product blends fall under the scope of this CAN definition, whereas, a physical blend of fertilizer grade ammonium nitrate granules or prills with carbonates (e.g., limestone granules or chips) giving the same average chemical composition as CAN does not qualify as CAN in this code if any of its individual blended constituents containing ammonium nitrate have more than 80 percent by weight of ammonium nitrate or are not intimate mixtures of ammonium nitrate and carbonates. CAN designation is exclusively reserved for a fertilizer matching the defined criteria of composition and production.
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Title or Description of Image or Presentation: _Appendixes for Yara White Paper on CAN_

Appendix 1 - YaraBela Product Manual,
Appendix 2 - TNO letter GHS label Classification
Appendix 3 - TNO letter - / CAN 27 Non Hazardous Non Explosive
Appendix 4 CAN 27 UN 5.1 Oxidizer Testing
From: Gary Vogen <>
Sent: Friday, May 25, 2018 2:49 PM
To: Fuller, Linda
Cc: Foran, Rosanne
Subject: RE: TIA for NFPA 400
Attachments: Copyright permission - NFPA-Yara.pdf; WP Appendixes.zip; Yara White Paper on CAN-A Safe Fertilizer-Updated 5-24-18.docx

Linda,

Find attached the executed authorization for the appendixes which Yara is granting permission to publicize. I have also attached a zip file containing only those specific appendixes since the embedded pdf’s were not working for you. Finally, I have reattached the version of the White Paper I sent earlier today. Please advise if you need any other information and thank you for your assistance.

Best regards,

Gary Vogen
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Calcium Ammonium Nitrate (CAN)

A Safe Nitrogen Fertilizer

Updated Version
5-24-18
Calcium Ammonium Nitrate (CAN)  
A Safe Nitrogen Fertilizer

Executive Summary:

The Safety of CAN This white paper looks at available historical evidence, years of large scale production, transport and use, as well the technical, chemical and safety analysis to conclude that CAN is an extremely safe form of a very valuable nitrogen-based fertilizer and its use should be encouraged, not impeded.

Calcium Ammonium Nitrate (CAN) is a safe nitrogen (N) fertilizer, correctly classified as a non-dangerous product in most countries in the world and for international transport. It has higher manufacturing costs which are linked directly to making it much safer than pure solid ammonium nitrate (AN). Linking CAN to the same regulatory controls as Fertilizer Grade AN (FGAN), may deter the market from seeking the safer product regardless of the cost, thereby increasing the risk to the public.

CAN typically contains 75-80% of AN by weight, combined with calcium carbonate material, which is added specifically to prevent hazards of accidental explosion and moreover brings agronomical value. It has been produced in millions of tons per year for many decades in many different parts of the world and is a leading N source in many markets.

The existing regulatory limits for CAN under DHS, for CFATS, and DOT’s hazmat transportation regulations, as well as regulations in other developed countries allow up to 80 percent AN content because of its neutralizing effect and classify it as a non-hazardous product. This is a highly accepted standard used around the world as the threshold for differentiating CAN from straight FGAN and establishing it as a fertilizer that is safe and not susceptible to accidental explosion.

CAN has been studied extensively from a safety point of view: it has proven to be a safe fertilizer when it is handled, transported, stored correctly and used for its intended legitimate purposes. CAN has never been involved in any accidental explosion.

This is consistent with standards established under several decades of regulations and legislation, using risk-evaluation and safety-testing. CAN’s intrinsic safety properties are supported by scientific evidence; all recent testing, including some at a very large scale (truckload equivalent), confirm the same.

Conclusion CAN is a safe fertilizer: It is a non-hazardous substance when used, stored and handled for legitimate purposes and has been acknowledged as such in regulations for several decades, based on risk-evaluation and safety-testing. Historical safety records of CAN are excellent. For decades, millions of tons of CAN have been handled each year without an accidental explosion. CAN’s safety is also supported by scientific evidence and testing, including testing at very large (truckload) scale. These tests confirm that CAN with up to 80% AN is a safe fertilizer.

In fact, subjecting CAN to the same level of regulation as FGAN when it is shown to be safer would eliminate much of the incentive to manufacture this inherently safer product and, thereby, increase the risk to the public.
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information can be used without any written approval by Yara International ASA.
**Introduction**

CAN is one of the major nitrate-based fertilizers used around the globe and is considered to be a very safe form of AN. CAN typically contains 75-80% of AN by weight, combined with carbonate material, which is added specifically to prevent hazards of accidental explosion. CAN has an excellent safety record and has been studied extensively from a safety point of view.

The main ingredient of CAN is AN which has a higher nitrogen (N) content than CAN. Pure AN is manufactured in both high density and low density forms with the low density form being manufactured for use in the explosive industry. High density AN is more stable and is manufactured for use as a fertilizer(FGAN) or fertilizer ingredient, and some is also used for technical applications (e.g. medical applications). CAN is exclusively manufactured for use as a fertilizer.

This report [white paper] focuses on CAN-related risk from a supply chain and market perspective, discussing specific safety issues related to the product once taken to the market and being handled and used for legitimate purposes. It therefore does not discuss risks related to product manufacturing which have separate, well-established guidelines.

Recent accidents, such as the explosion in 2013 at a storage and distribution facility in West, Texas, storing FGAN fertilizer, are leading to ongoing discussions which question product safety of FGAN fertilizer in the marketplace and, by extension, other AN-based fertilizers, including CAN.

This white paper demonstrates that, based on available analysis and documentation, CAN is safe to handle, store and use as a fertilizer.

**Scope**

Nitrogen (N) is an essential element for life, and all plants need nitrogen to grow. Nitrogen can be found in the soil or augmented through the application of fertilizers containing N in varying amounts in order to enhance crop production yields.

Anhydrous ammonia, urea, FGAN, UAN solutions, ammonium sulphate and potassium nitrate are all leading types of nitrogen-based fertilizers. Each of these products has individual and unique attributes that make that particular product most effective or useful to a particular crop.

CAN is one of the major nitrate-based fertilizers and is generally considered to be a very safe form of AN. This white paper looks at available historical evidence, years of large scale production, transport and use, as well the technical, chemical and safety analysis to conclude that CAN is an extremely safe form of a very valuable nitrogen-based fertilizer and its use should be encouraged, not impeded.

**CAN, A Safe and Important Fertilizer**

**Agronomical and Environmental Advantages**

CAN is a popular fertilizer for supplying N, as it combines superior agronomic advantages and inherent high safety features together in one product. CAN combines all the agronomic advantages of AN with the advantages of carbonate material, which not only supplies secondary nutrients such as calcium (Ca) and magnesium (Mg), but also maintains and protects the soil pH, thanks to its liming effect. Moreover, CAN has net advantages in terms of carbon footprint and global warming effect.
FGAN and AN-derived fertilizers, including CAN, provide a unique agronomic benefit by providing two distinct forms of N to the plant, 50% in the ammonium form and 50% in the nitrate form. Nitrate N is readily available for uptake by a plant upon application while ammonium N is either bound by the soil, taken up by the plant or converted to nitrate by soil bacteria, where it again becomes available to the plant for uptake. Because nitrates are easily absorbed, plants are highly efficient in their accumulation, thereby minimizing potential N losses through leaching.

Environmentally, enhanced uptake of nitrates results in a high Nitrogen Use Efficiency (NUE) and a higher nitrogen recovery percentage by the crop than when compared to other N sources. Some crops specifically prefer nitrate N and exhibit toxic effects to additional ammonia, which reduces the option of interchanging complete ammonium N fertilizers for nitrate N fertilizers. Therefore, substituting urea for FGAN for example may be detrimental to the health of a crop.

The results of years of research\(^1\) have shown that many crops (grain, grass, vegetables, fruit and nut bearing trees) prefer nitrate N when growing rapidly and under stress, thereby making AN based fertilizers superior and a preferred form of N fertilizer for those crops across the world. CAN can effectively replace FGAN in most applications with a slight increase in cost, usually between 5 and 7%, and with little to no decrease on fertilizer effectiveness. This provides the grower with a safer and effective alternative in supplying an essential nutrient to their crops. For more details about agronomical and environmental advantages, please refer to Appendix 1.

**Composition and Grade**

CAN is a solid fertilizer, normally in granular or prill form. Its N content is typically made up of between 75 and 80 percent AN, which translates to a range of between 26 and 28 percent nitrogen by weight with the average formation being 27 percent N. CAN also may contain additives, such as magnesium nitrate or aluminum sulphate, to enhance the physical quality of the product, in particular to improve hardness and storage properties of the product.

**Recognized Global Production Criteria**

CAN is manufactured according to a globally recognized criteria for the contents and purity of the ingredients. These criteria distinguish the safety classification of the product.

According to the *REGULATION (EC) No 2003/2003 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 13 October 2003 relating to fertilizers,* (EC2003/2003), the designation ‘calcium ammonium nitrate’ is exclusively reserved for a fertilizer containing only calcium carbonate (i.e. limestone) and/or magnesium carbonate and calcium carbonate (i.e. dolomite) in addition to AN. The minimum content of these carbonates must be 20 percent and their purity level at least 90 percent. (See reference 1).

To the best of our knowledge, the criteria outlined in EC2003/2003 is among the most comprehensive worldwide for ensuring product safety and quality. Yara is strictly adhering to these criteria in its’ production of CAN. An example of a typical SDS (safety data sheet) of CAN outlining the typical ingredients can be found in reference 2.

---

\(^1\) Dev T. Britto, Herbert J. Kronzucker, “NH\(_4\)*toxicity in higher plants: a critical review,” *Journal of Plant Physiology* 159:567-584 (2002);
How is CAN Produced?

CAN is a homogeneous mixture of co-granulated AN and calcium carbonate material (i.e. CaCO3, MgCO3). In some processes, the carbonate material is added into the AN melt to form a slurry that is sprayed in the granulator or prilled in a prilling tower. In some other processes, AN and carbonate material are added separately to the granulator and co-granulated. For more information, see reference 3.

A physical blend of AN granules and, for example, limestone granules or chips, is not a CAN. Existing regulations are very explicit and require either a uniform mixture (under United Nations (UN) regulations) or a “chemically obtained” product (under EC rules). A physical blend can actually be agronomically inferior because of uneven spreading on the field and also inferior from a safety point of view because segregation during handling and storage which can result in inconsistent and potential higher concentrations of AN within the pile.

Safety Advantages – Non Hazardous Designation

CAN is not classified as a dangerous product and is categorized as a non-hazardous substance under UN model regulations which have been adopted by countries around the world.

According to UN Model Regulations on the Transport of Dangerous Goods (also called UN Orange book: UN Recommendations on the Transport of Dangerous Goods - Model Regulations) found here: http://www.unece.org/fileadmin/DAM/trans/danger/publi/unrec/rev19/Rev19e_Vol_1.pdf, (See chapter 3.3, Special Provisions, Paragraph 307b) Any mixture of up to 80 percent AN by weight combining calcium carbonate and/or dolomite, and not more than 0.4% total combustible/organic material calculated as carbon, is not classified as hazardous.

CAN does not exhibit explosive properties of a UN Hazard Class and Division Class 1 explosive when tested in accordance with relevant UN explosion testing protocols, see examples in appendix 2 and 3 from TNO (the Netherlands, https://www.tno.nl/).

CAN is not an oxidizer as defined by UN/DOT Criteria. This is demonstrated in tests conducted by Stresau Laboratory in the USA (http://www.stresau.com/) using Yara’s formulation of CAN, in appendix 4.

CAN is the preferred base nitrogen fertilizer in certain countries due to these inherent safety and agronomic advantages, especially in Europe (i.e. Germany, The Netherlands, Spain and Ireland).

Situation Analysis:

Ammonium Nitrate and CAN Markets:

Approximately 20 million metric tons of FGAN is consumed worldwide annually in agriculture, while about 14 million metric tons of CAN is used. CAN is mostly used by the European agriculture sector, with the main market being Germany, consuming 3 million metric tons, followed by France, Turkey, Ireland and Spain with approximately 1 million metric tons of CAN each.

While the quantities of CAN in North America are significantly less by comparison, there is still approximately 200 thousand tons of CAN used annually, split evenly between Canada and the US. The overall FGAN market is significantly higher in the US, so the potential exists to shift to increased use of CAN as the market better understands the safe handling characteristics and advantages of CAN in storage and handling.
Regulation:

Different regulatory thresholds exist around the world with respect to the maximum allowable AN content of AN containing fertilizers before a product is subject to straight FGAN regulations. Under CFATS, DHS’ focus was on pure solid FGAN and not on AN mixtures or AN based products. With proposed rules under the ANSP, DHS has clearly added confusion to this subject seeking a broader definition and thus encompassing more products than what was originally followed by CFATS.

As indicated above, CAN fertilizer typically contains 77 percent AN by weight (or approximately 27 percent N by weight maximum). This is a highly accepted standard used around the world as the threshold for differentiating CAN from straight FGAN. For example:

- In Germany, FGAN is permitted but is subject to stringent storage restrictions not required for CAN. Therefore, CAN is widely used as a N fertilizer and today, Germany is the main market for CAN.
- In Ireland, FGAN is banned for security reasons, but CAN is allowed resulting in much higher use of CAN.
- In France, Turkey or Spain, straight FGAN is allowed and widely used in agriculture, although with a number of relevant safety controls, while CAN is also used and widely available with less stringent controls.
- In USA, FGAN and CAN are both marketed but, unlike FGAN, CAN is considered as a non-hazardous product (at least for purposes of DOT hazmat transport) and is exempt from CFATS.

Under European “Seveso” regulations, CAN is not considered a dangerous substance (See Directive 2012/18/EU of the European Parliament and of the Council of 4 July 2012 on the control of major accidents hazards involving dangerous substances in reference 4). These thresholds have historically been established and accepted for some time and were again re-examined and reconfirmed in the 60s and 70s by the regulatory authorities from different European countries collaborating together. Significant and still relevant testing was performed at that time. See for example Perbal (reference 5).

The majority of these regulations clearly outline that CAN may be stored and handled in a manner consistent with best management practices. They further identify that the risks of FGAN versus CAN are different; therefore, all requirements in effect for AN storage are not required for CAN storage. For example, there is no specific reference to sprinkler systems in the requirements for fire prevention, but rather a strong focus on the need to have access to a sufficient water supply.

Transport Regulation: Under U.S. and European hazardous materials transport rules, CAN is treated as a non-dangerous product. For more details on rules and regulations, see reference 6.

European Storage Regulations: Storage regulations in Europe, defining technical requirements, are a national matter and differ from country to country. For example:

- In Germany, which is the major CAN market, use of wood for structure and separation walls is permitted in storing CAN (See TRGS6), and this is seen in practice with the vast majority of CAN in Germany.
- In Ireland, there are no legislative restrictions for the use of wood, but national industry guidance stipulates strict avoidance of use of combustible materials.


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In France, for existing installations, wood is still allowed as a material for separation walls provided the fertilizer is not in direct contact. For new facilities, specific fire resistance requirements are in place. (English translated text: [Link to Google Translate])

**Universal Codification:** The Harmonized Commodity Description and Coding System generally referred to as "Harmonized System" or simply "HS" is a multipurpose international product nomenclature developed by the World Customs Organization (WCO). It comprises about 5,000 commodity groups; each identified by a six digit code, arranged in a legal and logical structure and is supported by well-defined rules to achieve uniform classification. The system is used by more than 200 countries and economies, including the US, as a basis for their Customs tariffs and for the collection of international trade statistics. Over 98% of the merchandise in international trade is classified in terms of the HS.

The WCO’s codification of nitrate containing fertilizers, creates a clear and indisputable distinction between straight ammonium nitrate and ammonium nitrates mixed with calcium carbonate or other inorganic non-fertilizing substances (= CAN).

The HS codes of the WCO, based on the International Convention on the Harmonized Commodity Description and Coding System, to which also the US is also subscribed, prescribe the following:

- **HS-Code 3102 30** Ammonium Nitrate
- **HS-Code 3102 40** Mixtures of ammonium nitrate with calcium carbonate or other inorganic non-fertilizing substances (CAN).

Given this standard baseline, the EU has gone to an 8-digit HS-code, introducing further thresholds for differentiating products. More information can be found here: ([Link](http://ec.europa.eu/taxation_customs/dds2/taric/measures.jsp?Lang=en&SimDate=20160221&Taric=3102&LangDescr=en))

For example, the HS-code 3102 40 is split up in two 8-digit sub-codes based on the nitrogen threshold of 28 percent which implies using the consistent threshold of 80% AN as the basis for differentiating between products (i.e. % AN = 35%N x 80% = < 28%N ). This division clearly demonstrates that the EU, based on its extensive experience with nitrate-based fertilizers, makes the distinction between "high" AN-mixtures and "low" AN mixtures (which includes CAN).

- **HS-Code 3102 40** Mixtures of ammonium nitrate with calcium carbonate or other inorganic non-fertilizing substances (CAN).
- **HS-code 3102 40 10** - With a nitrogen content not exceeding 28% by weight (CAN)
- **HS-code 3102 40 90** - With a nitrogen content exceeding 28% by weight

Further details may be found on: [Link](http://www.unece.org/trans/danger/publi/ghs/ghs_rev06/06files_e.html)
**CAN. Why is it Safe?**

**Accidental Explosions** - CAN has never been involved in any accidental explosion to-date, despite the fact that millions of tons have been handled, stored and used for decades, and in areas where such storage is open and accessible. On the other hand, AN has historically been involved in several dramatic accidents adversely impacting the agricultural community and causing fatalities. But CAN, as mentioned previously, differs significantly in that it is manufactured specifically to eliminate the risk of accidental explosion.

In the past, accidental explosion of AN in the supply chain and in the market primarily involved one of two types of product: (1) AN-based explosives (such as AN- fuel oil emulsion or ANFOANFO) or, (2) technical-grade ammonium nitrate (TAN) or pure AN-fertilizers (N content > 28%). We are not aware of a single incident involving CAN. Accidental explosions of AN are usually preceded by a fire, as summarized in the table below. Therefore, the focus of this review is on potential explosion hazard related to the consequences of CAN being involved in a fire. The most relevant scenarios to be considered are a fire in a storage facility, or a traffic accident during product transportation such as a vehicle crash resulting in a fire with potential contamination of the CAN by additional chemicals, such as fuels (e.g. from the truck in case of a traffic accident), organics, or pesticides.

<table>
<thead>
<tr>
<th>Reoccurring accident types resulting in accidental explosion</th>
<th>Examples involving straight AN fertilizer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Truck accidents followed by a fire</td>
<td>Mihăilești Romania, 2004</td>
</tr>
<tr>
<td>Fire in a storage facility</td>
<td>Saint-Romain-en-Jarez, France, 2003</td>
</tr>
<tr>
<td></td>
<td>West, Texas, USA, 2013</td>
</tr>
</tbody>
</table>

**Fire** - AN itself does not burn and neither does CAN. Straight AN and CAN may decompose during a fire, but are *not* subject to self-sustained decomposition (confirmed using the SSD/IMO trough test), as compared to some other fertilizer products that, once initiated, can continue decomposing into gases even with the initiating heat source removed, potentially releasing large amounts of toxic fumes. Such fertilizers are not produced by Yara.

However, AN as a chemical, is an oxidizer that can enhance the burning of combustible material, and it is important to respect and disseminate information about good storage practices to reduce or eliminate that risk using best practices. For example, see the chemical advisory jointly made by EPA, OSHA and ATF in June 2015, about the safe storage, handling and management of FGAN here: [http://www2.epa.gov/rmp/chemical-advisory-solid-ammonium-nitrate-storage-handling-and-management](http://www2.epa.gov/rmp/chemical-advisory-solid-ammonium-nitrate-storage-handling-and-management) (See also references 7, 8, and 9)

**Ammonium Nitrate Involved in a Fire** - When AN is involved in a fire, some material exposed to the heat will melt (pure AN melting temperature is 169.6 degrees Celsius = 337.3 degrees Fahrenheit). Melting is an endothermic process and occurs progressively because AN (and solid fertilizers in general) are good insulators. When exposed to heat radiations, the top layer of a few centimeters in thickness will melt and flow away from the pile, while the product just a few
centimeters deeper remains cold until exposed directly to heat by the melting away of the upper layer. When AN is in the molten state, it starts decomposing according to different reactions:

The main reactions can be summarized as follows (cf Shah, reference 10)

\[
\begin{align*}
\text{NH}_4\text{NO}_3 & \rightleftharpoons \text{NH}_3 + \text{HNO}_3 \\
\text{NH}_4\text{NO}_3 & \rightarrow \text{N}_2\text{O} + 2 \text{H}_2\text{O} \\
5 \text{NH}_4\text{NO}_3 & \rightarrow 2 \text{HNO}_3 + 4 \text{N}_2 + 9 \text{H}_2\text{O} \\
8 \text{NH}_4\text{NO}_3 & \rightarrow 2 \text{NO}_2 + 4 \text{NO} + 5 \text{N}_2 + 16 \text{H}_2\text{O} \\
2 \text{NH}_4\text{NO}_3 & \rightarrow 2 \text{N}_2 + 4 \text{H}_2\text{O} + \text{O}_2
\end{align*}
\]

The first reaction listed above is reversible and endothermic (requires heat). This reaction is a simple dissociation of ammonium nitrate into its original components; ammonia and nitric acid. The dissociation reaction explains why molten AN naturally acidifies; some ammonia can volatilize and escape the pile as a gas while the remaining nitric acid lowers the pH of the melt.

All the other reactions listed above are decomposition reactions, which are irreversible, exothermic and lead to the production of non-condensable gases. Moreover, these reactions are catalyzed by acidity that is generated by the original dissociation reaction and ammonia losses.

These reactions demonstrate why heated AN in open air can decompose freely, but become a safety concern when the AN is confined. When AN is heated under confinement, the endothermic dissociation reaction is of no effect and only exothermic reactions (release heat) occur, increasing the pressure of the confined volume until an explosion occurs.

**CAN in a Fire - How does it differ from AN?** - CAN differs drastically from AN when involved in a fire. As described below, the chemistry is different; other reactions are involved, the pH is buffered (thus avoiding acidic conditions) and the kinetics are much slower.

1. **Molten CAN and pH** - pH is a fundamental aspect when considering AN safety, since all decomposition reactions of AN are catalyzed by acidity and are hampered under alkaline pH as long as the temperature is not too high. This is a well-known industrial feature, where hot solutions of AN can be stored for months providing the pH is kept neutral or alkaline. Therefore CAN presents a major advantage due to the carbonate material component of its make-up. When involved in a fire, melting CAN will not acidify easily thanks to neutralization reactions, such as:

\[
\begin{align*}
\text{NH}_4\text{NO}_3 & \rightleftharpoons \text{NH}_3 + \text{HNO}_3 \\
\text{CaCO}_3 + 2 \text{HNO}_3 & \rightarrow \text{Ca(NO}_3)_2 + \text{CO}_2 + \text{H}_2\text{O}
\end{align*}
\]

2. **Kinetic of decomposition** - Acid neutralization by a carbonate product is an endothermic reaction, which generates water that helps to control the fire by evaporation. Oxley (reference 11) reports kinetics of decomposition with CAN (AN + 20% CaCO_3) versus pure AN to be 29 times lower at 260degC and still 5 times lower at 320degC, a temperature at which most AN would be decomposed or reacted. Moreover, the kinetics of AN decomposition can be strongly accelerated by the presence of certain compounds, such as chloride, acting as a catalyst. But this catalytic process requires acidity (See for example Shah and Roberts, reference 12), while CAN is pH-buffered.

3. **Practical remarks** - While CAN is inherently safer to use and to store than AN, that does not mean it is without all risk – only that it is much, much safer. For example:
  - If some CAN is trapped in a confined zone (e.g. a closed pipe or a closed vessel) and exposed to heat during a fire, decomposition implying formation of non-condensable gases...
such as CO₂ will occur, leading to localized pressure build-up and potentially the destruction of the confining pipe or vessel.

- If molten CAN is in contact with other chemicals that are incompatible to AN, such as fuels, other reactions such as oxidation-reduction will occur which compete with the neutralization of AN by the carbonate material and its positive pH-effect.

Therefore, it is evident that despite the inherent safety features of CAN, just like for any other nitrate based fertilizers, some common-sense rules and well-known best practices for its storage, such as ensuring separation from incompatible materials during storage and handling, must be respected. However, those safe practices are significantly less extensive than for pure AN. (See references 7, 8, 9).

4. Other reactions occurring when CAN is involved in a fire - AN involved in a fire will be entirely decomposed at temperatures above ~350degC. When CAN is involved in a fire, other compounds are generated in the molten state, namely calcium nitrate and/or magnesium nitrate. See for example reference 13, describing a fire of a CAN belt conveyor. With a rise in temperature further to ~350-600degC, these products will decompose into NOx and calcined lime and magnesite, or CaO and MgO respectively (See reference 14). These reactions are endothermic, thus absorbing heat from the fire.

Moreover the CaO and MgO formed will neutralize the acidity any new molten AN produced. This also keeps the pH alkaline (thus drastically limiting the kinetics of decomposition of AN), according to the reactions:

\[
\begin{align*}
\text{CaO} + 2 \text{HNO}_3 &\rightarrow \text{Ca(NO}_3)_2 + \text{H}_2\text{O} \\
\text{MgO} + 2 \text{HNO}_3 &\rightarrow \text{Mg(NO}_3)_2 + \text{H}_2\text{O}
\end{align*}
\]

![Diagram of CAN decomposition and neutralization process]

<table>
<thead>
<tr>
<th>Temperature (degC)</th>
<th>If a pile of AN in bulk</th>
<th>CAN pile</th>
</tr>
</thead>
<tbody>
<tr>
<td>170</td>
<td>AN melts, start acidifying (NH3 loss)</td>
<td>AN melts and carbonates start to react, pH remains constant and alkaline</td>
</tr>
<tr>
<td>170-350</td>
<td>further acidification, endothermic dissociation of AN</td>
<td>formation of Ca(NO3)2 and Mg(NO3)2; pH is buffered thus low kinetic of AN decomposition (N2O, NOx, N2)</td>
</tr>
<tr>
<td>350-600</td>
<td>nothing left, no AN any more</td>
<td>Ca(NO3)2 and Mg(NO3)2 decompose into CaO+MgO (endothermic reaction), regenerating alkaline compounds that may act as pH buffer, if getting in contact with new molten AN flowing in the same area during the fire.</td>
</tr>
</tbody>
</table>

Explosion-

How can the explosion be initiated? - As mentioned above, accidental explosion of AN and FGAN have occurred throughout history. One must differentiate the accidents related to the activities of explosives manufacturing and those of the fertilizer industry. In any case, we can learn
from the experience with more extreme situations, such as those involving AN-based explosives or AN-based raw material made for explosives as opposed to AN-based fertilizers. In that sense, the numerous studies performed in Canada after the Walden explosion of an ANFO loaded truck which caught fire after a traffic accident are quite illustrative. During the post-accident investigation study and subsequent tests performed to understand what happened, it has been impossible to reproduce the accident itself in full scale simulations. This is despite adding features to enhance the start of an explosion, and the fact that the full scale test was even performed twice. This study, however, reinforces the long-held belief that intense heat and heavy contamination (here stoichiometric mixture of AN and fuel oil) alone are not sufficient to lead to an explosion. Other elements are required, such as high velocity impact to trigger the explosion and a certain level confinement of the AN product. See Shah and Chys (reference 15).

**Tests on fertilizers for non-detonability (example of EU tests)** - Focusing now on FGAN, there have been numerous tests performed, particularly on straight AN fertilizers, to determine detonability. In this, fertilizers must satisfy strict quality criteria related to product properties. In some regulations straight fertilizers with AN content above 80% wt must pass a detonation prevention test (e.g. 4” EU tube test ) according to established criteria. Such resistance-to-detonation tests are not required by US legislation.

In order to be strict and more discriminative, the EU tube test combines several aggravating features: (1) thermal cycling of the product (to simulate degradation during its handling and storage), (2) confinement in a steel tube, and (3) use of a strong booster. Several authors criticize the test in itself (e.g. Bauer cited in Médard, reference 16), considering it as non-representative and too severe versus what can happen in real life situation. Further we acknowledge that accidental explosions of FGAN (but not of CAN) have occurred.

**Chemical reactions limiting any explosion effect** - CAN is fundamentally a mixture of compatible materials. Carbonate materials not only have the ability to neutralize the acidity of molten AN (as mentioned above), it also dilutes the AN content. The positive effect is stronger than a simple dilution, as illustrated by Clancy (see citing by Médard in reference 16) who demonstrated in his famous curve that the effect of adding calcium carbonate to AN was much more positive than compared to other products such as sand. This effect can be compared to the addition of other products like ammonium sulfate that, when mixed with AN, can enhance its explosive power (see Médard in reference 16, or Kiiski in reference 17). This is quite explainable when considering high temperature reactions that can occur in an explosion. Calcium carbonate can decompose into calcium oxide according to the endothermic reaction that acts against the explosion, such as:

\[
\text{CaCO}_3 \rightarrow \text{CaO} + \text{CO}_2
\]

On the contrary, the ammonia produced by the ammonium sulphate (AS), can act as a fuel for the AN, according to **exothermic reactions** such as:

\[
2 \text{NH}_4\text{NO}_3 + (\text{NH}_4)_2\text{SO}_4 \rightarrow \text{SO}_2 + 8 \text{H}_2\text{O} + 3 \text{N}_2 \quad \text{(See Médard, reference 16)}
\]

\[
3 \text{NH}_4\text{NO}_3 + (\text{NH}_4)_2\text{SO}_4 \rightarrow \text{SO}_3 + 10 \text{H}_2\text{O} + 4 \text{N}_2 \quad \text{(calculated from Kiiski, reference 17)}
\]

The dramatic accident of Oppau, Germany in 1921 was actually an explosion of a mixture of AS and AN, initiated by a strong booster.

**Definition of a relevant scenario** - One relevant scenario would involve a traffic accident where a truck carrying CAN is damaged and catches fire. Molten CAN produced from the fire and diesel from the truck could come in contact with each other, become sufficiently confined (as trapped in some part of the vehicle or tank), and become sensitized to allow it to detonate. Could
such a primary explosion lead to an explosion of a large fraction of the remaining product? Is such scenario that has never happened in practice despite long history, possible?

To answer such question, we must look to what is known. Standardized testing, such as the 4” EU tube test, provides a good indication but does not provide 100% certitude. Indeed, size matters: if the critical diameter (minimum diameter mass required for detonation to propagate through the product) is actually larger than the tested tube, the product will not explode in the small-scale test but might still explode on a larger-scale like in real-life storage or a truckload. However as we have said earlier, there has never been a report of an accidental explosion of CAN.

**Full scale testing of truck load CAN** - The probability of a strong projectile, generated by a primary explosion, impacting a pile of fertilizer and making it explode is very unlikely. Indeed, to be able to make the pile explode, the object must have 1) sufficient energy and 2) a diameter larger than the so-called critical diameter of the product being impacted. Otherwise it would disperse the product instead of making it explode.

To clarify this important aspect of the critical diameter, full scale tests with amounts of fertilizer equivalent to truck-load were performed in 2005 by the Dutch research institute TNO (Kersten, reference 18). These tests involved as much as 28 tons of product. Fertilizer grade ammonium nitrate (FGAN), successfully passing the 4” EU tube test was proven to be very insensitive in the large scale tests; the sympathetic explosion pressure was estimated to only be as high as 60% of the explosion pressure itself. However, it was possible to make a 28 ton load of FGAN explode with a velocity of 4,5km/s however a very large booster (a sensitive additive to provide more energy to the explosion) and close-to-ideal conditions were needed to get the explosion to occur. Meanwhile, the same test with CAN showed no detonation. Consequently, a critical diameter could not be established for CAN.

**Conclusion**

CAN is a safe fertilizer. It is a non-hazardous substance when used, stored and handled for legitimate purposes, in line with what the regulation and/or legislation acknowledged several decades ago, based on risk-evaluation and safety-testing.

Safety historical records of CAN in storage are excellent: millions of tons of CAN have been handled every year for decades and to-date we are not aware of an accidental explosion of CAN having ever occurred in the storage/market/supply chain. Moreover, its safety is supported by scientific evidence. This has been shown at small-scale and more recently, at very large scale (truckload equivalent)with the same outcome, proving that CAN is a safe fertilizer and that the threshold of 80% AN by weight for use in legislation is fully justified.

The designation of CAN as a non-hazardous fertilizer should be continued and should serve as a uniform designation, creating consistency of interpretation throughout agencies in the US regulatory community. In fact, subjecting CAN to the same level of regulation as AN when it is shown to be safer would eliminate much of the incentive to manufacture and provide for sale this inherently safer product and, thereby, increase the risk to the public.
Appendixes and references

Appendixes:

1-YaraBela product manual.

2-TNO, letter – GHS Label Classification

3-TNO, letter, company restricted - CAN Safety characteristics and classification

4-Stressau - Test report on UN test conducted on CAN

References:

1) Fertilizer regulation 2003/2003; Annex I: List of types of EC fertilizers; A: Inorganic straight primary nutrient fertilizers; A1: Nitrogenous fertilizers; Point 5: Type designation: “Ammonium nitrate or calcium ammonium nitrate”.

2) Typical safety data sheet for CAN27 via website: www.yara.us
   Fertilizer Product and Safety Information | SDS, TDS, Labels & Bags | Yara

3) Production of ammonium nitrate and calcium ammonium nitrate
   Fertilizers Europe/BATs/Booklet 6 Production of AN & CAN.pdf


5) Perbal G., the International Fertilizer Society, proceeding IFS124

6) Guidance for UN transport classification of ammonium nitrate based substances
   Fertilizers Europe-Guidance of UN class of ammonium nitrate based substances.pdf

7) Guidance for the storage, handling and transportation of solid mineral fertilizers
8) Guidance for safe and secure fertilisers on farm
Fertilizers Europe- Safe Storage /Farm storage.pdf

9) DO's and DON'T's. Safe storage of fertilizers containing AN
Fertilizers Europe- Safe storage of fertilizers EN.pdf

10) Shah K.D., the International Fertilizer Society, proceeding IFS629


12) Shah and Roberts, Fertilizer science and technologies series, vol 4-11, p190

13) Vogels N., Fire in CAN warehouse, ANNA conference 2014 in Tucson (AZ)

14) Kaljuvee et al., heating rate effects on the thermal behaviour of ammonium nitrate and its

15) Shah K.D. and Chys J., the International Fertilizer Society, proceeding IFS585

16) Médard, L., les explosifs occasionnels, éditions Tec & Doc

17) Kiiski H., the International Fertilizer Society, proceeding IFS627

18) Kersten R. J. A. et al., The International Fertilizer Society, proceeding IFS580
YaraBela™

Products you can rely on
Introduction

Balanced Nitrogen Source

Nitrogen fertilizers can contain any one of 3 forms of nitrogen; urea, ammoniacal or nitric nitrogen. The main Yara products in this respect are AN (Ammonium Nitrate) and CAN (Calcium Ammonium Nitrate). The nitrogen in both fertilizer types is 50% nitrate and 50% ammonium.

High Nitrogen Use Efficiency

Providing nitrogen in the form of nitrate to plants has been proven beneficial and fertilizers containing a proportion of their nitrogen in the nitrate form, often give superior results in the crop, when compared to pure ammonia or urea based products.

Proven Quality

YaraBela fertilizers represent products proven in delivering nutrition to your crops and are a key product group in the Yara portfolio for field crops.

With focus on nitrogen, YaraBela products are superior quality with a balanced supply of nitrate and ammonium. Importantly the products are easy to handle and can be applied to a wide range of crops.

Optimum Returns

YaraBela nitrates are also supported by Yara’s vast knowledge of application strategy in order to get the best performance from the crop. This in turn brings optimum return on investment for the grower.
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- Nitrogen Immobilization 10

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Yara’s Products Pocket
Yara Quality

Yara International produces high quality fertilizer products from a variety of raw materials by different production technologies. Compliance with international legislation and Yara’s internal technical standards ensure a high focus on product and process safety as well as protection of personnel and environment by implemented best available techniques.

YaraBela products are available in many different forms, all manufactured to Yara’s high and consistent global standards.

Nitrate based fertilizers are produced by transforming ammonia into nitrate nitrogen. Other essential plant nutrients are also added to YaraBela products, for example sulfur.

Figure 1
The Potential to Improve Energy Efficiency in Fertilizer Production is Higher for Nitrates Compared to Urea

Nitrate containing nitrogen fertilizers are highly energy efficient in their production compared to Urea. Better technology used in the production process will lead to even higher efficiency in future (Figure 1).

The production of nitrate based fertilizers requires the transformation of ammonia (NH₃) into nitric acid (HNO₃).

Nitric acid formation is an exothermic reaction which releases energy. This energy is released as steam, can be reused within the factory or fed into a generator to produce electricity (Figure 2).

Figure 2
Energy consumption and energy release during N fertilizer production

![Diagram showing energy consumption and release during nitrogen fertilizer production]
Balanced Nitrogen Nutrition

Nitrate and Ammonium-N Supply

"Nitrate fertilizers" are meant in this Manual as those fertilizers which contain at least 50% of their nitrogen in a nitrate form. Inside the YaraBela product range these are mainly CAN and AN, providing a 50:50 split of nitrate-N and ammonium-N (Table 1).

Table 1
Which N Fertilizers are ‘Nitrate’?
The definition is based on the nitrate content

<table>
<thead>
<tr>
<th>N fertilizer</th>
<th>N Content</th>
<th>Nitrates (% of total N)</th>
<th>Other Nutrients</th>
</tr>
</thead>
<tbody>
<tr>
<td>CN (calcium nitrate)</td>
<td>15.5%</td>
<td>93%</td>
<td>19% Ca</td>
</tr>
<tr>
<td>KN (potassium nitrate)</td>
<td>13%</td>
<td>100%</td>
<td>45% K₂O</td>
</tr>
<tr>
<td>AN (ammonium nitrate)</td>
<td>34%</td>
<td>50%</td>
<td></td>
</tr>
<tr>
<td>CAN (calcium ammonium nitrate)</td>
<td>27%</td>
<td>50%</td>
<td>4% MgO</td>
</tr>
<tr>
<td>UAN (liquid urea ammonium nitrate)</td>
<td>28%</td>
<td>25%</td>
<td></td>
</tr>
<tr>
<td>ASN (ammonium sulfate nitrate)</td>
<td>26%</td>
<td>25%</td>
<td>13% S</td>
</tr>
<tr>
<td>A5 (ammonium sulfate)</td>
<td>21%</td>
<td>0%</td>
<td>24% S</td>
</tr>
<tr>
<td>Urea</td>
<td>46%</td>
<td>0%</td>
<td></td>
</tr>
</tbody>
</table>

Nitrate based N fertilizers = ‘Nitrate’

When compared to pure ammonium or urea-based fertilizers, YaraBela products are significantly more effective on an equal nitrogen basis.

This means farmers can more easily predict the growth response from YaraBela products, giving consistently better quality and yield (Figure 3 and 4).

A well timed application of YaraBela minimizes nitrogen losses compared to straight urea or ammonium fertilizers.

Figure 3
Higher Grain Yield with YaraBela Cereals - Germany

Figure 4
YaraBela improves Yield and Protein Cereals - Germany
Nitrate - Immediately Available

Nitrate is the only N form, which is immediately and fully plant available, because nitrate can be easily taken up by the crops in high quantities together with water. In contrast, most of the ammonium is converted into nitrate before it is taken up by the plants (Figure 5).

The conversion process of ammonium to nitrate through nitrification is temperature dependent and can take more than 6 weeks (Table 2). Under extremes of soil pH or oxygen deficiency (e.g., water logging) the nitrification process takes even more time.

![Figure 5: Nitrate is Immediately Taken Up by Plants](image)

Ammonium is often locked in the soil by fixation and immobilization. In particular crops with rapid growth rates such as lettuce or spinach require high N uptake rates, which can only be supported by nitrates (Figure 6).

### Figure 6
Crops With High N Uptake Rates Need Nitrate
Spinach - Germany

![Graph showing N uptake (kg/ha) over weeks after planting](image)

**Table 2: Ammonium Needs Conversion to Nitrate**

<table>
<thead>
<tr>
<th>Soil temperature</th>
<th>Conversion time (50% conversion rate)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5°C</td>
<td>&gt; 6 weeks</td>
</tr>
<tr>
<td>10°C</td>
<td>2 weeks</td>
</tr>
<tr>
<td>20°C</td>
<td>1 week</td>
</tr>
</tbody>
</table>

REF: VILSMEIER & AMBERGER - 1980

---

Ammonium Fixation

Nitrogen fixation is the adsorption of the positively charged ammonium (NH₄⁺) ion to negatively charged clay particles in the soil. Ammonium fixation reduces nitrogen availability for plants. The negatively charged nitrate (NO₃⁻) ion is not fixed and remains fully plant available. Nitrates are therefore readily plant available (Figure 7).

Ammonium fixation depends upon the clay content and occurs fairly rapidly, with up to more than 50% fixation after just 7 days post application. The higher the clay content of the soil, the higher is the rate of ammonium fixation (Figure 8).

### Figure 7
Fixation of Ammonia Onto Clay Minerals

![Diagram showing fixation of ammonia onto clay minerals](image)

### Figure 8
Ammonium Fixation Depends on Clay Content

![Bar graph showing NH₄⁺ fixed (% of N applied) vs. medium and high clay content](image)

100 kg N/ha were applied as ammonium-N

REF: HANNINGHOF - 2004
Nitrogen Supports Cation Uptake

When taken up by the plant negatively charged nitrate anions (NO₃⁻) are often accompanied by positively charged plant nutrients (e.g. Ca²⁺, Mg²⁺, K⁺) (Figure 9).

This synergistic effect of nitrate with other important plant nutrients enhances crop yield and quality. Positively charged ammonium ions (NH₄⁺) however, can hamper the uptake of other positively charged plant nutrients, reducing yield and quality (Figure 10).

Figure 9
Apply nitrate for enhanced uptake of cations

Figure 10
Nitrate Nutrition Increases Ca, Mg and K Content in Grassland Trials
Soil pH 6.1, average of 4 years

Figure 11
Nitrate Nutrition Increases Yield in Grassland Trials
Soil pH 6.1, average of 4 years
Improved Soil Conditions

Soil Acidification

Soil acidification is a natural process but accelerated if acidifying fertilizers are applied. In contrast to nitrate, ammonium and urea are acidifying N fertilizers. In practice, acidification of arable soils is counteracted by lime application. Using low acidifying N fertilizers with a high nitrate content as YaraBela products leads to saving in cost and time for lime application (Figure 12).

Liming rates required to counteract acidification of different N fertilizers are shown in Table 3.

Figure 12
Nitrogen Form and Lime Requirement

Table 3
Lime Demand to Compensate for Acidification Caused by N-Fertilizers

<table>
<thead>
<tr>
<th>Product</th>
<th>(kg CaO/100kg product)</th>
<th>Lime Demand (kg CaO/100kg N)</th>
<th>(kg CaCO3/100kg N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcium Nitrate</td>
<td>-12</td>
<td>-80</td>
<td>140</td>
</tr>
<tr>
<td>CAN 22</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>CAN 27</td>
<td>13</td>
<td>48</td>
<td>86</td>
</tr>
<tr>
<td>Ammonium Nitrate</td>
<td>34</td>
<td>100</td>
<td>180</td>
</tr>
<tr>
<td>Urea</td>
<td>46</td>
<td>100</td>
<td>180</td>
</tr>
<tr>
<td>Ammonium Sulfate Nitrate</td>
<td>51</td>
<td>196</td>
<td>352</td>
</tr>
<tr>
<td>Ammonium Sulfate</td>
<td>63</td>
<td>300</td>
<td>540</td>
</tr>
</tbody>
</table>

As ammonium is taken up by plant roots, hydrogen ions are pumped out to maintain electrical neutrality, but causes a drop in pH in the rhizosphere as a consequence. This is not the case if nitrate is taken up by the crop (Figure 13).

Figure 13
Effect of Nitrate and Ammonium uptake on soil pH

Nitrate Nutrition

pH
NO$_3^-$N maintains/ Increases pH of the rhizosphere

Ammonium Nutrition

pH
NH$_4^+$N acidifies the rhizosphere

Plant Root
Nitrogen Immobilization

Just like plants, soil microorganisms (bacteria, fungi) also need nitrogen for their growth. Therefore, soil microbes compete with plants for nitrogen. The uptake of ammonium and nitrate nitrogen by soil microbes is called microbial N immobilization (Figure 14). Immobilized N is not plant available. Most soil microbes prefer ammonium compared to nitrate (Figure 15). Furthermore, nitrogen immobilized by soil microbes may not be significantly remobilized during the current growing season (Figure 16).

Microbes prefer ammonium as N source, because uptake and metabolism of ammonium consumes less energy.

Figure 14
Microbial N immobilisation - most soil microbes prefer ammonium compared to nitrate

Figure 15
Plants Prefer Nitrate, Soil Microbes Prefer Ammonium

Figure 16
Fertilizer N Immobilization Occurs Rapidly After N Application

The described nitrogen losses due to Ammonium Fixation and Immobilisation combined lead to a substantial lower nitrogen availability and lower yield (Figure 17).

Figure 17
Ammonium leads to higher N losses and decreased yield compared to Nitrate nutrition

REF: HANSCHMANN & LIPPOLD (1997, GERMANY)
Reduced Nitrogen Loss

Ammonia Volatilization

Ammonia volatilization means the gaseous loss of ammonia (NH₃) from ammonium (NH₄⁺) fertilizers, or created from urea after conversion to NH₄⁺ (Figure 18).

Besides soil and climate, the nitrogen fertilizer type determines the rate of ammonia volatilization.

The higher the nitrate share in a fertilizer the lower the risk of ammonia losses. Pure nitrates release no ammonia. Urea application leads to particularly high ammonia losses because the conversion of urea into ammonium supports conditions in the soil, which are favorable for volatilization losses (Figure 19).

Figure 18
Origin of Ammonia Volatilization Loss

Figure 19
Average Ammonia Losses from Different Mineral Fertilizers in a Temperate Climate

Ammonia losses not only have economic consequences for the farmer - lower N use efficiency causes lower yield (Figure 20) - but also trigger important environmental impacts.

Figure 20
NH₃ Emissions from Urea Reduce the N Availability
Valencia Oranges - Brazil

© Yara
NH₃ Losses from Urea

High pH at the soil surface increases losses due to volatilization. However, even in fairly neutral soil pH levels, the rate of volatilization can be surprisingly high when urea fertilizers are used. This is because of a temporary increase in the soil pH near to the urea fertilizer particle as urea undergoes conversion to ammonium through hydrolysis (Figure 21).

Volatile ammonium can be visualized with Yara’s ammonia volatilization kit. The rate of ammonia losses is indicated by the yellow column which turns blue when ammonia is formed (Figure 22).

**Table 4**

<table>
<thead>
<tr>
<th>Soil pH</th>
<th>Temperate Climate</th>
<th>Tropical Climate</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.5</td>
<td>12</td>
<td>18</td>
</tr>
<tr>
<td>5.5 - 7.3</td>
<td>14</td>
<td>20</td>
</tr>
<tr>
<td>7.3 - 8.5</td>
<td>19</td>
<td>28</td>
</tr>
<tr>
<td>&gt; 8.5</td>
<td>35</td>
<td>52</td>
</tr>
</tbody>
</table>

**Figure 21**

NH₃ Losses from Urea Even on Acidic Soils

- Urea zone pH 8.5
- Bulk soil pH 5.5

**Figure 22**

Ammonia volatilization kit - a semi-quantitative test to illustrate NH₃ volatilization losses

- DAY 5
  - CAN 75 kg N/ha
  - Urea 75 kg N/ha

- The rate of ammonia losses is indicated by the yellow column which turns blue when ammonia is formed.

**Nitrous Oxide Emissions**

Nitrous oxide (N₂O) is a greenhouse gas and is released during nitrification if the initial N source is ammonium (NH₄⁺).

Under oxygen deficient conditions (e.g. water-logging), N₂O emissions also occur as an intermediate during the denitrification of nitrate into dinitrogen.

Besides carbon dioxide (CO₂), nitrous oxide (N₂O) is one of the greenhouse gases, which contribute to climate change (1 kg N₂O contributes as much as 300 kg CO₂ to the global warming effect). In fact N₂O is responsible for 6% of the total global warming effect, with major sources being animal manures and mineral fertilizers. Microbial conversion processes of nitrogen in the soil (nitrification and denitrification) are potential sources of N₂O emissions (Figure 23).

The application of nitrogen fertilizer contributes to gaseous N₂O losses. The rate of N₂O emissions mainly depends on soil and climate, but the nitrogen form also has an impact. On average, N₂O emissions are lower from nitrates than from other N fertilizers.
Nitrogen Leaching

The risk of N leaching is significantly reduced when nitrogen is applied according to crop demand, and in fact optimum economic application rates of nitrogen fertilizer comply with good environmental farming practices (Figure 25).

Nitrogen leaching is the downward movement of nitrogen in the soil solution through the soil profile, and out of the rooting zone. Fertilizer nitrogen can be leached as nitrate or urea, as both are highly soluble in water. In temperate climates the main risk for leaching of nitrate is during fall and winter. Thus, N residues in soil after harvest should be minimized in order to avoid leaching losses after harvest.

Figure 25
Low N Leaching Risk at Optimum N supply (trials with winter wheat, N applied in 3 dressings) - Germany

In contrast, nitrate leaching within the growing period is rather exceptional because of high water consumption of the crop (evapotranspiration) and high N uptake rates of the plants, which both counteracts leaching. Leaching of fertilizer nitrogen directly after fertilizer application is more likely to occur on light soils with heavy rainfall or excess irrigation (Figure 26).

Figure 26
No Increased Mineral Soil N in the Sub-Soil at Optimum N Fertilizer Supply = No Leaching

[Graph showing yield and soil nitrate level at harvest]
Reduced Environmental Impact

Life Cycle Assessment (LCA) is a methodology to integrate the different N losses, like ammonia volatilization, nitrous oxide emissions and nitrate leaching. In LCA studies nitrates perform best because they combine the most efficient use of land and with the least environmental impact. Thus, nitrates are the most environmentally friendly nitrogen fertilizers (Figure 27).

The N balance simply calculates the difference between N fertilizer input and N removal with the crop yield. The remaining nitrogen is either lost to the environment or left in the soil. The results of N balance calculations show nitrate based products to be superior to UAN or urea (Figure 28).

Figure 27
Environmental Impact of Different N Forms

Figure 28
Low N Balance With Nitrate Applied at Optimum N Rate - N Balance Indicates Potential Nitrogen
Handling and Storage

Transport & Storage

Bulk density and nitrogen content determine how much of the fertilizer volume is required for transportation. The bulk density of nitrate-based fertilizers such as AN and CAN is higher than that of urea. Considering both, bulk density and N concentration, the transport volume expressed as kg N per cubic meter is almost the same for AN and urea (Table 5).

Caking and dust formation can be major problems, often created during fertilizer transport and storage. Stringent storage and handling procedures are implemented for Yara fertilizers in order to maintain the high quality of our products from the factory to the farmer’s field.

Effective anti-caking additives are available to avoid caking of nitrates during storage in the warehouse. With regard to dust formation, nitrates generally develop less dust than other fertilizers. A special problem of urea is that its dust can lead to caking problems in neighboring fertilizer piles containing ammonium and nitrate. This makes separate storage of urea from other such fertilizers necessary.

Table 5
The Transport Volume per Tonne of N is a Function of Bulk Density and Nutrient Concentration

<table>
<thead>
<tr>
<th></th>
<th>Bulk Density (kg/l)</th>
<th>N Content (kg N/kg)</th>
<th>Transport Volume (m^3/t N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prilled AN</td>
<td>0.99</td>
<td>0.345</td>
<td>2.9</td>
</tr>
<tr>
<td>Granular AN</td>
<td>0.94</td>
<td>0.345</td>
<td>3.1</td>
</tr>
<tr>
<td>Prilled CAN</td>
<td>1.05</td>
<td>0.275</td>
<td>3.5</td>
</tr>
<tr>
<td>Granular CAN</td>
<td>1.05</td>
<td>0.275</td>
<td>3.5</td>
</tr>
<tr>
<td>Prilled Urea</td>
<td>0.73</td>
<td>0.46</td>
<td>3.0</td>
</tr>
<tr>
<td>Granular Urea</td>
<td>0.77</td>
<td>0.46</td>
<td>2.8</td>
</tr>
</tbody>
</table>

REF: EPPA - 2006
Spreading

Low density N fertilizers with poor particle size distribution lead to striping of crops and loss of yield.

Figure 29 shows an example how uneven 1st N application with Urea in early spring (spreading width 36m), can cause striping.

Biomass monitoring in the same field in May shows a clear strip pattern with under-fertilized and overfertilized strips in the field, and indicates possible loss of yield (Figure 29).

Yara’s High Quality Nitrate are the Basis to Accurate Application

High bulk density and uniform distribution of the fertilizer particles are important prerequisites for high spreading accuracy. Yara’s high quality nitrate fertilizers fulfill these requirements and show excellent spreading properties.

The use of high quality nitrate allows greatest spreading width, while maintaining high spreading accuracy. Fertilizers with low bulk density and uneven particle size distribution lead to reduced spreading performance and uneven nutrient distribution in the field.

Leading fertilizer spreader manufacturers recommend spreading of AN and CAN at spreading width up to 40 metres (prilled urea less than 30 metres).
Product Performance

Nitrate based fertilizers, such as our YaraBela range (AN / CAN) are mainly used in arable crops like cereals, maize, oilseed rape, sugar beet, potato or grassland. This is also reflected in the field trials which are based on the comparison of YaraBela products and urea (Figures 33 to 35).

The positive effect of YaraBela on yield is not restricted to arable crops as the result in a banana trial shows (Figure 32).

In arable crops nitrogen fertilizer containing 50% nitrate and 50% ammonium such as our YaraBela range are likely to be the most financially rewarding option.

Figure 33
Higher Yields with YaraBela Compared to Urea
South Africa - 6 Trials Spring Wheat

Figure 34
YaraBela Improves Yield
Maize - Argentina

Figure 35
Higher Grass Yields with YaraBela vs Urea
Grassland - Germany

More field trial results that support the superior performance of our YaraBela range with regard to yield and quality are available from our local Yara Agronomists.
Safety

Yara International produces high quality fertilizer products from a variety of raw materials by different production technologies. Compliance with international legislation and Yara’s internal technical standards ensure a high focus on product and process safety as well as protection of personnel and environment by implemented best available techniques.

The Yara product portfolio is broad to fit market requirements. This includes straight nitrogen fertilizers like ammonium nitrate (AN) and urea, as well as composite NPK products. The products from Yara maybe granular or prilled and these characteristics can significantly affect the handling and storage of the products. Yara has adopted the EFMA Product Stewardship program that aims to:

- Take responsibility for the product through the value chain from raw material to use.
- Meet the public demands for openness and communication.
- Share experiences and knowledge.
- Provide a good structure for setting up
- Product Stewardship on a company level.

Special comments on ammonium nitrate Legislation

Over the years ammonium nitrate fertilizers have been involved in several accidents that have influenced the legislation of transport, storage and handling.

Decompositions during transport and in storage have caused release of toxic gases and hazardous situations.

The international UN ‘Recommendations on the Transport of Dangerous Goods’ (www.unece.org/trans) is adopted in international fertilizer transport legislation by IMO (shipping), ADR (road), RID (rail), ADNIR (barges) and IATA (air) regulations. National and local regulations apply for storage of fertilizers. The SEVESO-directive gives guidance on storage volumes / risk assessment for hazardous products within the EU.

Properties related to safety

AN 33.5 is classified as an oxidizer (Class 5.1) by UN due to its high AN content.

Special regulation for storage is given by National authorities. Yara ammonium nitrate based fertilizers pass the resistance to detonation test, and have very high resistance to detonation. When bagged fertilizers are involved in a fire, the bags may melt and break, but they will have insignificant effect on the fire.

Pellets can allow heat and fire to penetrate into the interior of the stack. Proper handling and avoiding confinement and contamination (i.e., organic material, trace metals, chloride, acids) minimize any risk in the handling chain.

(For more information see Yara’s From Factory to Field Brochure and www.efma.org.)
For a fertilizer programme to meet your local needs, contact your nearest Yara Agronomist.

Yara’s Products

Yara manufactures and sells a large range of fertilizers. In addition the individual country operations owned by Yara may have a range of other fertilizers available for the grower. Check with your local agronomist to see a full range of fertilizers available.

Disclaimer: The information contained herein is to the best of Yara’s knowledge and belief accurate. Recommendations and results stated, unless otherwise acknowledged, are based upon Yara’s experience and on field trial data.
For further information please contact:
Yara International ASA
Bygdøya allé 2,
N-0202, Oslo, Norway
www.yara.com
LABORATORY REPORT NO. 04077

DOT OXIDIZER TESTING
On solid materials

May 26, 2004

for

Yara North America
100 N. Tampa St., Suite 3200
Tampa, FL 33602
USA

Attn: Mr. Bill Easterwood

Prepared by: Beth Frederick
Hazardous Materials Technician

Review by: Michael J. Pesko
Chief Operating Officer
STRESAU LABORATORY, INC.

May 26, 2004

Prepared for: Yara North America
100 N. Tampa St., Suite 3200
Tampa, FL 33602

Subject: DOT OXIDIZER TESTING

1.0 OBJECT

Your sample identified as a CAN (Calcium Ammonium Nitrate) 27 was received and subjected to a DOT Oxidizer test (solid substance), as requested by Mr. Bill Easterwood of Yara North America.

2.0 PHYSICAL APPEARANCE

The sample was comprised of gray spears. It arrived at Stresau in a plastic bottle at ambient temperature and was tested in the form received.

3.0 UN Oxidizer Test UN test 0.1

3.1 Procedure
Thirty gram mixtures of sample to cellulose (Whatman grade CFR11), containing 1 to 1 and 4 to 1 ratios by mass, were prepared, placed in conical piles, and ignited by means of a wire heated to 1000°C until the first signs of combustion were noticed. This was repeated four times for each mixing ratio, for a total of five trials per ratio. Similar tests were performed using Potassium Bromate instead of sample, in a 3 to 7 ratio, as Packing Group III reference material.

The room conditions at the start of the test were 72°F and 46% relative humidity.
STRESAU LABORATORY, INC.  
May 26, 2004  

LABORATORY REPORT NO. 04077  
Page 2 of 3

3.1.2 TEST RESULTS

3.1.2.1 REFERENCE TRIALS

3:7 ratio of Potassium Bromate/Cellulose, Packing Group III standard. All trials burned with approx. 10 - 12" flame. The burn times were as follows:

1) Burn time 92 seconds  
2) Burn time 91 seconds  
3) Burn time 94 seconds  
4) Burn time 95 seconds  
5) Burn time 89 seconds  
   average burn time: 92.2 seconds

SAMPLE TRIALS

04077: CAN (Calcium Ammonium Nitrate) 27  
1:1 ratio of Test Sample/Cellulose. All trials burned with approx. 6" flame.

1) Burn time 134 seconds  
2) Burn time 144 seconds  
3) Burn time 125 seconds  
4) Burn time 129 seconds  
5) Burn time 141 seconds  
   average burn time: 134.6 seconds

4:1 ratio of Test Sample/Cellulose. All trials burned with approx. 3" flame.

1) Burn time 105 seconds  
2) Burn time 105 seconds  
3) Burn time 112 seconds  
4) Burn time 105 seconds  
5) Burn time 111 seconds  
   average burn time: 107.6 seconds
4.0 CONCLUSION

Based on the test results, the following conclusion was made:

Your sample CAN (Calcium Ammonium Nitrate) 27 is not considered to be a Division 5.1 Oxidizer, as defined by the UN/DOT Criteria. This is because the average burn time of the sample material was greater than the Packing Group III standard.

The above conclusion represents our interpretations of the test data, as defined by the above listed test specifications. The conclusions contained in this report are for the customer’s information purpose only.

5.0 DATA STORAGE

The field data for this report is contained in data book SLF # 2004-1, and filed with Stresau Laboratory’s Document Control. No videotape or photographic documentation was made.

Standard on Protective Ensembles for First Responders to Hazardous Materials Emergencies and CBRN Terrorism Incidents

T1A Log No.: 1371

Reference: Various

Comment Closing Date: July 19, 2018

Submitter: Jeffrey O. Stull, International Personnel Protection, Inc.

www.nfpa.org/1994

1. Add an entry to paragraph 2.3.4 ASTM Publications as follows:


2. Revise 5.3.2 to read as follows:

   5.3.2* The technical data package shall contain all documentation required by this standard and the values obtained from the initial certification showing compliance with the requirements of Chapter 7 in the current edition of this standard, using the reporting formats provided in Table 5.3.2(a) and Table 5.3.2(b), and Table 5.3.2(c) for each ensemble, element, material, or component, as applicable.

3. Revise Table 5.3.2(a) to reflect addition of Chemical penetration testing and add a new Table 5.3.2(c) to capture the reporting of this data.

<table>
<thead>
<tr>
<th>Ensemble or Element</th>
<th>Performance Requirement</th>
<th>Test Method</th>
<th>Requirement</th>
<th>Result</th>
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<tr>
<td><strong>Class I Garment Elements</strong></td>
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<td>Materials and seams</td>
<td>Chemical penetration resistance</td>
<td>Section 8.33</td>
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<td>See Table 5.3.2(c)</td>
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<td><strong>Class I Garment Visors</strong></td>
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<td>Chemical penetration resistance</td>
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<td>See Table 5.3.2(c)</td>
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<tr>
<td><strong>Class I Footwear Elements</strong></td>
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<td>See Table 5.3.2(c)</td>
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</table>
Table 5.3.2(c) Format for Reporting Certification Penetration Test Data in Technical Data Package

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Sulfuric acid, CAS 7664-93-9, 93.1%</td>
<td>Pass</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*A pass result indicates no liquid penetration through the tested specimens after a 1-hour exposure with 1 minute of the exposure at 7.8 kPa hydrostatic pressure.

4. Add new paragraphs to provide new criteria for liquid penetration resistance criteria of ensemble element materials and seams against sulfuric acid to read as follows:

7.1.2.1.1 Class 1 garment materials and seams shall be tested for penetration resistance as specified in Section 8.33, Chemical Penetration Resistance Test, and shall exhibit no penetration for at least 1 hour.

7.1.2.8.1.1 Class 1 garment visor materials and seams shall be tested for penetration resistance as specified in Section 8.33, Chemical Penetration Resistance Test, and shall exhibit no penetration for at least 1 hour.

7.1.2.9.1.1 Where the Class 1 garment includes elastomeric interface materials, each elastomeric interface material shall be tested for penetration resistance as specified in Section 8.33, Chemical Penetration Resistance Test, and shall exhibit no penetration for at least 1 hour.

7.1.3.2.1 Class 1 glove materials and seams shall be tested for penetration resistance as specified in Section 8.33, Chemical Penetration Resistance Test, and shall exhibit no penetration for at least 1 hour.

7.1.4.2.1 Class 1 footwear upper materials and seams shall be tested for penetration resistance as specified in Section 8.33, Chemical Penetration Resistance Test, and shall exhibit no penetration for at least 1 hour.

5. Revise 8.7.6.1 to read as follows:

8.7.6.1* The following challenge chemicals shall be tested as liquids at a concentration of 95 percent or greater, except where otherwise specified:

1. Liquid chemical warfare agents for Class 1, Class 2, Class 2R, Class 3, and Class 3R ensemble element materials and seams
   (a) Sulfur mustard, distilled [HD, or bis(2-chloroethyl) sulfide, CAS 505-60-2]
   (b) Soman (GD, or O-Pinacolyl methylphosphonofluoridate, CAS 96-94-0)

2. Liquid toxic industrial chemicals for Class 1 ensemble elements materials and seams
   (a) Dimethyl sulfate (DMS, sulfuric acid dimethyl ester, CAS 77-78-1)
   (b) Sulfuric acid, 93.1 percent, specific gravity 1.84, 66° Baume (CA 7664-93-9)
   (c) Tetrachloroethylene (perchloroethylene, CAS 127-18-4)
   (d) Toluene (toluol, CAS 108-88-3)

3. Liquid toxic industrial chemical for Class 2, Class 2R, Class 3, and Class 3R ensemble elements materials and seams
   (a) Dimethyl sulfate (DMS, sulfuric acid dimethyl ester, CAS 77-78-1)

6. In Table A.8.74.4, delete the row with Sulfuric acid as shown legislatively:

Table A.8.74.4 Suggested Collection Media/Sorbents, Detection Techniques, and Analytical Methods by Test Chemical

<table>
<thead>
<tr>
<th>Chemical</th>
<th>Examples of Collection/Media Sorbent Bed*</th>
<th>Detection Techniques*</th>
<th>EPA Method</th>
<th>NIOSH Method</th>
<th>OSHA Method</th>
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<tbody>
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<td>Sulfuric acid</td>
<td>Silica gel, DI-H₂O</td>
<td>IC-pH, conductivity</td>
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<td>7903/7908</td>
<td>ID-165SG</td>
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</table>

...
7. Revise the section on Final Challenge Battery in A.8.7.6.1 to read as follows:

A.8.7.6.1 The selection of the test chemicals takes into account several factors that are described in the sections below.

Definition of Ideal Chemical Challenge Battery.

... Final Challenge Battery.

The final challenge battery consisted of 10 toxic industrial chemicals and 2 chemical warfare agents as described in the Table A.8.7.6.1(b). The final list incorporates a wide range of chemical reactivity, solubility and structure-property relationships. Due to limitations in the ability to collect sulfuric acid in vapor phase, liquid penetration resistance testing is used for sulfuric acid in lieu of permeation testing.

8. Revise the titles of Tables A.8.7.6.1(a) and (b) to read as follows:

Table A.8.7.6.1(a) Basis for Selection of NFPA 1994 Chemicals for Permeation and Liquid Penetration Resistance Testing

Table A.8.7.6.1(b) Final 10-Chemical Battery for NFPA 1994 Class 1 Permeation and Liquid Penetration Resistance Testing

9. Add a new section 8.33 to read as follows:

8.33 Chemical Penetration Resistance Test.

8.33.1 Application.

8.33.1.1 This method shall apply to the CBRN barrier layer and the CBRN barrier layer’s seams used in ensembles and ensemble elements for CBRN terrorism agent protection.

8.33.1.2 Specific requirements for testing the CBRN barrier layer of garments, hoods, elastomeric interface material, and socks shall be as specified in 8.33.7.

8.33.1.3 Specific requirements for testing the CBRN barrier layer of visors shall be as specified in 8.33.8.

8.33.1.4 Specific requirements for testing the CBRN barrier layer of gloves shall be as specified in 8.33.9.

8.33.1.5 Specific requirements for testing the CBRN barrier layer of footwear shall be as specified in 8.3.10.

8.33.1.6 Specific requirements for testing the CBRN barrier layer’s seams of garments, hoods, socks, visors, and gloves shall be as specified in 8.3.11.

8.33.1.7 Specific requirements for testing elastomeric interface materials shall be specified in 8.33.12.

8.33.2 Samples.

8.33.2.1 Samples for conditioning shall be as specified according to the specific requirements in 8.33.7, 8.33.8, 8.33.9, 8.33.10, 8.33.11, and 8.33.12, as appropriate.

8.33.2.2 Samples shall be conditioned as specified according to the specific requirements in 8.33.7, 8.33.8, 8.33.9, 8.33.10, 8.33.11, and 8.33.12, as appropriate.

8.33.2.3 Samples shall then be cut to the specimen size.

8.33.2.4 All layers of the samples during conditioning shall be present and configured in the order and orientation as worn.

8.33.3 Specimens.

8.33.3.1 Specimens shall be the CBRN barrier layer or the CBRN barrier layer’s seam of the size required to fit the penetration test cell.

8.33.3.2 At least three specimens shall be tested against each challenge chemical.

8.33.3.3 Any outer shell or other composite layers normally worn over the specimen shall be permitted to be included on top of the specimen in the test. The outer shell or other composite layers shall be placed on the test specimen through the cell cap port after the test cell has been assembled.

8.33.3.4 If the specimen is the outermost layer of the composite, then it shall be tested without any additional layers on top.
8.3.3.5 Any separable layers normally worn underneath the specimen shall not be permitted to be included in the test.
8.3.3.6 The specimens with nonuniform surfaces shall be permitted to be treated with an impermeable nonreactive sealant outside the area of the specimen exposed to the challenge chemical, in order to allow scaling of the test cell to a uniform surface of the specimen.
8.3.4 Procedure.
8.3.4.1 Penetration testing shall be conducted against liquid sulfuric acid, 93.1 percent, chemical abstract service (CAS) number CAS 7664-93-9, at specific gravity 1.84, 66° Baumé.
8.3.4.2 Penetration resistance shall be measured in accordance with ASTM F903, Standard Test Method for Resistance of Protective Clothing Materials to Penetration by Liquids, Procedure C, using the following modifications:
   (1) All tests shall be conducted at 25°C ±3°C (77°F ±5°F) and 65 percent ±5 percent relative humidity.
   (2) The plexiglass shield shall be omitted from the test cell.
   (3) Use of blotting paper at the end of the test shall be permitted to assist in the visual observation of liquid penetration. Visually observed chemical on the blotting paper shall constitute failure of this test.
   (4) An observation to determine specimen penetration shall be made at the end of the 60-minute chemical contact period.
8.3.5 Report. The pass or fail results for each chemical tested and identification of location where penetration occurs, if discernible, shall be recorded and reported.
8.3.6 Interpretation. Observed liquid penetration at the end of the test for any specimen shall constitute failure.
8.3.7 Specific Requirements for the CBRN Barrier Layer of Garments, Hoods, and Socks.
8.3.7.1 Samples shall be conditioned by flexing as specified in 8.1.3 and shall be 200 mm × 280 mm (8 in. × 11 in.). Following flexing, one specimen shall be taken from the center of each sample subjected to flexing for penetration resistance testing.
8.3.7.2 Samples shall be conditioned by abrading as specified in 8.1.4 and shall be configured as specified in Figure 8.1.4. Following abrading, one specimen shall be taken from the center of each sample subjected to abrading for penetration resistance testing.
8.3.7.3 Preconditioning one sample to both flexing and abrading shall be permitted prior to penetration resistance testing.
8.3.8 Specific Requirements for Testing the CBRN Barrier Layer of Visors.
8.3.8.1 Samples for conditioning shall be visor materials.
8.3.9 Specific Requirements for Testing the CBRN Barrier Layer of Gloves.
8.3.9.1 Samples for conditioning shall be whole gloves.
8.3.10 Specific Requirements for Testing the CBRN Barrier Layer of Footwear.
8.3.10.1 This test shall apply to all types of footwear configurations.
8.3.10.2 Where the footwear incorporates a sock or overboot constructed of garment material, the garment material flex fatigue resistance test as specified in 8.1.3 shall be permitted to be substituted for this test.
8.3.10.3 Upper samples for conditioning shall be whole footwear items.
8.3.10.4 Footwear upper samples shall be conditioned by abrading as specified in 8.1.4.
8.3.10.5 Following abrasion, only one test specimen for chemical penetration resistance testing shall be taken from each sample subjected to abrasion.
8.3.10.6 The chemical penetration test specimen shall be taken from the exact center of the abraded sample so that the center of the penetration test specimen and the center of the abraded specimen coincide.
8.3.11 Specific Requirements for Testing the CBRN Barrier Layer’s Seams of Garments, Hoods, Socks, Visors, and Gloves.
8.3.11.1 Samples for conditioning shall be 600 mm (23 1/2 in.) lengths of prepared seam or cut from ensembles.
8.3.11.2 Seam specimens shall be prepared from seam samples that have a minimum of 75 mm (3 in.) of material on each side of the seam center.
8.33.11.3 Penetration test specimens shall be cut such that the exact seam center divides the specimen in half.

8.33.11.4 Seam specimens shall be prepared representing each type of seam found in the garment, or shall be taken from each type of seam found in the garment, including as a minimum the garment-to-garment material seams and the garment-to-visor material seams.

8.33.11.5 Seam specimens shall be taken from the gauntlet portion of the glove where an external seam is used in the construction of the glove.

8.33.12 Specific Requirements for Testing Elastomeric Interface Materials.

8.33.12.1 Samples shall not be subjected to conditioning by flexing or abrasion.

8.33.12.2 Specimens shall be taken from elastomeric interface sheet material or formed elastomeric interface items that are representative of the elastomeric interface material nominal thickness.

Substantiation: Sulfuric acid was added as a new chemical as part of the Class 1 battery for chemical permeation testing. However, the current chemical permeation resistance procedures specified in the standard do not permit the analysis of a relatively nonvolatile chemical with air collection at the specified air flow. While other chemicals could be substituted, the proposal for removing sulfuric acid addresses the problem of performing a test where the chemical cannot be efficiently collected in air. Instead, liquid penetration resistance testing is recommended where the ensemble element materials and seams are evaluated against full strength sulfuric acid with the observation of liquid penetration through the fabric. This represents a more likely mechanism of how sulfuric acid would be presented as a hazard to the wearer of a protective ensemble. The same procedures for liquid penetration resistance as now specified in NFPA 1992 have been adapted as part of the proposed changes. Additional changes are needed to remove sulfuric acid where it appears in other portions of the standard, particularly within Appendix A.

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

In specifying new chemicals as part of the Class 1 ensemble element chemical permeation testing requirements, the Technical Committee overlooked how sulfuric acid would be collected due to its relative low volatility. The inclusion of sulfuric acid as a permeation test chemicals using the current permeation test procedures represents an error in the standard.
MEMORANDUM

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

FROM: Yvonne Smith, Project Administrator

DATE: July 20, 2018

SUBJECT: NFPA 1994 Proposed TIA No. 1371 FINAL CC BALLOT RESULTS

The public comment circulation has passed, 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).

30 Eligible to Vote
5 Not Returned (Area, Barker, Farley, Legendre, Traynor)

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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.

[30 eligible ÷ 2 = 15 + 1 = (16)]

(2) The number of affirmative votes needed to satisfy the ¾ requirement is 19.

(30 eligible to vote - 5 not returned - 0 abstentions = 25 × 0.75 = 18.75)

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 Wednesday, July 25, 2018.
MEMORANDUM

TO: Technical Committee on Hazardous Materials Protective Clothing and Equipment

FROM: Yvonne Smith, Project Administrator

DATE: July 20, 2018

SUBJECT: NFPA 1994 Proposed TIA No. 1371 FINAL TC BALLOT RESULTS

The public comment circulation has passed, 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).

30 Eligible to Vote
8 Not Returned (Buck, D. Green, R. Greene, Shelton, Thompson, West, Wisner Jr., Dulisse)

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</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.

\[30 \text{ eligible} \div 2 = 15 + 1 = 16\]

2) The number of affirmative votes needed to satisfy the ¾ requirement is 16 for Technical Merit and 17 for Emergency Nature.

- **Technical Merit:** (30 eligible to vote - 8 not returned - 1 abstentions = 21 \times 0.75 = 15.75)
- **Emergency Nature:** (30 eligible to vote - 8 not returned - 0 abstentions = \times 0.75 = 16.5)

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 **Wednesday, July 25, 2018**.

Attachment
Ballot Item No. 1:
I agree with the TECHNICAL MERITS of the Proposed TIA to revise sections 2.3.4, 5.3.2, revise various sections in chapter 7, revise sections of chapter 8 and to add section 8.33.

_________ AGREE   _________ DISAGREE*   _________ ABSTAIN*

EXPLANATION OF VOTE - Please type or print your comments:

*An explanation shall accompany a “disagree” or “abstain” vote.

I completely agree with keeping sulfuric acid but I do not necessarily agree penetration to be the optimal tests method. Permeation testing using conductivity would also be possible for example. That said, I would accept that it is certainly better to do penetration than deleting sulfuric acid.

Ballot Item No. 2:
I AGREE that the subject is of an EMERGENCY NATURE* for one or more of the following reasons (Check all that apply):

√   A. The standard contains an error or an omission that was overlooked during the regular revision process.
   
   _______ B. The NFPA Standard contains a conflict within the NFPA Standard or with another NFPA Standard.
   
   _______ C. The proposed TIA intends to correct a previously unknown existing hazard.
   
   _______ D. The proposed TIA intends to offer to the public a benefit that would lessen a recognized (known) hazard or ameliorate a continuing dangerous condition or situation.
   
   _______ E. The proposed TIA intends to accomplish a recognition of an advance in the art of safeguarding property or life where an alternative method is not in current use or is unavailable to the public.
   
   _______ F. The proposed TIA intends to correct a circumstance in which the revised NFPA Standard has resulted in an adverse impact on a product or method that was inadvertently overlooked in the total revision process or was without adequate technical (safety) justification for the action.

_________ ABSTAIN

_________ DISAGREE The TIA does not meet any of the regulations above warranting a TIA, therefore the TIA is NOT of emergency nature

EXPLANATION OF VOTE - Please type or print your comments:

* An explanation must accompany a “disagree” or “abstain” vote.
Signature

Ulf Nyström
Name (Please Print)
Please return the ballot on or before June 5, 2018

PLEASE RETURN TO:
Yvonne Smith, Project Administrator
NFPA
1 Batterymarch Park
Quincy, MA 02169

FAX: (617) 984-7110
E-mail: ysmith@nfpa.org/
X TECHNICAL COMMITTEE ON HAZARDOUS MATERIALS
PROTECTIVE CLOTHING AND EQUIPMENT LETTER BALLOT
PROPOSED TENTATIVE INTERIM AMENDMENT LOG NO. 1371
of the 2018 Edition of
NFPA 1994

Ballot Item No. 1:
I agree with the TECHNICAL MERITS of the Proposed TIA to revise sections 2.3.4, 5.3.2,
revise various sections in chapter 7, revise sections of chapter 8 and to add section 8.33.

AGREE          X        DISAGREE*          ABSTAIN*

EXPLANATION OF VOTE - Please type or print your comments:

* An explanation shall accompany a “disagree” or “abstain” vote.

Ballot Item No. 2:
I AGREE that the subject is of an EMERGENCY NATURE* for one or more of the following reasons
(Click all that apply):

A. The standard contains an error or an omission that was overlooked during the regular revision process.
B. The NFPA Standard contains a conflict within the NFPA Standard or with another NFPA Standard.
C. The proposed TIA intends to correct a previously unknown existing hazard.
D. The proposed TIA intends to offer to the public a benefit that would lessen a recognized (known) hazard or ameliorate a continuing dangerous condition or situation.
E. The proposed TIA intends to accomplish a recognition of an advance in the art of safeguarding property or life where an alternative method is not in current use or is unavailable to the public.
F. The proposed TIA intends to correct a circumstance in which the revised NFPA Standard has resulted in an adverse impact on a product or method that was inadvertently overlooked in the total revision process or was without adequate technical (safety) justification for the action.

ABSTAIN
X DISAGREE The TIA does not meet any of the regulations above warranting a TIA, therefore the TIA is NOT of emergency nature

EXPLANATION OF VOTE - Please type or print your comments:

* An explanation must accompany a “disagree” or “abstain” vote.

In the 2012 edition of NFPA 1994, a new permeation testing apparatus and method of detection were specified. In the 2016 edition, the scope of that standard was broadened to include hazardous materials emergencies. Sulfuric acid is the largest quantity industrial chemicals...
produced in the United States and frequently transported by pipeline, truck, rail, barge and ship. It is also recognized as a potential terrorist weapon.

Sulfuric acid has low volatility and cannot be detected in sufficient levels with the recently implemented permeation test method. However, the permeation of sulfuric acid has been routinely measured with the antecedent permeation test method, ASTM F 739. In the antecedent method, the outside surface of the test materials is normally covered with excess challenge chemical. For sulfuric acid, the inner surface is completely exposed to water. The conductivity of the water will change is any sulfuric acid permeates the material.

In NFPA 1994, only 10% (approx.) of the outside surface of the test specimens is covered with droplets of the test chemical. This requires that the specimen lay horizontally during the test. In order to maintain full water contact with the inside surface of the specimen, a modification of the antecedent test cell is required and is permissible. This work has not been performed to make these modifications. Instead an alternative barrier test based on penetration has been proposed.

Penetration is not an adequate substitution for a permeation test. Penetration is flow of the test material through a void or hole. Permeation is a three step process in which the challenge material is absorbed into the barrier, saturates the barrier and is available on the opposite surface. The permeation test is a much more critical test for resistance to chemical exposure. Permeation can occur through a material without observed penetration. Therefore, permeation, not penetration testing is utilized in NFPA 1991, Standard on Vapor Protective Ensembles for Hazardous Materials Emergencies and CBRN Terrorism Incidents and Classes 1, 2 and 3 of NFPA 1994, Standard on Protective Ensembles for First Responders to Hazardous Materials Emergencies and CBRN Terrorism Incidents.

In a penetration test, the outer surface barrier material or seam is exposed to the challenge chemical and the inner surface (skin side) observed for evidence of liquid penetration. This evidence may be visible droplets on the inner surface or wetting of a blotting paper that is wiped across this inner surface. There are numerous examples where permeation is observed in a permeation test, but no penetration is observed with the same material/chemical combination is a penetration test.

In this TIA, ASTM F 903 is specified as the penetration test method. In that test method, the duration of exposure and the amount of pressure applied during that exposure is arbitrary. For this TIA the time pressure sequence of 5 minutes at 0 pressure, 1 minute at 2 psi pressure followed 54 minutes is specified. This is the same sequence utilized in NFPA 1992, Standard on Liquid Splash-Protective Ensembles for Hazardous Materials Emergencies. Note that while penetration testing generally employs pressure for some duration and permeation does not, permeation can still occur while penetration remains undetected.

There have arguments presented that the penetration test is a suitable replacement. Not so if it is not as sensitive as a permeation test. Arguments have made that a permeation test with liquid collection medium is not representative. However, the wearers of this garment generally are covered in sweat and the contact of the sweat soaked skin is well represented by a water collection medium. The acute impact should sulfuric permeate the suit would be corrosive damage to the skin and some conjecture that sulfuric acid may have an oncological impact. Arguments have been made that the test method has not been validated. The same arguments hold for the test method added in the 2012 edition; no data on precision and bias has been presented.

While this may further delay the certification of garment to this standard, that in itself does not constitute an emergency. There has been sufficient time since this issue was first recognized to develop a method employing ASTM F 739 with liquid collection medium. Prior editions of the standard utilized ASTM F 739. Liquid collection medium is common and widely used technique.
The modification to the ASTM F 739 test cell is allowed by that method and commonly done, generally to address highly corrosive materials or to conduct measurement with liquid collection medium.

To summarize, the substitution of a less sensitive penetration test is unnecessary. Certification of products to the most recent edition of the standard will be delayed until this test method complication is resolved. But this should not be sufficient reason to substitute a less sensitive test that may, in the end product erroneous results. Given the high potential exposure of wearers to the specific chemical threat, an appropriate permeation test should be utilized.

Signature
James P. Reigler
Date
June 4, 2018

Name (Please Print)
James P. Reigler

Please return the ballot on or before June 5, 2018

PLEASE RETURN TO:
Yvonne Smith, Project Administrator
NFPA
1 Batterymarch Park
Quincy, MA 02169

FAX: (617) 984-7110

E-mail:

*Standard on Protective Ensembles for First Responders to Hazardous Materials Emergencies and CBRN Terrorism Incidents*

TIA Log No.: 1372  
Reference: 7.1.2.6.1(new), 7.1.2.8.4.1(new), 7.3.2.5.1(new), and 7.3.2.8.3.1(new)  
Comment Closing Date: July 19, 2018  
Submitter: Jeffrey O. Stull, International Personnel Protection, Inc.  

1. **Add a new paragraph 7.1.2.6.1 to read as follows:**

   7.1.2.6.1 Seam breaking strength shall be considered acceptable where the material strength is less than the required seam strength specified in 7.1.2.6 provided the material fails without failure of the seam below the applicable forces specified in 7.1.2.6.

2. **Add a new paragraph 7.1.2.8.4.1 to read as follows:**

   7.1.2.8.4.1 Seam breaking strength shall be considered acceptable where the material strength is less than the required seam strength specified in 7.1.2.8.4 provided the material fails without failure of the seam below the applicable forces specified in 7.1.2.8.4.

3. **Add a new paragraph 7.3.2.5.1 to read as follows:**

   7.3.2.5.1 Seam breaking strength shall be considered acceptable where the material strength is less than the required seam strength specified in 7.3.2.5 provided the material fails without failure of the seam below the applicable forces specified in 7.3.2.5.

4. **Add a new paragraph 7.3.2.8.3.1 to read as follows:**

   7.3.2.8.3.1 Seam breaking strength shall be considered acceptable where the material strength is less than the required seam strength specified in 7.3.2.8.3 provided the material fails without failure of the seam below the applicable forces specified in 7.3.2.8.3.

**Substantiation:** Seam breaking strength cannot be properly interpreted. If the seam being evaluated includes the garment material joined to an otherwise compliant component, such as an inner glove or sock material, which is not expected to be as strong as the garment material. Breakage of the test specimen in the component, especially at the attachment point of the tensile testing machine jaws should not be considered the basis for failing a sample. Other standards including NFPA 1951-2013 and NFPA 1971-2018 provide the same manner of interpretation as suggested by this proposed amendment. This is only an issue that pertains to Class 1 and Class 2R seams for garments and visors, where significantly larger seam strength requirements are imposed.

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

The committee inadvertently overlooked a necessary provision to allow for the proper execution of the requirement in the interpretation of seam breaking strength test results for compliant components with the garment.
MEMORANDUM

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

FROM: Yvonne Smith, Project Administrator

DATE: July 20, 2018

SUBJECT: NFPA 1994 Proposed TIA No. 1372 FINAL CC BALLOT RESULTS

The public comment circulation has passed, therefore, according to 5.6(b) in the NFPA Regs, the final results show this TIA has achieved the ¼ majority vote needed on both Ballot Item No. 1 (Correlation Issues) and Ballot Item No. 2 (Emergency Nature).

30 Eligible to Vote
6 Not Returned (Area, Barker, Farley, Legendre, McKenna, Traynor)

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<td>0 Disagree</td>
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</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.

\[30 \text{ eligible} \div 2 = 15 + 1 = 16\]

(2) The number of affirmative votes needed to satisfy the ¼ requirement is 18.

\[30 \text{ eligible to vote} - 6 \text{ not returned} - 0 \text{ abstentions} = 24 \times 0.75 = 18\]

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 Wednesday, July 25, 2018.
MEMORANDUM

TO: Technical Committee on Hazardous Materials Protective Clothing and Equipment

FROM: Yvonne Smith, Project Administrator

DATE: July 20, 2018

SUBJECT: NFPA 1994 Proposed TIA No. 1372 FINAL TC BALLOT RESULTS

The public comment circulation has passed, 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).

30 Eligible to Vote
6 Not Returned (Buck, D. Green, R. Greene, Thompson, Wisner Jr., Dulisse)

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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.

\[
30 \text{ eligible} \div 2 = 15 + 1 = 16
\]

2) The number of affirmative votes needed to satisfy the ¾ requirement is 18.

\[
(30 \text{ eligible to vote} - 6 \text{ not returned} - 1 \text{ abstentions} = 23 \times 0.75 = 17.25)
\]

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 **Wednesday, July 25, 2018**.

Attachment
TECHNICAL COMMITTEE ON HAZARDOUS MATERIALS
PROTECTIVE CLOTHING AND EQUIPMENT LETTER BALLOT
PROPOSED TENTATIVE INTERIM AMENDMENT LOG NO. 1372
of the 2018 Edition of
NFPA 1994

Ballot Item No. 1:
I agree with the TECHNICAL MERITS of the Proposed TIA to add paragraphs 7.1.2.6.1, 7.1.2.8.4.1, 7.3.2.5.1 and 7.3.2.8.3.1.

_________ AGREE   X _______ DISAGREE*   _______ ABSTAIN*

EXPLANATION OF VOTE - Please type or print your comments:

*An explanation shall accompany a "disagree" or "abstain" vote.

There is insufficient strength specified for material.

Ballot Item No. 2:
I AGREE that the subject is of an EMERGENCY NATURE* for one or more of the following reasons (Check all that apply):

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

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

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

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

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

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

X _______ ABSTAIN

DISAGREE The TIA does not meet any of the regulations above warranting a TIA, therefore the TIA is NOT of emergency nature

EXPLANATION OF VOTE - Please type or print your comments:

* An explanation must accompany a "disagree" or "abstain" vote.

This is not error or omission.
Signature

Name (Please Print)

Please return the ballot on or before June 5, 2018

PLEASE RETURN TO:
Yvonne Smith, Project Administrator
NFPA
1 Batterymarch Park
Quincy, MA 02169

FAX: (617) 984-7110

E-mail: ysmith@nfpa.org

Date 6-1-18
TECHNICAL COMMITTEE ON HAZARDOUS MATERIALS
PROTECTIVE CLOTHING AND EQUIPMENT LETTER BALLOT
PROPOSED TENTATIVE INTERIM AMENDMENT LOG NO. 1372
of the 2018 Edition of NFPA 1994

Ballot Item No. 1:
I agree with the TECHNICAL MERITS of the Proposed TIA to add paragraphs 7.1.2.6.1, 7.1.2.8.4.1, 7.3.2.5.1 and 7.3.2.8.3.1.

_________ AGREE  _________ DISAGREE*  _______ x _____ ABSTAIN*

EXPLANATION OF VOTE - Please type or print your comments:

*An explanation shall accompany a “disagree” or “abstain” vote.

Ballot Item No. 2:
I AGREE that the subject is of an EMERGENCY NATURE* for one or more of the following reasons (Check all that apply):

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

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

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

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

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

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

______ x _____ ABSTAIN

_________ DISAGREE The TIA does not meet any of the regulations above warranting a TIA, therefore the TIA is NOT of emergency nature

EXPLANATION OF VOTE - Please type or print your comments:

* An explanation must accompany a “disagree” or “abstain” vote.
Do not totally understand the rational to adjust vs. current benefit
Rob West

Signature  

5/23/2018  

Date

Name (Please Print)
Please return the ballot on or before June 5, 2018

PLEASE RETURN TO:
Yvonne Smith, Project Administrator
NFPA
1 Batterymarch Park
Quincy, MA 02169  

FAX: (617) 984-7110  

E-mail: ysmith@nfpa.org

*Standard on Protective Ensembles for First Responders to Hazardous Materials Emergencies and CBRN Terrorism Incidents*

TIA Log No.: 1373

Reference: 8.25.4.3

Comment Closing Date: July 19, 2018

Submitter: Jeffrey O. Stull, International Personnel Protection, Inc.


1. Revise 8.25.4.3 to read as follows:

   **8.25.4.3** Where the ensemble is nonencapsulating, devices or plugs described in ASTM F1052, Standard Test Method for Pressure Testing of Vapor-Protective Ensembles, shall be used to seal off open areas, such as the opening of a hood for a respirator facepiece. The laboratory shall also be permitted to use an appropriate fixture for isolating the area of the ensemble where the specific external fitting is installed for the purpose of evaluating its gastight integrity.

**Substantiation:** TIA 1994 18-3 removed the gastight integrity test as it applied to the overall evaluation of ensembles; however, the test was retained in the standard for the evaluation of installed external fittings on whole ensembles. The proposed modification of the test procedures permits the evaluation of the installation quality of the external fitting installation.

**Emergency Nature:** The NFPA 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 amendment corrects a conflict in the standard for the evaluation of external fittings for gastight integrity that was not addressed in TIA 1994 18-3.
MEMORANDUM

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

FROM: Yvonne Smith, Project Administrator

DATE: July 20, 2018

SUBJECT: NFPA 1994 Proposed TIA No. 1373 FINAL CC BALLOT RESULTS

The public comment circulation has passed, 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).

<table>
<thead>
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<tbody>
<tr>
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(Area, Barker, Brinkley, Hess, Legendre, McKenna, Reall, Winer, Traynor)

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<tr>
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<td>1 Abstentions (Farley)</td>
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<tr>
<td>21 Agree</td>
<td>20 Agree</td>
</tr>
<tr>
<td>0 Disagree</td>
<td>0 Disagree</td>
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</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.

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

2) The number of affirmative votes needed to satisfy the ¾ requirement is **16 on Technical Merit and 15 on Emergency Nature**.

Technical Merit: (30 eligible to vote - 9 not returned - 0 abstentions = 21 \times 0.75 = 15.75)
Emergency Nature: (30 eligible to vote - 9 not returned - 1 abstentions = 20 \times 0.75 = 15)

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 **Wednesday, July 25, 2018**.
MEMORANDUM

TO: Technical Committee on Hazardous Materials Protective Clothing and Equipment

FROM: Yvonne Smith, Project Administrator

DATE: July 20, 2018

SUBJECT: NFPA 1994 Proposed TIA No. 1373 FINAL TC BALLOT RESULTS

The public comment circulation has passed, 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).

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(Buck, D. Green, R. Greene, Thompson, West, Wisner Jr., Dulisse)

**Technical Merit:**

- 0 Abstentions
- 23 Agree
- 0 Disagree

**Emergency Nature:**

- 0 Abstentions
- 23 Agree
- 0 Disagree

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

2. The number of affirmative votes needed to satisfy the ¾ requirement is 18.
   
   (30 eligible to vote - 7 not returned - 0 abstentions = 23 × 0.75 = 17.25)

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 **Wednesday, July 25, 2018**.
MEMORANDUM

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

FROM: Yvonne Smith, Project Administrator

DATE: July 23, 2018

SUBJECT: NFPA 1994 Proposed TIA No. 1373 FINAL CC BALLOT RESULTS

The public comment circulation has passed, 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).

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

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

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

\[(30 \text{ eligible to vote} - 10 \text{ not returned} - 0 \text{ abstentions} = 20 \times 0.75 = 15)\]

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 Saturday, July 28, 2018.

Standard on Protective Ensembles for First Responders to Hazardous Materials Emergencies and CBRN Terrorism Incidents

TIA Log No.: 1374

Reference: 8.28.5.3

Comment Closing Date: July 19, 2018

Submitter: Jeffrey O. Stull, International Personnel Protection, Inc.

www.nfpa.org/1994

1. Revise 8.28.5.3 to read as follows:

8.28.5.3 The average elongation at rupture before and after heat aging shall be individually used to qualify the elastomeric character of the interface material.

Substantiation: There are no heat aging requirements in NFPA 1994-2018. This information appears to be mistakenly copied from NFPA 1999-2018.

Emergency Nature: The NFPA 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 standard contains an instruction that cannot be performed and represents an error that was inadvertently missed during the revision process.
MEMORANDUM

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

FROM: Yvonne Smith, Project Administrator

DATE: July 20, 2018

SUBJECT: NFPA 1994 Proposed TIA No. 1374 FINAL CC BALLOT RESULTS

The public comment circulation has passed, 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).

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</tr>
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<tbody>
<tr>
<td>30</td>
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</table>

Correlation Issues: | Emergency Nature:  
0 Abstentions | 0 Abstentions  
21 Agree | 21 Agree  
0 Disagree | 0 Disagree

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.

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

(2) The number of affirmative votes needed to satisfy the \(\frac{3}{4}\) requirement is 16.

\[30 \text{ eligible to vote} - 9 \text{ not returned} - 0 \text{ abstentions} = 21 \times 0.75 = 15.75\]

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 Wednesday, July 25, 2018.
MEMORANDUM

TO: Technical Committee on Hazardous Materials Protective Clothing and Equipment

FROM: Yvonne Smith, Project Administrator

DATE: July 20, 2018

SUBJECT: NFPA 1994 Proposed TIA No. 1374 FINAL TC BALLOT RESULTS

The public comment circulation has passed, 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).

30 Eligible to Vote
7 Not Returned (Buck, D. Green, R. Greene, Thompson, West, Wisner Jr., Dulisse)

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<thead>
<tr>
<th>Technical Merit:</th>
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<tr>
<td>0 Abstentions</td>
<td>0 Abstentions</td>
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<tr>
<td>23 Agree</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.

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

(2) The number of affirmative votes needed to satisfy the ¾ requirement is 18.

\[(30 \text{ eligible to vote} - 7 \text{ not returned} - 0 \text{ abstentions} = 23 \times 0.75 = 17.25)\]

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 Wednesday, July 25, 2018.
Standard on Protective Ensembles for First Responders to Hazardous Materials Emergencies and CBRN Terrorism Incidents
TIA Log No.: 1382
Reference: 7.1.1.3 thru 7.1.1.8
Comment Closing Date: July 19, 2018
Submitter: Jeffrey O. Stull, International Personnel Protection, Inc.
www.nfpa.org/1994

1. Delete all of 7.1.1.3, and associated subparagraphs as follows:
   7.1.1.3 Class 1 ensembles shall be tested for liquid tight integrity as specified in Section 8.4, Liquidtight Integrity Test, and ensembles shall allow no liquid penetration.

   7.1.1.3.1 Where outer gloves are designed to be worn in conjunction with gloves attached to the ensemble, the outer gloves shall not collect liquid.

   7.1.1.3.2 Where outer boots are designed to be worn in conjunction with socks, the outer boots shall not collect liquid.

2. Renumber paragraphs 7.1.1.4 through 7.1.1.8 as follows:
   7.1.1.43 ...
   7.1.1.54 ...
   7.1.1.65 ...
   7.1.1.65.1 ...
   7.1.1.76 ...
   7.1.1.87 ...

Substantiation: This test is currently included in Paragraph 7.1.1.2, and is conducted after the Overall Function and Integrity Test, which provides a more severe test condition for the ensemble.

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

In adding the new Class 1 ensemble element testing requirements, the Technical Committee inadvertently overlooked the duplicate test requirement which is not currently included in either the Class 2 or Class 3 requirements. The inclusion of Paragraph 7.1.1.3 represents an unnecessary duplicate test for Class 1 ensembles.
MEMORANDUM

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

FROM: Yvonne Smith, Project Administrator

DATE: July 20, 2018

SUBJECT: NFPA 1994 Proposed TIA No. 1382 FINAL CC BALLOT RESULTS

The public comment circulation has passed, 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).

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<tr>
<td>Emergency Nature:</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.

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

2. The number of affirmative votes needed to satisfy the ¾ requirement is 18.

   \[(30 \text{ eligible to vote} - 7 \text{ not returned} - 0 \text{ abstentions} = 23 \times 0.75 = 17.75)\]

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 Wednesday, July 25, 2018.
MEMORANDUM

TO: Technical Committee on Hazardous Materials Protective Clothing and Equipment

FROM: Yvonne Smith, Project Administrator

DATE: July 20, 2018

SUBJECT: NFPA 1994 Proposed TIA No. 1382 FINAL TC BALLOT RESULTS

The public comment circulation has passed, 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:
0  Abstentions  0  Abstentions
23  Agree  23  Agree
0  Disagree  0  Disagree

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.
   
   [30 eligible ÷ 2 = 15 + 1 = (16)]

(2) The number of affirmative votes needed to satisfy the ¾ requirement is 18.
   (30 eligible to vote - 7 not returned - 0 abstentions = 23 × 0.75 = 17.25)

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 Wednesday, July 25, 2018.
NFPA 1999-2018 Edition

*Standard on Protective Clothing and Ensembles for Emergency Medical Operations*

TIA Log No.: 1375
Reference: 7.1.2.7.1(new)
Comment Closing Date: July 19, 2018
Submitter: Jeffrey O. Stull, International Personnel Protection, Inc.

www.nfpa.org/1999

1. Add a new paragraph 7.1.2.7.1 to read as follows:

   **7.1.2.7.1** Seam breaking strength shall be considered acceptable where the material strength is less than the required seam strength specified in 7.1.2.7, provided the material fails without failure of the seam below the applicable forces specified in 7.1.2.7.

**Substantiation:** Seam breaking strength cannot be properly interpreted. If the seam being evaluated includes the garment material joined to an otherwise compliant component, such as an inner glove or sock material, which is not expected to be as strong as the garment material. Breakage of the test specimen in the component, especially at the attachment point of the tensile testing machine jaws should not be considered the basis for failing a sample. Other standards including NFPA 1951-2013 and NFPA 1971-2018 provide the same manner of interpretation as suggested by this proposed amendment. This proposed change only affects garment seams for multiple-use garments and ensembles.

**Emergency Nature:** The NFPA 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 committee inadvertently overlooked a necessary provision to allow for the proper execution of the requirement in the interpretation of test results for compliant components with the garment.
MEMORANDUM

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

FROM:       Yvonne Smith, Project Administrator

DATE:       July 20, 2018

SUBJECT:    NFPA 1999 Proposed TIA No. 1375 FINAL CC BALLOT RESULTS

____________________________________________________________________________

The public comment circulation has passed, 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).

30  Eligible to Vote  
9   Not Returned (Area, Barker, Brinkley, Hess, Legendre, McKenna, Reall, Winer, Traynor)

Correlation Issues:  Emergency Nature:
0  Abstentions  0  Abstentions
21  Agree  21  Agree
0  Disagree  0  Disagree

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.

[30 eligible ÷ 2 = 15 + 1 = (16)]

(2) The number of affirmative votes needed to satisfy the ¾ requirement is 16.

(30 eligible to vote - 9 not returned - 0 abstentions = 21 × 0.75 = 15.75)

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 Wednesday, July 25, 2018.
MEMORANDUM

TO: Technical Committee on Emergency Medical Services Protective Clothing and Equipment

FROM: Yvonne Smith, Project Administrator

DATE: July 20, 2018

SUBJECT: NFPA 1999 Proposed TIA No. 1375 FINAL TC BALLOT RESULTS

The public comment circulation has passed, 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).

17 Eligible to Vote
3 Not Returned (J. Davis, Hickerson, Patrick)

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<tr>
<td>14 Agree</td>
<td>14 Agree</td>
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<tr>
<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.

\[17 \text{ eligible} ÷ 2 = 8.5 = (9)\]

(2) The number of affirmative votes needed to satisfy the ¾ requirement is 11.

\[(17 \text{ eligible to vote} - 3 \text{ not returned} - 0 \text{ abstentions} = 14 \times 0.75 = 10.5)\]

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 **Wednesday, July 25, 2018**.

Attachment
NFPA 1999-2018 Edition  
*Standard on Protective Clothing and Ensembles for Emergency Medical Operations*  
TIA Log No.: 1376  
**Reference:** 8.1.3, Table 8.1.3.4 title, 8.1.3.6, 8.1.5, and 8.3.3.2  
**Comment Closing Date:** July 19, 2018  
**Submitter:** Jeffrey O. Stull, International Personnel Protection, Inc.  

1. **Revise the title of subsection 8.1.3 to read as follows:**


2. **Revise the title of Table 8.1.3.4 to read as follows:**

   Table 8.1.3.4 Wash Cycle Procedure for Whole Complete Garments, Garment Samples, Work Gloves, and Work Glove Pouches

3. **Revise paragraphs 8.1.3.6 and 8.1.3.6.1 to read as follows:**

   8.1.3.6 Complete garments and garment samples shall be tumbled for a minimum of 30 minutes or until samples are completely dry and shall be removed immediately at the end of the drying cycle.

   8.1.3.6.1 At the conclusion of the final drying cycle, the complete garment and garment samples shall be allowed to air dry for at least 48 hours prior to conducting the test.

4. **Delete subsection 8.1.5 and renumber subsequent subsections and paragraphs (including cross references) as shown legislatively:**

   8.1.5.6 Washing and Drying Procedure for Garment Materials. Specimens shall be subjected to 10 cycles of washing and drying in accordance with the procedure specified in Machine Cycle 1, Wash Temperature V, and Drying Procedure Ai, of the 2004 edition of AATCC 135, Dimensional Changes in Automatic Home Laundering of Woven and Knit Fabrics. A 1.8 kg ± 0.1 kg (4.0 lb ± 0.2 lb) load shall be used. A laundry bag shall not be used.

   8.1.56.1 Glove samples …

   8.1.56.2 The sample gloves …


   8.1.67.1 The standard abrasive fabric and…

   8.1.67.2 The standard abrasive fabric shall…

   8.1.67.3 Specimens shall be subjected to…

   8.1.78 Wet Conditioning for Work Gloves.

   8.1.78.1 Test subjects shall be …

   8.1.78.2 The wrist crease location…

   8.1.78.3 Test subject shall don …

   8.1.78.4 Test subject shall immerse …
8.1.78.5 The glove specimens shall …
8.1.89 Work Glove Test Areas.
8.1.89.4 Work glove test areas …
8.1.940 Cold Temperature Conditioning for Medical …

5. Revise 8.3.3.2 to read as follows:

8.3.3.2 Samples of multiple-use garment barrier layer and garment barrier layer seams shall be conditioned as specified in 8.1.3 and then conditioned as specified in 8.1.2. The garment barrier layer and garment barrier layer seams shall be permitted to be representative materials and seams used in the actual construction, or representative of actual construction.

Substantiation: An examination of the records for the revision of NFPA 1999 revealed that a submitted Public Input had been accepted as the basis for a First Revision (No. 98) to add the new top-loader laundering procedures; however, the substantiation statement for the First Revision read, “This change would allow for the preconditioning of garment materials, as opposed to having to launder whole garments and cut specimens from the garments. This brings the testing requirements more into line with other NFPA clothing standards in general, and NFPA 1951, specifically.” Clearly, this is contrary to the final result as appears in the NFPA 1999-2018 standard. A separate First Revision (No. 81) changed the specified laundering preconditioning from 8.1.3 to 8.1.4, which later became Section 8.1.5 when the test method sections in the standard were renumbered.

The top-loader procedures introduced into the 2018 edition of NFPA 1999 are in contrast to the washer/extractor-based procedures that had been specified in the 2013 edition of NFPA 1999 as well as the subsequent TIA-modified edition. The use of top-loader based washing procedures are contrary to the washing of clothing material barrier specimens in both NFPA 1951 and 1971, where barrier layers are instead conditioned by multiple cycles of a washer/extractor laundering procedures.

Emergency Nature: The NFPA 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 committee made an error for incorporating a change into the 2018 edition of NFPA 1999 that creates conflicts in testing among the fire service project.
MEMORANDUM

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

FROM: Yvonne Smith, Project Administrator

DATE: July 20, 2018

SUBJECT: NFPA 1999 Proposed TIA No. 1376 FINAL CC BALLOT RESULTS

The public comment circulation has passed, 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).

30 Eligible to Vote
5 Not Returned (Area, Barker, Legendre, McKenna, Traynor)

<table>
<thead>
<tr>
<th>Correlation Issues:</th>
<th>Emergency Nature:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Abstentions (Freeman)</td>
<td>1 Abstentions (Freeman)</td>
</tr>
<tr>
<td>23 Agree</td>
<td>24 Agree</td>
</tr>
<tr>
<td>1 Disagree (Lehtonen)</td>
<td>0 Disagree</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.

[30 eligible ÷ 2 = 15 + 1 = (16)]

(2) The number of affirmative votes needed to satisfy the ¾ requirement is 18.

(30 eligible to vote - 5 not returned - 1 abstentions = 24 × 0.75 = 18)

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 Wednesday, July 25, 2018.

Attachment
Ballot Item No. 1:
I agree there are no CORRELATION ISSUES in accordance with 3.4.2 and 3.4.3 of the NFPA Regs.

___________ AGREE ___________ DISAGREE* ______X____ ABSTAIN*

EXPLANATION OF VOTE - Please type or print your comments:

* An explanation must accompany a “disagree” or “abstain” vote. If disagreeing, cite relevant section(s)/paragraph(s) of the correlation issue and describe.

___ I believe there may be a technical issue concerning the wash procedure and as such am abstaining on the correlating ballot.

Ballot Item No. 2:
I AGREE that the subject is of an EMERGENCY NATURE for one or more of the following reasons (Check all that apply):

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

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

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

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

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

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

_____X____ ABSTAIN*

___________ DISAGREE* The TIA does not meet any of the regulations above warranting a TIA, therefore the TIA is NOT of emergency nature.

EXPLANATION OF VOTE - Please type or print your comments:

* An explanation must accompany a “disagree” or “abstain” vote.

___ I believe there may be a technical issue concerning the wash procedure and as such am abstaining on the correlating ballot.
_Patricia A. Freeman
Name (Please Print)

Please return the ballot on or before **Wednesday, July 11, 2018**

**PLEASE RETURN TO:**
Yvonne Smith, *Project Administrator*
NFPA
1 Batterymarch Park
Quincy, MA 02169       **FAX: (617) 984-7110**       **E-mail: vsmith@nfpa.org**
Ballot Item No. 1:
I agree there are no CORRELATION ISSUES in accordance with 3.4.2 and 3.4.3 of the NFPA Regs.

__________ AGREE ___________ X _______ DISAGREE* ___________ ABSTAIN*

EXPLANATION OF VOTE - Please type or print your comments:

* An explanation must accompany a “disagree” or “abstain” vote. If disagreeing, cite relevant section(s)/paragraph(s) of the correlation issue and describe.

I disagree that the extractory conditioning method is to be applied to all EMS Multi Use garment materials (ex: outer shell prior to physical testing). This method of conditioning should only be applied to the viral penetration test on the barrier layer and not all layers such as the outer shell. The proposed TIA still presents a correlation issue in that test requirements do not line up with NFPA 1951 as referenced. Section 8.1.5 should not be deleted.

Ballot Item No. 2:
I AGREE that the subject is of an EMERGENCY NATURE for one or more of the following reasons (Check all that apply):

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

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

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

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

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

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

__________ ABSTAIN*

__________ DISAGREE* The TIA does not meet any of the regulations above warranting a TIA, therefore the TIA is NOT of emergency nature.

EXPLANATION OF VOTE - Please type or print your comments:

* An explanation must accompany a “disagree” or “abstain” vote.

I agree that the TIA is of emergency nature, however the recommended revisions do not correct
PLEASE RETURN TO:
Yvonne Smith, Project Administrator
NFPA
1 Batterymarch Park
Quincy, MA 02169
FAX: (617) 984-7110
E-mail: vsmith@nfpa.org

Karen E Lehtonen
Signature

Date

Please return the ballot on or before Thursday, July 5, 2018
MEMORANDUM

TO: Technical Committee on Emergency Medical Services Protective Clothing and Equipment

FROM: Yvonne Smith, Project Administrator

DATE: July 20, 2018

SUBJECT: NFPA 1999 Proposed TIA No. 1376 FINAL TC BALLOT RESULTS

The public comment circulation has passed, 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).

17 Eligible to Vote
1 Not Returned (J. Davis)

<table>
<thead>
<tr>
<th>Technical Merit:</th>
<th>Emergency Nature:</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 Abstentions</td>
<td>0 Abstentions</td>
</tr>
<tr>
<td>14 Agree</td>
<td>16 Agree</td>
</tr>
<tr>
<td>2 Disagree (Corrado, Lehtonen)</td>
<td>0 Disagree</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.

\[
\frac{17 \text{ eligible}}{2} = 8.5 = 9 \]

(2) The number of affirmative votes needed to satisfy the ¾ requirement is 12.

\[
17 \text{ eligible to vote} - 1 \text{ not returned} - 0 \text{ abstentions} = 16 \times 0.75 = 12
\]

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 Wednesday, July 25, 2018.

Attachment
Hi Yvonne,
I wish to change my vote to Disagree on the Technical Merits of the proposed TIA.

The substantiation is as follows:

I disagree that the extractor conditioning method is to be applied to all EMS multi-use garment materials. Section 8.1.5 (home laundering) should only be applied to the bio-penetration test specimens. Section 8.1.5 should not be deleted.

I still agree with the emergency nature as specified in my original ballot.

Please let me know if I need to do anything further.

Sincerely,

Steven D. Corrado
Principal Engineer – Personal Protective Equipment
Distinguished Member of Technical Staff - William Henry Merrill Society
----------
UL LLC
12 Laboratory Drive
Research Triangle Park, NC 27709-3995
T: 919.549.1433
E: Steven.D.Corrado@ul.com
W: www.ul.com
This information has also been posted onto the Document Information page, which can be accessed by going to www.nfpa.org/1999next.

Sincerely,

Yvonne Smith  
Project Administrator | NFPA  
1 Batterymarch Park  
Quincy, MA 02169-7471  
Phone: 617-984-7489  
E-mail: ysmith@nfpa.org

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National Fire Protection Association  
The leading information and knowledge resource on fire, electrical and related hazards.

IT’S A BIG WORLD. LET’S PROTECT IT TOGETHER.”

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**Ballot Item No. 1:**
I agree with the TECHNICAL MERITS of the Proposed TIA to; Revise title of subsection 8.1.3, revise title of Table 8.1.3.4, revise paragraphs 8.1.3.6 and 8.1.3.6.1, delete subsection 8.1.5 and revise section 8.3.3.2.

*AGREE* ____________ *DISAGREE* ____________ *ABSTAIN* 

**EXPLANATION OF VOTE - Please type or print your comments:**

*An explanation shall accompany a “disagree” or “abstain” vote.

I disagree that the extractor conditioning method is to be applied to all EMS multi use garment materials (ex: prior to physical testing). This method of conditioning should only be applied to the viral penetration test on the barrier layer not all layers such as an outer shell. This will bring the documents into alignment. Section 8.1.5 should not be deleted.

**Ballot Item No. 2:**
I AGREE that the subject is of an EMERGENCY NATURE* for one or more of the following reasons (Check all that apply):

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

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

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

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

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

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

* An explanation must accompany a “disagree” or “abstain” vote.

**EXPLANATION OF VOTE - Please type or print your comments:**

I disagree that the extractor conditioning method is to be applied to all EMS multi use garment the viral penetration test on the barrier layer not all layers such as an outer shell. This will bring materials (ex: prior to physical testing). This method of conditioning should only be applied to the documents into alignment. Section 8.1.5 should not be deleted.

I disagree that the extractor conditioning method is to be applied to all EMS multi use garment the viral penetration test on the barrier layer not all layers such as an outer shell. This will bring materials (ex: prior to physical testing). This method of conditioning should only be applied to the documents into alignment. Section 8.1.5 should not be deleted.
This TIA is of emergency nature but the recommended revisions do not correct the error that is in the document.

Karen Lehtonen  
Signature  
6/4/18  
Date  

Karen Lehtonen  
Name (Please Print)  
Please return the ballot on or before June 5, 2018.

PLEASE RETURN TO:  
Yvonne Smith, Project Administrator  
NFPA  
1 Batterymarch Park  
Quincy, MA 02169  
FAX: (617) 984-7110  
E-mail: vsmith@nfpa.org