AGENDA
Standards Council Meeting
Via Teams Video Conferencing

August 24-26, 2021

<table>
<thead>
<tr>
<th>21-8-1</th>
<th>Report of the Committee Membership Task Group (J. Quiter, Chair).</th>
</tr>
</thead>
<tbody>
<tr>
<td>21-8-1-a</td>
<td>Act on pending applications for Committee Members. No Attachment</td>
</tr>
<tr>
<td>21-8-1-b</td>
<td>Proposed start up roster and Chair for AIF-AAA</td>
</tr>
<tr>
<td>21-8-1-c</td>
<td>Proposed start up roster and Chair for CGP-AAA</td>
</tr>
<tr>
<td>21-8-2</td>
<td>Report of the Policy and Procedures Task Group (J. Foisel, Chair). No Attachment</td>
</tr>
<tr>
<td>21-8-3</td>
<td>Report of the April 2021 Minutes. No Attachment</td>
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**AMENDMENTS**

<table>
<thead>
<tr>
<th>21-8-4</th>
<th>Act on the issuance of NFPA 10, <em>Standard for Portable Fire Extinguishers</em>, with an issuance date of August 26, 2021, and an effective date of September 15, 2021, as acted on at the NFPA Technical Meeting, with one amendment and two appeals.</th>
</tr>
</thead>
</table>
| 21-8-4-a | CAM 10-5: Reject Second revision No. 18. CAM 10-5 passed vote of the participating Membership during the NFPA Technical Meeting. **FAILED** TC Ballot – 32 voting members/13 agree/15 disagree/0 abstained/4 ballots not returned.  
See Attachment 21-8-4-a |

**APPEAL**

| 21-8-4-b | Consider the Appeal of John McSheffrey, en-Guage Inc., requesting that the NFPA Standards Council overturn the results of the technical committee ballot on CAM 10-5. This CAM achieved the necessary support of the voting Association Members during the NFPA Technical Meeting.  
See Attachment 21-8-4-b |

| 21-8-4-c | Consider the Appeal of Danielle Felch, Johnson Controls, requesting that the NFPA Standards Council uphold the results of the voting Association Members during the NFPA Technical Session to reject Second revision No. 18. This CAM achieved the necessary support of the voting Association Members during the NFPA Technical Meeting, but then failed ballot of the technical committee.  
See Attachment 21-8-4-c |

| 21-8-4-d | Comment received from N. Addleman, Chair, TC on Portable Fire Extinguishers, regarding the appeals on the issuance of NFPA 10, 2022 edition.  
See Attachment 21-8-4-d |

| 21-8-4-e | Comment received from J.R. Nerat, National Presto Safety, and Member, TC Portable Fire Extinguishers, regarding the issuance of NFPA 10, 2022 edition.  
See Attachment 21-8-4-e |

| 21-8-4-f | Comment received from C. Horst, Security Fire Equipment Company, Inc., and Member, TC Portable Fire Extinguishers, regarding the issuance of NFPA 10, 2022 edition.  
See Attachment 21-8-4-f |

<table>
<thead>
<tr>
<th>21-8-5</th>
<th>Act on the issuance of NFPA 13, <em>Standard for the Installation of Sprinkler Systems</em>, with an issuance date of August 26, 2021, and an effective date of September 15, 2021, as acted on at the NFPA Technical Meeting, with two amendments and one appeal.</th>
</tr>
</thead>
</table>
| 21-8-5-a | CAM 13-34: Reject Second Revision No. 1162. CAM 13-34 passed vote of the participating Membership during the NFPA Technical Meeting. **PASSED** TC Ballot – 35 voting members/30 agree/3 disagree/1 abstained/1 ballots not returned. **PASSED** CC Ballot – 22 voting members/16 agree 0 disagree/0 abstained/6 ballots not returned.  
See Attachment 21-8-5-a |
<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
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</thead>
</table>
| 21-8-5-b | CAMs 13-23/13-37/13-42: Accept Public Comment No. 256. **No Ballot Necessary per NFPA Regulations**  
See Attachment 21-8-5-b |
| 21-8-5-c | Consider the Appeal of Kenneth Isman, University of Maryland, requesting that the NFPA Standards Council either overturn the vote of the Membership on CAM13-23/13-37/13-42 and restore FR 1195 and its related materials as it appears in the First Draft, or form a Task Group to create a Tentative Interim Amendment (TIA). The CAM failed to achieve the necessary support of the voting Association Members during the NFPA Technical Meeting.  
See Attachment 21-8-5-c |
| 21-8-5-d | Comment received from Russell Leavitt, Chair, TC Sprinkler System Discharge Criteria, regarding the appeal on the issuance of NFPA 13, 2022 edition.  
See Attachment 21-8-45-d |
| 21-8-5-e | Comment received from Mike Friedman, CC Member, Automatic Sprinkler Systems, regarding the appeal of CAM 13-23/13-37/13-42.  
See Attachment 21-8-5-e |
| 21-8-5-f | Comment submitted jointly by the National Fire Sprinkler Association, the American Fire Sprinkler Association, and Johnson Controls regarding the appeal of CAM 13-23/13-37/13-42.  
See Attachment 21-8-5-f |
| 21-8-6 | **NFPA 72**  
Act on the issuance of NFPA 72, *National Fire Alarm Signaling Code®,* with an issuance date of August 26, 2021 and an effective date of September 15, 2021, as acted on at the NFPA Technical Meeting, with no amendments (CAM Failed) and one appeal. See related TIAs 1567 and 1568, SC Items 21-8-30 and 21-8-31.  
No Attachment. |
| 21-8-6-a | Consider the Appeal of Richard Simpson, Vector Security, requesting that the NFPA Standards Council overturn the results of CAM 72-26, and Accept Public Comment No. 277. This CAM failed to achieve the necessary support of the voting Association Members during the NFPA Technical Meeting.  
See Attachment 21-8-6-a |
| 21-8-6-b | Comment received from M. Bunker, CC Chair, Signaling Systems for the Protection of Life and Property, regarding the appeal on the issuance of NFPA 72, 2022 edition.  
See Attachment 21-8-6-b |
| 21-8-7 | **NFPA 80**  
Act on the issuance of NFPA 80, *Standard for Fire Doors and other Opening protectives,* with an issuance date of August 26, 2021, and an effective date of September 15, 2021, as acted on at the NFPA Technical Meeting, with no amendments (CAM Failed) and no appeals. See related TIA 1553, SC Item 21-8-32.  
No Attachment. |
| 21-8-8 | **NFPA 291**  
Act on the issuance of NFPA 291, *Recommended Practice for Fire Flow Testing and Marking of Hydrants,* with an issuance date of August 26, 2021, and an effective date of September 15, 2021, as acted on at the NFPA Technical Meeting, with no amendments (CAM Failed) and no appeals.  
No Attachment. |
| 21-8-9 | **NFPA 318**  
Act on the issuance of NFPA 318, *Standard for Protection of Semiconductor Fabrication Facilities,* with an issuance date of August 26, 2021, and an effective date of September 15, 2021, as acted on at the NFPA Technical Meeting, with no amendments (CAM Failed) and no appeals.  
No Attachment. |
| 21-8-10 | **NFPA 470**  
No Attachment |
| 21-8-12 | NFPA 501 | Act on the issuance of NFPA 501, *Standard on Manufactured Housing*, with an issuance date of August 26, 2021, and an effective date of September 15, 2021, as acted on at the NFPA Technical Meeting, with no amendments (CAM Failed) and no appeals. No Attachment |
| 21-8-13 | NFPA 1123 | Act on the issuance of NFPA 1123, *Code for Fireworks Display*, with an issuance date of August 26, 2021, and an effective date of September 15, 2021, as acted on at the NFPA Technical Meeting, with no amendments (CAM Failed) and one appeal. No Attachment |
| 21-8-13-a | APPEAL | Consider the Appeal of Charles P. Weeth, Weeth and Associates, LLC, requesting that the NFPA Standards Council overturn the results of CAM 1123-4, and Accept Public Comment No. 8. This CAM failed to achieve the necessary support of the voting Association Members during the NFPA Technical Meeting. See Attachment 21-8-13-a |
| 21-8-13-b | | Comment received from John Steinberg, MD, TC Member, Pyrotechnics, regarding the appeal on CAM 1123-4. See Attachment 21-8-13-b |
| 21-8-14 | NFPA 1225 | Act on the issuance of NFPA 1225, *Standards for Emergency Services Communications*, with an issuance date of August 26, 2021, and an effective date of September 15, 2021, as acted on at the NFPA Technical Meeting, with no amendments (CAMs Failed) and no appeals. See related TIAs 1571, 1572, 1581 and 1584, SC Items 21-8-41 thru 21-8-44. No Attachment |
| 21-8-15 | NFPA 2001 | Act on the issuance of NFPA 2001, *Standards on Clean Agent Fire Extinguishing Systems*, with an issuance date of August 26, 2021, and an effective date of September 15, 2021, as acted on at the NFPA Technical Meeting, with no amendments (CAM Failed) and three appeals. No Attachment |
| 21-8-15-a | APPEAL | Consider the Appeal of Thomas Wysocki, Guardian Services, Inc., requesting that the NFPA Standards Council overturn the results of the Tech Session action on CAM 2001-5/2001-9 and Reject Second Revision No. 24. CAM 2001-5/2001-9 failed to achieve the necessary support of the voting Association Members during the NFPA Technical Meeting. See Attachment 21-8-15-a |
| 1-8-15-a-1 | | Comment received from Joanna Minion, Honeywell, regarding the appeals on the issuance of NFPA 2001, 2022 edition. See Attachment 21-8-15-a-1 |
| 21-8-15-b-1 | | Comment received from Joanna Minion, Honeywell, regarding the appeals on the issuance of NFPA 2001, 2021 edition. See Attachment 21-8-15-a-1 |
| 21-8-15-c | APPEAL | Consider the Appeal of John Owens, 3M, requesting that the NFPA Standards Council overturn the results of the Tech Session action on CAM 2001-5 and CAM 2001-9 and Reject Second |
Revision No. 24. CAM 2001-5/2001-9 failed to achieve the necessary support of the voting Association Members during the NFPA Technical Meeting. See Attachment 21-8-15-c

Comment received from Joanna Minion, Honeywell, regarding the appeals on the issuance of NFPA 2001, 2021 edition. See Attachment 21-8-15-a-1

**21-8-16 NFPA 2500**


<table>
<thead>
<tr>
<th>TENTATIVE INTERIM AMENDMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>21-8-17 NFPA 13</strong> Act on the issuance of proposed Tentative Interim Amendment (TIA) to add Section 7.6.2 (new) and associated annex material to the 2019 and proposed 2022 editions of NFPA 13, <em>Standard for the Installation of Sprinkler Systems</em> (TIA No. 1577).</td>
</tr>
<tr>
<td><strong>21-8-17-a</strong> Text of proposed TIA No. 1577. See Attachment 21-8-17-a</td>
</tr>
<tr>
<td><strong>21-8-17-b</strong> Ballot results of TIA No. 1577. <strong>FAILED</strong> TC ballot on both technical merit and emergency nature – 36 voting members/11 agree on technical merit/22 disagree/1 abstained/2 ballots not returned/12 agree on emergency nature/21 disagree/1 abstained/2 ballots not returned. <strong>FAILED</strong> CC ballot on both correlation and emergency nature – 22 voting members 7 agree on correlation/14 disagree/0 abstained/1 ballots not returned/4 agree on emergency nature/17 disagree/0 abstained/1 ballots not returned. See Attachment 21-8-17-b</td>
</tr>
<tr>
<td><strong>21-8-17-c</strong> No comments were received. No Attachment</td>
</tr>
</tbody>
</table>

| **21-8-18 NFPA 13** Act on the issuance of proposed Tentative Interim Amendment (TIA) to revise Table 7.3.1.1 of the 2019 and proposed 2022 editions of NFPA 13, *Standard for the Installation of Sprinkler Systems* (TIA No. 1595). |
| **21-8-18-a** Text of proposed TIA No. 1595. See Attachment 21-8-18-a |
| **21-8-18-b** Ballot results of TIA No. 1595. **PASSED** TC ballot on both technical merit and emergency nature – 36 voting members/29 agree on technical merit/0 disagree/0 abstained/7 ballots not returned/29 agree on emergency nature/0 disagree/0 abstained/7 ballots not returned. **PASSED** CC ballot on correlation and emergency nature – 22 voting members 18 agree on correlation/0 disagree/0 abstained/4 ballots not returned/18 agree on emergency nature/0 disagree/0 abstained/4 ballots not returned. See Attachment 21-8-18-b |
| **21-8-18-c** No comments were received. No Attachment |

<p>| <strong>21-8-19 NFPA 13</strong> Act on the issuance of proposed Tentative Interim Amendment (TIA) to add new paragraph 7.5.1.3 to the 2019 and proposed 2022 editions of NFPA 13, <em>Standard for the Installation of Sprinkler Systems</em> (TIA No. 1596). |
| <strong>21-8-19-a</strong> Text of proposed TIA No. 1596. See Attachment 21-8-19-a |
| <strong>21-8-19-b</strong> Ballot results of TIA No. 1596. <strong>PASSED</strong> TC ballot on both technical merit and emergency nature – 36 voting members/29 agree on technical merit/0 disagree/0 abstained/7 ballots not returned/29 agree on emergency nature/0 disagree/0 abstained/7 ballots not returned. <strong>PASSED</strong> CC ballot on correlation and emergency nature – 22 voting members 18 agree on correlation/0 disagree/0 abstained/4 ballots not returned/18 agree on emergency nature/0 disagree/0 abstained/4 ballots not returned. See Attachment 21-8-19-b |
| <strong>21-8-19-c</strong> No comments were received. No Attachment |</p>
<table>
<thead>
<tr>
<th>Date</th>
<th>NFPA</th>
<th>Description</th>
<th>Priority A</th>
<th>Priority B</th>
</tr>
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<tbody>
<tr>
<td>21-8-20</td>
<td>NFPA 13</td>
<td>Act on the issuance of proposed Tentative Interim Amendment (TIA) to add paragraph 14.2.8.2.4 (new) to the proposed 2022 edition of NFPA 13, <em>Standard for the Installation of Sprinkler Systems</em> (TIA No. 1599).</td>
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<tr>
<td>21-8-20-a</td>
<td></td>
<td>Text of proposed TIA No. 1599. See Attachment 21-8-20-a</td>
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<tr>
<td>21-8-20-b</td>
<td></td>
<td>Ballot results of TIA No. 1599. PASSED TC ballot on both technical merit and emergency nature – 36 voting members/30 agree on technical merit/1 disagree/0 abstained/5 ballots not returned/30 agree on emergency nature/1 disagree/0 abstained/5 ballots not returned. PASSED CC ballot on correlation and emergency nature – 22 voting members 15 agree on correlation/0 disagree/0 abstained/7 ballots not returned/15 agree on emergency nature/0 disagree/0 abstained/7 ballots not returned. See Attachment 21-8-20-b</td>
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<tr>
<td>21-8-20-c</td>
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<td>No comments were received. No Attachment</td>
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<tr>
<td>21-8-21-a</td>
<td></td>
<td>Text of proposed TIA No. 1600. See Attachment 21-8-21-a</td>
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<td>21-8-21-b</td>
<td></td>
<td>Ballot results of TIA No. 1600. PASSED TC ballot on both technical merit and emergency nature – 35 voting members/33 agree on technical merit/1 disagree/0 abstained/1 ballots not returned/32 agree on emergency nature/2 disagree/0 abstained/1 ballot not returned. PASSED CC ballot on correlation and emergency nature – 22 voting members 16 agree on correlation/0 disagree/0 abstained/6 ballots not returned/16 agree on emergency nature/0 disagree/0 abstained/6 ballots not returned. See Attachment 21-8-21-b</td>
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<tr>
<td>21-8-21-c</td>
<td></td>
<td>No comments were received. No Attachment</td>
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<tr>
<td>21-8-22</td>
<td>NFPA 30</td>
<td>Act on the issuance of proposed Tentative Interim Amendment (TIA) to revise Figures 16.2.6, 16.4.1(c), Table 16.5.2.16, 16.5.2.7, Tables 16.5.2.7, 16.5.2.17, 16.5.2.18, Figure 16.6.4.1(b), 16.6.5.1, and Figures 16.6.5.1(a) and 16.6.5.1(b)(new) of the 2021 edition of NFPA 30, <em>Flammable and Combustible Liquids Code</em> (TIA No. 1565).</td>
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<tr>
<td>21-8-22-a</td>
<td></td>
<td>Text of proposed TIA No. 1565. See Attachment 21-8-22-a</td>
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<tr>
<td>21-8-22-b</td>
<td></td>
<td>Ballot results of TIA No. 1565. PASSED TC ballot on both technical merit and emergency nature – 30 voting members/22 agree on technical merit/0 disagree/0 abstained/8 ballots not returned/21 agree on emergency nature/0 disagree/1 abstained/8 ballots not returned. PASSED CC ballot on both correlation and emergency nature – 14 voting members/11 agree on correlation/0 disagree/0 abstained/3 ballots not returned/11 agree on emergency nature/0 disagree/0 abstained/3 ballots not returned. See Attachment 21-8-22-b</td>
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<tr>
<td>21-8-22-c</td>
<td></td>
<td>No comments were received. No Attachment</td>
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<tr>
<td>21-8-23-a</td>
<td></td>
<td>Text of proposed TIA No. 1569. See Attachment 21-8-23-a</td>
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<tr>
<td>21-8-23-b</td>
<td></td>
<td>Ballot results of TIA No. 1569. PASSED TC ballot on technical merit but FAILED emergency nature – 41 voting members/24 agree on technical merit/7 disagree/0 abstained/10 ballots not returned/18 agree on emergency nature/13 disagree/0 abstained/10 ballots not returned. See Attachment 21-8-23-b</td>
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<th>Topic</th>
<th>Description</th>
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<td>21-8-23-c</td>
<td>Two comments were received. See Attachment 21-8-23-c</td>
</tr>
<tr>
<td>21-8-24-a</td>
<td>Text of proposed TIA No. 1563. See Attachment 21-8-24-a</td>
</tr>
<tr>
<td>21-8-24-b</td>
<td>Ballot results of TIA No. 1563. <strong>FAILED</strong> CMP ballot on both technical merit and emergency nature – 15 members/8 agree on technical merit/6 disagree/0 abstained1 ballots not returned/6 agree on emergency nature/8 disagree/0 abstained/1 ballots not returned. <strong>PASSED</strong> CC ballot on correlation but <strong>FAILED</strong> emergency nature – 12 voting members/9 agree on correlation/2 disagree/1 abstained/0 ballots not returned/3 agree on emergency nature/6 disagree/1 abstained/0 ballots not returned. See Attachment 21-8-24-b</td>
</tr>
<tr>
<td>21-8-24-c</td>
<td>Six comments were received. See Attachment 21-8-24-c</td>
</tr>
<tr>
<td>21-8-25 NFPA 70</td>
<td>Act on the issuance of proposed Tentative Interim Amendment (TIA) to revise Section 210.8(F) of the 2020 edition of NFPA 70, <em>National Electrical Code</em>® (TIA No. 1564).</td>
</tr>
<tr>
<td>21-8-25-a</td>
<td>Text of proposed TIA No. 1564. See Attachment 21-8-25-a</td>
</tr>
<tr>
<td>21-8-25-b</td>
<td>Ballot results of TIA No. 1564. <strong>FAILED</strong> CMP ballot on both technical merit and emergency nature – 15 members/9 agree on technical merit/5 disagree/0 abstained/1 ballots not returned/8 agree on emergency nature/6 disagree/0 abstained/1 ballots not returned. <strong>PASSED</strong> CC ballot on correlation but <strong>FAILED</strong> emergency nature – 12 voting members/9 agree on correlation/2 disagree/1 abstained/0 ballots not returned/5 agree on emergency nature/6 disagree/1 abstained/0 ballots not returned. See Attachment 21-8-25-b</td>
</tr>
<tr>
<td>21-8-25-c</td>
<td>Seventeen comments were received. See Attachment 21-8-25-c</td>
</tr>
<tr>
<td>21-8-25-d</td>
<td>Consider the joint appeal of Laura Petrillo-Groh, Air-Conditioning, Heating, &amp; Refrigeration Institute (AHRI), and William Koffel on behalf of Leading Builders of America (LBA) requesting that the NFPA Standards Council overturn the ballot results of TIA 1564 and issue the TIA. See Attachment 21-8-25-d</td>
</tr>
<tr>
<td>21-8-25-e</td>
<td>Comment received from CMP 2 Chair, David Humphrey, regarding the appeal on TIA 1564. See Attachment 21-8-25-e</td>
</tr>
<tr>
<td>21-8-26 NFPA 70</td>
<td>Act on the issuance of proposed Tentative Interim Amendment (TIA) to revise Section 520.21 of the 2020 edition of NFPA 70, <em>National Electrical Code</em>® (TIA No. 1573).</td>
</tr>
<tr>
<td>21-8-26-a</td>
<td>Text of proposed TIA No. 1573. See Attachment 21-8-26-a</td>
</tr>
<tr>
<td>21-8-26-b</td>
<td>Ballot results of TIA No. 1573. <strong>PASSED</strong> CMP ballot on both technical merit and emergency nature – 21 members/18 agree on technical merit/1 disagree/0 abstained/2 ballots not returned/18 agree on emergency nature/1 disagree/0 abstained/2 ballots not returned. <strong>PASSED</strong> CC ballot on both correlation and emergency nature – 12 voting members/10 agree on correlation/0 disagree/0 abstained/2 ballots not returned/10 agree on emergency nature/0 disagree/0 abstained/2 ballots not returned. See Attachment 21-8-26-b</td>
</tr>
<tr>
<td>21-8-26-c</td>
<td>Four comments were received. See Attachment 21-8-26-c</td>
</tr>
<tr>
<td>21-8-27 NFPA 70</td>
<td>Act on the issuance of proposed Tentative Interim Amendment (TIA) to revise Section 520.53 of the 2020 edition of NFPA 70, <em>National Electrical Code</em>® (TIA No. 1574).</td>
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<tr>
<td>Date</td>
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<tr>
<td>21-8-27-a</td>
<td>Text of proposed TIA No. 1574. See Attachment 21-8-27-a</td>
</tr>
<tr>
<td>21-8-27-b</td>
<td>Ballot results of TIA No. 1574. <strong>PASSED</strong> CMP ballot on both technical merit and emergency nature – 21 members/18 agree on technical merit/1 disagree/0 abstained/2 ballots not returned/18 agree on emergency nature/1 disagree/0 abstained/2 ballots not returned. <strong>PASSED</strong> CC ballot on both correlation and emergency nature – 12 voting members/10 agree on correlation/0 disagree/0 abstained/2 ballots not returned.</td>
</tr>
<tr>
<td>21-8-27-c</td>
<td>Three comments were received. See Attachment 21-8-27-c</td>
</tr>
<tr>
<td>21-8-28</td>
<td><strong>NFPA 70</strong> Act on the issuance of proposed Tentative Interim Amendment (TIA) to revise Section 210.8(F) of the 2020 edition of NFPA 70, <em>National Electrical Code®</em> (TIA No. 1589).</td>
</tr>
<tr>
<td>21-8-28-a</td>
<td>Text of proposed TIA No. 1589. See Attachment 21-8-28-a</td>
</tr>
<tr>
<td>21-8-28-b</td>
<td>Ballot results of TIA No. 1589. <strong>FAILED</strong> CMP ballot on both technical merit and emergency nature – 15 members/6 agree on technical merit/7 disagree/0 abstained/2 ballots not returned/5 agree on emergency nature/7 disagree/1 abstained/2 ballots not returned. <strong>PASSED</strong> CC ballot on correlation but <strong>FAILED</strong> on emergency nature – 12 voting members/11 agree on correlation/1 disagree/0 abstained/0 ballots not returned.</td>
</tr>
<tr>
<td>21-8-28-c</td>
<td>Thirteen comments were received. See Attachment 21-8-28-c</td>
</tr>
<tr>
<td>21-8-28-d</td>
<td><strong>APPEAL</strong> Consider the appeal of Daniel Buuck, National Association of Home Builders, requesting that the NFPA Standards Council overturn the ballot results of TIA 1589, NFPA 70, and issue the TIA. See Attachment 21-8-28-d</td>
</tr>
<tr>
<td>21-8-28-e</td>
<td><strong>APPEAL</strong> Consider the appeal of William Koffel, Koffel Associates, Inc., representing Leading Builders of America, requesting that the NFPA Standards Council overturn the ballot results of TIA 1589, NFPA 70, and issue the TIA. See Attachment 21-8-28-e</td>
</tr>
<tr>
<td>21-8-28-f</td>
<td>Comment received by David Humphrey, CMP 2 Chair, regarding the appeal on TIA 1589. See Attachment 21-8-28-f</td>
</tr>
<tr>
<td>21-8-29</td>
<td><strong>NFPA 70</strong> Act on the issuance of proposed Tentative Interim Amendment (TIA) to revise Section 210.8(F) of the 2020 edition of NFPA 70, <em>National Electrical Code®</em> (TIA No. 1593).</td>
</tr>
<tr>
<td>21-8-29-a</td>
<td>Text of proposed TIA No. 1593. See Attachment 21-8-29-a</td>
</tr>
<tr>
<td>21-8-29-b</td>
<td>Ballot results of TIA No. 1593. <strong>PASSED</strong> CMP ballot on both technical merit and emergency nature – 15 members/12 agree on technical merit/1 disagree/0 abstained/2 ballots not returned/12 agree on emergency nature/1 disagree/0 abstained/2 ballots not returned. <strong>PASSED</strong> CC ballot on both correlation and emergency nature – 12 voting members/12 agree on correlation/0 disagree/0 abstained/0 ballots not returned/11 agree on emergency nature/1 disagree/0 abstained/0 ballots not returned. See Attachment 21-8-29-b</td>
</tr>
<tr>
<td>21-8-29-c</td>
<td>Eight comments were received. See Attachment 21-8-29-c</td>
</tr>
<tr>
<td>21-8-30</td>
<td><strong>NFPA 72</strong> Act on the issuance of proposed Tentative Interim Amendment (TIA) to revise Section 29.11.3.4 item (6) of the 2019 edition of NFPA 72, <em>National Fire Alarm and Signaling Code®</em> (TIA No. 1567).</td>
</tr>
<tr>
<td>21-8-30-a</td>
<td>Text of proposed TIA No. 1567. See Attachment 21-8-30-a</td>
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<tr>
<td>21-8-30-b</td>
<td>Ballot results of TIA No. 1567. <strong>PASSED</strong> TC ballot on both technical merit and emergency nature – 21 members/19 agree on technical merit/0 disagree/0 abstained/2 ballots not returned/19 agree on emergency nature/0 disagree/0 abstained/2 ballots not returned. <strong>PASSED</strong> CC ballot on both technical merit and emergency nature – 21 members/19 agree on technical merit/0 disagree/0 abstained/2 ballots not returned/19 agree on emergency nature/1 disagree/0 abstained/3 ballots not returned. See Attachment 21-8-30-b</td>
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<tr>
<td>21-8-30-c</td>
<td>No comments were received. No Attachment</td>
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<td><strong>21-8-31</strong>&lt;br&gt;NFPA 72</td>
<td>Act on the issuance of proposed Tentative Interim Amendment (TIA) to revise Section 29.11.3.4 items (4)(a), (4)(b), (5)(a) and (5)(b) of the proposed 2022 edition of NFPA 72, <em>National Fire Alarm and Signaling Code®</em> (TIA No. 1568)</td>
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<td>21-8-31-a</td>
<td>Text of proposed TIA No. 1568. See Attachment 21-8-31-a</td>
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<td>21-8-31-b</td>
<td>Ballot results of TIA No. 1568. <strong>PASSED</strong> TC ballot on both technical merit and emergency nature – 21 members/16 agree on technical merit/4 disagree/4 abstained/5 ballots not returned/16 agree on emergency nature/0 disagree/0 abstained/5 ballots not returned. <strong>PASSED</strong> CC ballot on both correlation and emergency nature – 19 voting members/15 agree on correlation/4 disagree/0 abstained/3 ballots not returned/15 agree on emergency nature/0 disagree/0 abstained/3 ballots not returned. See Attachment 21-8-31-b</td>
</tr>
<tr>
<td>21-8-31-c</td>
<td>No comments were received. No Attachment</td>
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<tr>
<td><strong>21-8-32</strong>&lt;br&gt;NFPA 80</td>
<td>Act on the issuance of proposed Tentative Interim Amendment (TIA) to revise 19.5.1.3 and A.19.5.1.3 of the 2019 and proposed 2022 editions of NFPA 80, <em>Standard for Fire Doors and Other Opening Protectives</em> (TIA No. 1553).</td>
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<td>21-8-32-a</td>
<td>Text of proposed TIA No. 1553. See Attachment 21-8-32-a</td>
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<tr>
<td>21-8-32-b</td>
<td>Ballot results of TIA No. 1553. <strong>PASSED</strong> TC ballot on technical merit but <strong>FAILED</strong> emergency nature – 40 voting members/26 agree on technical merit/4 disagree/4 abstained/6 ballots not returned/21 agree on emergency nature/9 disagree/4 abstained/6 ballots not returned. See Attachment 21-8-32-b</td>
</tr>
<tr>
<td>21-8-32-c</td>
<td>No comments were received. No Attachment</td>
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<tr>
<td><strong>21-8-33</strong>&lt;br&gt;NFPA 105</td>
<td>Act on the issuance of proposed Tentative Interim Amendment (TIA) to revise Sections 7.5.2.2.3 and A.7.5.2.2.3 of the 2022 edition of NFPA 105, <em>Standard for Smoke Door Assemblies and Other Opening Protectives</em> (TIA No. 1554).</td>
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<tr>
<td>21-8-33-a</td>
<td>Text of proposed TIA No. 1554. See Attachment 21-8-33-a</td>
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<tr>
<td>21-8-33-b</td>
<td>Ballot results of TIA No. 1554. <strong>PASSED</strong> TC ballot on technical merit but <strong>FAILED</strong> emergency nature – 40 voting members/21 agree on technical merit/4 disagree/4 abstained/11 ballots not returned/16 agree on emergency nature/9 disagree/4 abstained/11 ballots not returned. See Attachment 21-8-33-b</td>
</tr>
<tr>
<td>21-8-33-c</td>
<td>No comments were received. No Attachment</td>
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<tr>
<td><strong>21-8-34</strong>&lt;br&gt;NFPA 470</td>
<td>Act on the issuance of proposed Tentative Interim Amendment (TIA) to revise various sections of the proposed 2022 edition of NFPA 470, <em>Hazardous Materials Standards for Personnel</em> (TIA No. 1587).</td>
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<tr>
<td>21-8-34-a</td>
<td>Text of proposed TIA No. 1587. See Attachment 21-8-34-a</td>
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<td>Document Number</td>
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<td>21-8-34-b</td>
<td>Ballot results of TIA No. 1587. <strong>PASSED</strong> TC ballot on both technical merit and emergency nature – 43 voting members/38 agree on technical merit/0 disagree/0 abstained/5 ballots not returned/38 agree on emergency nature/0 disagree/0 abstained/5 ballots not returned. <strong>PASSED</strong> CC ballot on both correlation and emergency nature – 20 voting members/16 agree on correlation/0 disagree/1 abstained/3 ballots not returned/16 agree on emergency nature/0 disagree/1 abstained/3 ballots not returned. See Attachment 21-8-34-b</td>
</tr>
<tr>
<td>21-8-34-c</td>
<td>No comments were received. No Attachment</td>
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<tr>
<td>21-8-35 <strong>NFPA 484</strong></td>
<td>Act on the issuance of proposed Tentative Interim Amendment (TIA) of the 2019 and proposed 2022 editions of NFPA 484, <em>Standard for Combustible Metals</em> (TIA No. 1527) as follows: In both 2019 and 2022 editions add a new 1.1.2.2 and associated Annex material; and renumber existing paragraph accordingly, In both 2019 and 2022 editions add a new reference to Section 2.4, Revise 3.3.10 (2019 edition) and 3.3.12 (2022 edition) and associated Annexes A.3.3.10 (2019 ed)/A.3.3.12 (2022 ed), In both 2019 and 2022 editions in section 3.3 add new definition for Combustible Fibers/Flying and associated Annex material, In both 2019 and 2022 editions in section 3.3 add new definition for Ignitable Fibers/Flying and associated Annex material, Revise 3.3.11.1 (2019 ed) and 3.3.13.1 (2022 ed) and associated Annex material, Revise 9.7.1.1 (2019 ed) and 11.7.1.1 (2022 ed), Revise 10.8 (2019 ed) and 12.4 (2022 ed) and associated Annex material, Revise 16.6.2.2.2 (2019 ed) and 18.6.2.2.2 (2022 ed), Add new material to the end of Annex A.3.3.12 (2019 ed) and A.3.3.14 (2022 ed), Revise Annex A.10.9.2 (2019 edition only), Revise Annex A.15.7 (2019 ed) item (3) and A.17.7 (2022 ed) item (3), Add a new citation to J.1.2.9 (2019 ed) and J.1.2.10 (2022 ed), In 2019 ed only, delete J.1.2.10 entirely and renumber subsequent paragraphs, In both 2019 and 2022 ed, add a new citation J.3. See Attachment 21-8-35</td>
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<tr>
<td>21-8-35-a</td>
<td>Text of proposed TIA No. 1527. See Attachment 21-8-35-a</td>
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<tr>
<td>21-8-35-b</td>
<td>Ballot results of TIA No. 1527. <strong>PASSED</strong> TC ballot on both technical merit and emergency nature – 29 voting members/17 agree on technical merit/4 disagree/0 abstained/5 ballots not returned/16 agree on emergency nature/4 disagree/2 abstained/7 ballots not returned. <strong>PASSED</strong> CC ballot on correlation but <strong>FAILED</strong> on emergency nature – 16 voting members/10 agree on correlation/2 disagree/1 abstained/3 ballots not returned/6 agree on emergency nature/4 disagree/3 abstained3 ballots not returned. See Attachment 21-8-35-b</td>
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<td>21-8-35-c</td>
<td>No comments were received. No Attachment</td>
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<tr>
<td>21-8-36 <strong>NFPA 502</strong></td>
<td>Act on the issuance of proposed Tentative Interim Amendment (TIA) to delete Annex D in its entirety and renumber all remaining annexes of the 2020 edition of NFPA 502, <em>Standard for Road Tunnels, Bridges, and Other Limited Access Highways</em> (TIA No. 1561).</td>
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<tr>
<td>21-8-36-a</td>
<td>Text of proposed TIA No. 1561. See Attachment 21-8-36-a</td>
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<tr>
<td>21-8-36-b</td>
<td>Ballot results of TIA No. 1561. <strong>PASSED</strong> TC ballot on both technical merit and emergency nature – 30 voting members/21 agree on technical merit/4 disagree/0 abstained/ 5 ballots not returned/22 agree on emergency nature/2 disagree/1 abstained/5 ballots not returned. See Attachment 21-8- 36-b</td>
</tr>
<tr>
<td>21-8-36-c</td>
<td>No comments were received. No Attachment</td>
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<tr>
<td>21-8-37-a</td>
<td>Text of proposed TIA No. 1585. See Attachment 21-8-37-a</td>
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Ballot results of TIA No. 1585. **PASSED** TC ballot on both technical merit and emergency nature – 46 voting members/40 agree on technical merit/1 disagree/0 abstained/5 ballots not returned/37 agree on emergency nature/3 disagree/1 abstained/5 ballots not returned.
See Attachment 21-8-37-b

Three comments were received.
See Attachment 21-8-37-c

**21-8-38**

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Act on the issuance of proposed Tentative Interim Amendment (TIA) to revise the fourth paragraph of Annex A.11.3.9 of the 2019 edition of NFPA 1221, *Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems* (TIA No. 1570).

Text of proposed TIA No. 1570.
See Attachment 21-8-38-a

Ballot results of TIA No. 1570. **PASSED** TC ballot on technical merit but **FAILED** on emergency nature – 43 voting members/28 agree on technical merit/7 disagree/0 abstained/8 ballots not returned/26 agree on emergency nature/9 disagree/0 abstained/8 ballots not returned.
See Attachment 21-8-38-b

No comments were received.
No Attachment

**21-8-39**

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Act on the issuance of proposed Tentative Interim Amendment (TIA) to revise sections 11.3.9, 11.3.9.2.3, 11.3.9.2.3.1, 11.3.9.2.3.1.1(new), 11.3.9.2.3.1.2(new), and 11.3.9.2.3.1.3(new) of the 2019 edition of NFPA 1221, *Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems* (TIA No. 1580).

Text of proposed TIA No. 1580.
See Attachment 21-8-39-a

Ballot results of TIA No. 1580. **PASSED** TC ballot on technical merit but **FAILED** on emergency nature – 43 voting members/26 agree on technical merit/8 disagree/0 abstained/9 ballots not returned/25 agree on emergency nature/9 disagree/0 abstained/9 ballots not returned.
See Attachment 21-8-39-b

No comments were received.
No Attachment

**21-8-40**

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Text of proposed TIA No. 1583.
See Attachment 21-8-40-a

Ballot results of TIA No. 1583. **PASSED** TC ballot on both technical merit and emergency nature – 43 voting members/34 agree on technical merit/1 disagree/0 abstained/8 ballots not returned/34 agree on emergency nature/1 disagree/0 abstained/8 ballots not returned.
See Attachment 21-8-40-b

One comment was received.
See Attachment 21-8-40-c

**21-8-41**

| NFPA 1225 |

Act on the issuance of proposed Tentative Interim Amendment (TIA) to replace current Figure A.20.3.10 of the proposed 2022 edition of NFPA 1225, *Standard for Emergency Services Communications* (TIA No. 1571).

Text of proposed TIA No. 1571.
See Attachment 21-8-41-a

Ballot results of TIA No. 1571. **PASSED** TC ballot on both technical merit and emergency nature – 43 voting members/26 agree on technical merit/5 disagree/0 abstained/12 ballots not returned/26 agree on emergency nature/5 disagree/0 abstained/12 ballots not returned.
See Attachment 21-8-41-b
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<td>21-8-41-c</td>
<td>No comments were received. No Attachment</td>
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<td><strong>21-8-42</strong>&lt;br&gt;NFPA 1225</td>
<td>Act on the issuance of proposed Tentative Interim Amendment (TIA) to revise section 18.12.3.3 of the proposed 2022 edition of NFPA 1225, <em>Standard for Emergency Services Communications</em> (TIA No. 1572).</td>
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<td>21-8-42-a</td>
<td>Text of proposed TIA No. 1572. See Attachment 21-8-42-a</td>
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<tr>
<td>21-8-42-b</td>
<td>Ballot results of TIA No. 1572. <strong>FAILED</strong> TC ballot on both technical merit and emergency nature – 43 voting members/22 agree on technical merit/12 disagree/0 abstained/9 ballots not returned/22 agree on emergency nature/12 disagree/0 abstained/9 ballots not returned. See Attachment 21-8-42-b</td>
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<tr>
<td>21-8-42-c</td>
<td>One comment was received. See Attachment 21-8-42-c</td>
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<tr>
<td>21-8-42-d</td>
<td><strong>APPEAL</strong> Consider the appeal of Will Rogers, Rogers Wireless, requesting that the NFPA Standards Council overturn the ballot results of TIA 1572 and issue the TIA. See Attachment 21-8-42-d</td>
<td></td>
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<tr>
<td>21-8-42-e</td>
<td>Comment received by TC Chair, Charles Berdan, regarding the appeal on TIA Log 1572. See Attachment 21-8-42-e</td>
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<td><strong>21-8-43</strong>&lt;br&gt;NFPA 1225</td>
<td>Act on the issuance of proposed Tentative Interim Amendment (TIA) to revise paragraph 20.3.10.2.3.2 of the proposed 2022 edition of NFPA 1225, <em>Standard for Emergency Services Communications</em> (TIA No. 1581).</td>
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<td>21-8-43-a</td>
<td>Text of proposed TIA No. 1581. See Attachment 21-8-43-a</td>
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<td>21-8-43-b</td>
<td>Ballot results of TIA No. 1581 <strong>PASSED</strong> TC ballot on technical merit but <strong>FAILED</strong> on emergency nature – 43 voting members/25 agree on technical merit/8 disagree/0 abstained/10 ballots not returned/23 agree on emergency nature/10 disagree/0 abstained/10 ballots not returned. See Attachment 21-8-43-b</td>
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<td>21-8-43-c</td>
<td>No comments were received. No Attachment</td>
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<td><strong>21-8-44</strong>&lt;br&gt;NFPA 1225</td>
<td>Act on the issuance of proposed Tentative Interim Amendment (TIA) to revise paragraph 18.12.1.1 of the proposed 2022 edition of NFPA 1225, <em>Standard for Emergency Services Communications</em> (TIA No. 1584).</td>
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<td>21-8-44-a</td>
<td>Text of proposed TIA No. 1584. See Attachment 21-8-44-a</td>
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<td>21-8-44-b</td>
<td>Ballot results of TIA No. 1584. <strong>PASSED</strong> TC ballot on both technical merit and emergency nature – 43 voting members/31 agree on technical merit/2 disagree/0 abstained/10 ballots not returned/30 agree on emergency nature/3 disagree/0 abstained/10 ballots not returned. See Attachment 21-8-44-b</td>
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<td>21-8-44-c</td>
<td>No comments were received. No Attachment</td>
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<td><strong>21-8-45</strong>&lt;br&gt;NFPA 1971</td>
<td>Act on the issuance of proposed Tentative Interim Amendment (TIA) to revise sections 7.1.23, 8.62, Table A.4.3.4(a), Table A.4.3.4(f) and Table B.2 of the 2018 edition of NFPA 1971, <em>Standard on Protective Ensembles for Structural Fire Fighting and proximity Fire Fighting</em> (TIA No. 1594).</td>
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<td>21-8-45-a</td>
<td>Text of proposed TIA No. 1594. See Attachment 21-8-45-a</td>
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<td>21-8-45-b</td>
<td><strong>PRELIMINARY</strong> Ballot results of TIA No. 1594. <strong>FAILING</strong> TC ballot on both technical merit and emergency nature – 36 members/11 agree on technical merit/12 disagree/7 abstained/6 ballots not returned/11 agree on emergency nature/14 disagree/5 abstained/6 ballots not returned. <strong>FAILING</strong> CC ballot on both correlation and emergency nature – 27 voting members/9 agree on...</td>
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**Correlation/9 disagree/5 abstained/4 ballots not returned. See Attachment 21-8-45-b**

| 21-8-45-c | One hundred eighty-four (184) comments were received. See Attachment 21-8-45-c |

**NFPA 1977**

| 21-8-46-a | Text of proposed TIA No. 1588. See Attachment 21-8-46-a |
| 21-8-46-b | Ballot results of TIA No. 1588. **PASSED** TC ballot on both technical merit and emergency nature – 23 voting members/15 agree on technical merit/0 disagree/0 abstained/8 ballots not returned/15 agree on emergency nature/0 disagree/0 abstained/3 ballots not returned. **PASSED** CC ballot on both correlation and emergency nature – 27 voting members/19 agree on correlation/0 disagree/0 abstained/8 ballots not returned/19 agree on emergency nature/0 disagree/0 abstained/3 ballots not returned. See Attachment 21-8-46-b |

| 21-8-46-c | No comments were received. No Attachment |

**NFPA 1977**

| 21-8-47-a | Text of proposed TIA No. 1590. See Attachment 21-8-47-a |
| 21-8-47-b | Ballot results of TIA No. 1590. **PASSED** TC ballot on both technical merit and emergency nature – 23 voting members/15 agree on technical merit/0 disagree/0 abstained/8 ballots not returned/15 agree on emergency nature/0 disagree/0 abstained/3 ballots not returned. **PASSED** CC ballot on both correlation and emergency nature – 27 voting members/24 agree on correlation/0 disagree/0 abstained/3 ballots not returned/24 agree on emergency nature/0 disagree/0 abstained/3 ballots not returned. See Attachment 21-8-47-b |

| 21-8-47-c | No comments were received. No Attachment |

**NFPA 1977**

| 21-8-48-a | Text of proposed TIA No. 1591. See Attachment 21-8-48-a |
| 21-8-48-b | Ballot results of TIA No. 1591. **PASSED** TC ballot on both technical merit and emergency nature – 23 voting members/16 agree on technical merit/0 disagree/0 abstained/7 ballots not returned/16 agree on emergency nature/0 disagree/0 abstained/7 ballots not returned. **PASSED** CC ballot on both correlation and emergency nature – 27 voting members/23 agree on correlation/0 disagree/0 abstained/4 ballots not returned/23 agree on emergency nature/0 disagree/0 abstained/4 ballots not returned. See Attachment 21-8-48-b |

| 21-8-48-c | No comments were received. No Attachment |
| 21-8-49-a | Text of proposed TIA No. 1592. See Attachment 21-8-49-a |
| 21-8-49-b | Ballot results of TIA No. 1592. FAILED TC ballot on technical merit but PASSED on emergency nature – 23 voting members/9 agree on technical merit/8 disagree/0 abstained/6 ballots not returned/13 agree on emergency nature/3 disagree/1 abstained/6 ballots not returned. FAILED CC ballot on correlation but PASSED on emergency nature – 27 voting members/11 agree on correlation/10 disagree/0 abstained/5 ballots not returned/17 agree on emergency nature/3 disagree/2 abstained/5 ballots not returned. See Attachment 21-8-49-b |
| 21-8-49-c | No comments were received. No Attachment |

| 21-8-50-a | Text of proposed TIA No. 1578. See Attachment 21-8-50-a |
| 21-8-50-b | Ballot results of TIA No. 1578. PASSED TC ballot on both technical merit and emergency nature – 16 voting members/10 agree on technical merit/1 disagree/0 abstained/4 ballots not returned/10 agree on emergency nature/1 disagree/1 abstained/4 ballots not returned. PASSED CC ballot on both correlation and emergency nature – 27 voting members/19 agree on correlation/0 disagree/0 abstained/8 ballots not returned/19 agree on emergency nature/0 disagree/0 abstained/8 ballots not returned. See Attachment 21-8-50-b |
| 21-8-50-c | No comments were received. No Attachment |

| 21-8-51 | NFPA 1999 | Act on the issuance of proposed Tentative Interim Amendment (TIA) to revise paragraphs 6.4.2.4, 6.4.2.4.2, 6.4.3.3 and 6.4.3.3.2 of the 2018 edition of NFPA 1999, *Standard on Protective Clothing and Ensembles for Emergency Medical Operations* (TIA No. 1579). |
| 21-8-51-a | Text of proposed TIA No. 1579. See Attachment 21-8-51-a |
| 21-8-51-b | Ballot results of TIA No. 1579. PASSED TC ballot on both technical merit and emergency nature – 16 voting members/11 agree on technical merit/0 disagree/0 abstained/5 ballots not returned/11 agree on emergency nature/0 disagree/0 abstained/5 ballots not returned. PASSED CC ballot on both correlation and emergency nature – 27 voting members/23 agree on correlation/0 disagree/0 abstained/4 ballots not returned/22 agree on emergency nature/1 disagree/0 abstained/4 ballots not returned. See Attachment 21-8-51-b |
| 21-8-51-c | No comments were received. No Attachment |

<p>| 21-8-52-a | Text of proposed TIA No. 1586. See Attachment 21-8-52-a |
| 21-8-52-b | Ballot results of TIA No. 1586. PASSED TC ballot on both technical merit and emergency nature – 16 voting members/12 agree on technical merit/0 disagree/0 abstained/4 ballots not returned/12 agree on emergency nature/0 disagree/0 abstained/4 ballots not returned. PASSED CC ballot on both correlation and emergency nature – 27 voting members/24 agree on emergency nature/3 disagree/1 abstained/6 ballots not returned. See Attachment 21-8-52-b |
| 21-8-52 | No comments were received. No Attachment | 21-8-52-c |
| 21-8-53-b | Ballot results of TIA No. 1575. PASSED TC ballot on both technical merit and emergency nature – 27 voting members/15 agree on technical merit/0 disagree/0 abstained/12 ballots not returned/15 agree on emergency nature/0 disagree/0 abstained/12 ballots not returned. PASSED CC ballot on both correlation and emergency nature – 27 voting members/20 agree on correlation/0 disagree/0 abstained/7 ballots not returned/20 agree on emergency nature/0 disagree/0 abstained/7 ballots not returned. | 21-8-53-c |
| 21-8-54 | Act on the issuance of proposed Tentative Interim Amendment (TIA) to revise Chapter 25 (re: escape rope) of the proposed 2022 edition of NFPA 2500, <em>Standard for Operations and Training for Technical Search and Rescue Incidents and Life Safety Rope and Equipment for Emergency Services</em> (TIA No. 1576). | 21-8-54-a |
| 21-8-54-b | Ballot results of TIA No. 1576. PASSED TC ballot on both technical merit and emergency nature – 27 voting members/15 agree on technical merit/0 disagree/0 abstained/12 ballots not returned/15 agree on emergency nature/0 disagree/0 abstained/12 ballots not returned. PASSED CC ballot on both correlation and emergency nature – 27 voting members/20 agree on correlation/0 disagree/0 abstained/7 ballots not returned/20 agree on emergency nature/0 disagree/0 abstained/7 ballots not returned. | 21-8-54-c |
| 21-8-55 | Consider the request of Don Abril to process a Tentative Interim Amendment (TIA) to revise Section 7.6.2.3 and A.7.6.2.3 of the 2019 edition of NFPA 105, <em>Standard for Smoke Door Assemblies and Other Opening Protectives</em>. See Attachment 21-8-55 | 21-8-56 |
| 21-8-56 | Proposed scope for Fire Protection of Cannabis Growing and Processing Facilities (see also proposed TC member roster CGP-AAA, agenda item 21-8-1-c). See Attachment 21-8-56 | 21-8-57 |
| 21-8-57 | Consider the request of the Technical Committee on Fire Investigation Units to approve proposed draft standard NFPA 1321, <em>Standard for Fire Investigation Units</em>. The Technical Committee also requests the Standard be entered into its initial revision cycle, with a Public Input closing date of January 5, 2022. See Attachment 21-8-57 | 21-8-58 |
| 21-8-58 | The Council to review and approve the dates of upcoming Council meetings: |</p>
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<tr>
<td>December 7-8, 2021</td>
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<tr>
<td>April 2022</td>
<td>Proposals: April 5-6, 6-7, 12-13, OR 13-14</td>
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<td><strong>21-8-59</strong></td>
<td>Update from the Council Secretary.</td>
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<td>No Attachment</td>
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NFPA 70®-2020 Edition
National Electrical Code®
TIA Log No.: 1564
Reference: 210.8(F)
Comment Closing Date: April 28, 2021
Submitter: Laura Petrillo-Groh, Air-Conditioning, Heating & Refrigeration Institute (AHRI)
www.nfpa.org/70

1. Revise Section 210.8(F) to read as follows:

210.8 Ground-Fault Circuit-Interrupter Protection for Personnel. …
(F) Outdoor Outlets. All outdoor outlets for dwellings, other than those covered in 210.8(A)(3), Exception to (3), that are supplied by single-phase branch circuits rated 150 volts or less to ground, 50 amperes or less, shall have ground-fault circuit-interrupter protection for personnel. This requirement shall become effective January 1, 2023, for ducted or ductless mini-split and multi-split-type heating/ventilating/air-conditioning (HVAC) equipment, including variable refrigerant flow (VFR), variable air volume (VAV), and other HVAC, or water heating units employing power conversion equipment as a means to control compressor speed.

   Informational Note: Power conversion equipment is the term used to describe HVAC equipment components that are commonly referred to as the variable speed drive. The use of power conversion equipment to control compressor speed differs from multi-stage compressor speed control.

   Exception: Ground-fault circuit-interruption protection shall not be required on lighting outlets other than those covered in 210.8(C).

Substantiation: While this expanded GFCI protection in the 2020 NEC presents a clear enhancement to safety, HVAC component and equipment safety standards are not harmonized with GFCI amperage limits. Until both equipment and component standards are updated, designers, installers, AHJs, and consumers are forced to choose between an NEC 2020 compliant installation or an operational installation. In jurisdictions that have adopted 2020 NEC with 210.8(F) intact, there have been numerous instances of field tripping of the GFCI breaker on ductless mini splits and units containing power conversion equipment. In these cases, the only solution was for the AHJ to approve a temporary allowance to install a non-GFCI breaker. Known instances of attempt to use GFCI breaker on products with inverter driven compressors, with only resolution to provide heating/cooling to residence by using non-GFCI breaker:
1. Columbiana, AL
   a. 1-1/2-ton mini-split HP
   b. GFCI circuit breaker – Brand “A”
2. Helena, AL
   a. 1-ton mini-split HP
   b. GFCI circuit breaker – Brand “B”
3. Helena, AL
   a. 1-ton mini-split HP
b. GFCI circuit breaker – Brand “B"

4. Middleburg Heights, OH
   a. 3-ton mini-split HP
   b. GFCI circuit breaker – Brand “A”

5. Middleburg Heights, OH – Three separate instances, two different HP manufacturers, and three different GFCI circuit breaker brands, all resolved by replacing with non-GFCI breakers. Ohio has not adopted 2020 NEC yet, so this was a compliant solution.
   a. 3-ton mini-split HP
   b. GFCI circuit breaker – Brand unknown

These concerns are emergency in nature as this issue impacts consumers who would be relying on this equipment for their only or primary source of heating or cooling. Tripping of the GFCI breakers could result in dangerous conditions for people in cold or hot weather. In CDC’s June 19, 2020 Morbidity and Mortality Weekly Report, an article was published analyzing Heat-Related Deaths in the United States, 2004-2018 (https://www.cdc.gov/mmwr/volumes/69/wr/pdfs/mm6924a1-H.pdf). A key finding of the article is that, “Observed differences in heat-related mortality across racial/ethnic groups can also be associated with social vulnerability, which often tracks with factors leading to heat exposure (e.g., less green space and more heat-absorbing surfaces), health disparities manifested by lower income, and absence of structural adaptations such as air conditioning.” [Emphasis added.]

AHRI notes, there has not yet been a full peak cooling season while NEC 2020 requirements are in place and our expectation is that installations compliant with 210.8(F) will cause widespread non-operational applications of cooling in peak cooling season. In June 2020, the Guardian published an article (https://www.theguardian.com/us-news/2020/jun/16/climate-deaths-heat-cdc) noting that, “in the last six decades, the number of annual heatwaves in 50 US cities has, on average, tripled.” Heat and cold related deaths, a known hazard, may be exacerbated by the lack of a temporary suspension of 210.8(F) for inverter-driven equipment.

The purpose of this proposed TIA is not to eliminate the GFCI protection, but simply to provide time for the NEC, Product Standards (both UL 943 and UL 60335-2-40), and product certification to be harmonized. While some products covered by this new requirement may work, there is no assurance without appropriate revisions to leakage current limitations and associated text in the product and component standards, that all listed (certified) products will operate. While adoption of the 2020 NEC and use of 210.8 (F) is currently limited (as of 1/1/2021 only nine states have adopted the 2020 NEC (along with some other local jurisdictions), however, 13 more states are currently in the process of adopting the 2020 NEC and the number of affected installations will rise significantly), interoperability of listed equipment has already been identified. These issues are noted from multiple manufacturers and multiple jurisdictions. In addition, inverter-driven HVAC equipment currently represent a small portion of the industry installations – although this product segment is quickly increasing due to the increased demand for higher efficient HVAC equipment. It is significant to note that Massachusetts and Utah, in the adoption of NEC 2020, declined to adopt the provision of 210.8(F), recorded for MA, here: https://www.mass.gov/doc/state-electrical-code-massachusetts-amendments-2020/download.

Emergency Nature: The proposed TIA intends to offer to the public a benefit that would lessen a recognized (known) hazard or ameliorate a continuing dangerous condition or situation. The
proposed TIA intends to correct a circumstance in which the revised NFPA Standard has resulted in an adverse impact on a product of method that was inadvertently overlooked in the total revision process or was without adequate technical (safety) justification for the action.

Without this TIA, designers, installers, AHJs, and consumers are forced to choose between an NEC compliant installation or an operational installation. While lack of harmonization may not impact every installation, current product and component standards do not address leakage current at other than 60Hz for all utilization equipment from exceeding the Class A GFCI trip levels. GFCI component standards and product safety standards need time to update certification testing requirements and OEMs need time to redesign to these yet undefined certification requirements. With the small number of states/jurisdictions that have adopted the 2020 NEC along with there has not yet been a full peak cooling season while NEC 2020 requirements are in place and our expectation is it is expected that installations compliant with 210.8(F) will cause widespread non-operational applications of cooling outages in high peak cooling season. Tripping of the GFCI breakers could result in dangerous conditions for consumers in cold or hot weather.
MEMORANDUM

TO: Code-Making Panel 2
FROM: Sarah Caldwell, Committee Administrator
DATE: May 12, 2021
SUBJECT: NEC® Proposed TIA No. 1564 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 \( \frac{3}{4} \) majority vote needed on both Ballot Item No. 1 (Technical Merit) and Ballot Item No. 2 (Emergency Nature).

<table>
<thead>
<tr>
<th>Eligible to Vote</th>
<th>Not Returned (Harman)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>1</td>
</tr>
</tbody>
</table>

### Technical Merit:
- 0 Abstentions
- 9 Agree (w/comment: Abbassi, Humphrey)
- 5 Disagree (Campolo, Cook, Domitrovich, Manche, McCamish)

### Emergency Nature:
- 0 Abstentions
- 8 Agree (w/comment: Abbassi, Humphrey)
- 6 Disagree (Campolo, Cook, Domitrovich, El-Sherif, Manche, McCamish)

There are two criteria necessary to pass ballot [(1) simple majority (2) affirmative vote of \( \frac{3}{4} \) of ballots received]. Both questions must pass ballot in order to recommend that the Standards Council issue this TIA.

1. In all cases, an affirmative vote of at least a simple majority of the total membership eligible to vote is required.
   \[ 15 \text{ eligible} + 2 = 7.5 = (8) \]

2. The number of affirmative votes needed to satisfy the \( \frac{3}{4} \) requirement is **11**.
   \[ (15 \text{ eligible to vote} - 1 \text{ not returned} - 0 \text{ abstentions} = 14 \times 0.75 = 10.5) \]

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 **May 17, 2021**.
QUESTION NO. 1: I AGREE with the TECHNICAL MERITS of the Proposed TIA Log No. 1564 to Revise Section 210.8(F).

Eligible to Vote: 15
Not Returned: 1
Thomas L. Harman

<table>
<thead>
<tr>
<th>Vote Selection</th>
<th>Votes</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agree</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Charles L. Boynton</td>
<td>Agree</td>
<td></td>
</tr>
<tr>
<td>David W. Johnson</td>
<td>Agree</td>
<td></td>
</tr>
<tr>
<td>Christopher J. Pavese</td>
<td>Agree</td>
<td></td>
</tr>
<tr>
<td>Cesar Lujan</td>
<td>Agree</td>
<td></td>
</tr>
<tr>
<td>David G. Humphrey</td>
<td>The documented occurrence of unwanted tripping at the types of HVAC equipment detailed in the proposed TIA merits a delay in adoption until Jan.1, 2023. After installation of the equipment, any remedy for unwanted tripping would be cost prohibitive and impracticable for the occupant of a new dwelling. This TIA is a practical solution that allows industry a limited amount of time to technically resolve this issue.</td>
<td></td>
</tr>
<tr>
<td>Fred Neubauer</td>
<td>Agree</td>
<td></td>
</tr>
<tr>
<td>Frederick P. Reyes</td>
<td>agree</td>
<td></td>
</tr>
<tr>
<td>Nehad El-Sherif</td>
<td>Agree</td>
<td></td>
</tr>
<tr>
<td>Mathher Abbassi</td>
<td>The proposed TIA intends to correct a circumstance in which the revised NFPA Standard has resulted in an adverse impact on a product or method that was inadvertently overlooked where the equipment standards lack the required threshold of leakage current.</td>
<td></td>
</tr>
</tbody>
</table>
Steve Campolo

The inclusion of 250V GFCI protection has been “in discussion” long before the 2020 NEC as a review of the 2020 Public Inputs and Public Comments will attest. This should have been ample time for the standard making body and the industry to update both products and product standards. Additionally, it was learned that certain “mini-splits” with certain types of variable speed motors/compressors were found to trip GFCI’s due to the nature of the of the motor control circuit. This modulated motor control was found to be beneficial in meeting some energy saving requirements (mandated in some areas). However, not one attempt to relax the energy savings requirements was made known. Rather, this TIA seeks to postpone a real safety requirement. Rational thought would indicate to seek relaxation of the energy savings requirement rather then a life safety requirement.

Alan Manche

The proposed language in this TIA creates a significant safety issue. The language that is proposed provides an exception to not only the mini-split configuration that is documented in the substantiation but may also exempt all multi-split type systems that work with GFCI protection. The sentence structure uses the term “including” that in effect provides numerous examples of the mini-split and multi-split units. Therefore, the proposed language may drive an even broader exemption in the main part of the sentence, “...ducted or ductless mini-split and multi-split-type heating/ventilating/air-conditioning (HVAC) equipment.” The substantiation only documents mini-split concerns. However, the language excludes nearly all types of HVAC systems from GFCI protection. While the substantiation suggests the intent is to harmonize the UL standard with the GFCI protection requirement in the NEC, numerous HVAC industry members recently voted against a proposed revision to UL 60335-2-40 that would have required the leakage current to be less than 4.0 mA. Therefore, the HVAC industry is not supporting the need to address the issue as they indicate in the TIA. We supported the original TIA language in TIA 1529 to limit the exemption to mini-split and units employing power conversion equipment. We would continue to support the language in TIA 1529. Unfortunately, the proposed language in TIA 1564 nearly eliminates GFCI protection from HVAC installations where NEC CMP-2 acted on substantiation that included a child being electrocuted. This TIA has significant language issues that may open the exception to units that will operate with GFCI protection and could create confusion for compliance and enforcement.

John McCamish

I supported the earlier TIA (1529) regarding HVAC units that use power conversion technology to control the unit. This TIA also includes all mini splits, not only the ones that use the technologies mentioned in the TIA.
Thomas A. Domitrovich  The proposed language will eliminate all mini-split and all multi-split units from GFCI protection. The substantiation only points to the potential need to address mini-split units. In light of the fact that this requirement was put in place due to direct loss of life, more data and research should be brought to this Code Making Panel to justify the removal of this lifesaving technology with such broad sweeping language, especially outside of the normal vetting process currently underway as part of the NEC® 2023 revision process. More evidence and data must be provided to support the broad removal of GFCIs as part of 210.8(F).

Mark Daniel Cook  I supported the need for the special mini-splits in question. But not all min-split AC units

Abstain  0

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

Eligible to Vote: 15  
Not Returned : 1  
Thomas L. Harman

<table>
<thead>
<tr>
<th>Vote Selection</th>
<th>Votes</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agree</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Charles L. Boynton</td>
<td></td>
<td>F</td>
</tr>
<tr>
<td>David W. Johnson</td>
<td></td>
<td>The proposed TIA intends to correct a circumstance in which the revised NFPA Standard has resulted in an adverse impact on a product or method that was inadvertently overlooked in the total revision process or was without adequate technical (safety) justification for the action.</td>
</tr>
<tr>
<td>Christopher J. Pavese</td>
<td></td>
<td>F</td>
</tr>
<tr>
<td>Cesar Lujan</td>
<td></td>
<td>F</td>
</tr>
<tr>
<td>David G. Humphrey</td>
<td></td>
<td>As documented occurrences are ongoing, this TIA would provide the enforcement community with a practical solution to a difficult enforcement issue.</td>
</tr>
<tr>
<td>Fred Neubauer</td>
<td>Agree</td>
<td></td>
</tr>
<tr>
<td>Frederick P. Reyes</td>
<td></td>
<td>Code F</td>
</tr>
<tr>
<td>Name</td>
<td>Position</td>
<td>Comments</td>
</tr>
<tr>
<td>----------------------</td>
<td>---------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Mathher Abbassi</td>
<td></td>
<td>The current outdoor HVAC has a greater leakage current and time is required for the industry to address the equipment manufacturing and standards.</td>
</tr>
<tr>
<td>Disagree</td>
<td>6</td>
<td>Steve Campolo</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The inclusion of 250V GFCI protection has been “in discussion” long before the 2020 NEC as a review of the 2020 Public Inputs and Public Comments will attest.</td>
</tr>
<tr>
<td>Alan Manche</td>
<td></td>
<td>The proposed TIA would potentially have an adverse impact on electrical safety and increase the electrical hazard based on the substantiation acted on by NEC CMP-2 during the development of the 2020 NEC.</td>
</tr>
<tr>
<td>John McCamish</td>
<td></td>
<td>This language was added as a result of an electrocution. The proposed TIA is too broad, reducing the safety that the code text addresses.</td>
</tr>
<tr>
<td>Thomas A. Domitrovich</td>
<td></td>
<td>Evidence has not been demonstrated by thesubmitter to support the broad and immediate removal of the life safety provisions of 210.8(F) from all mini-split and all multi-split units. This TIA language will reduce safety on systems that can viably be GFCI protected.</td>
</tr>
<tr>
<td>Nehad El-Sherif</td>
<td></td>
<td>The requirements found in 210.8(F) were added in response to identified deaths due to electrocution. Therefore, the proposed language will limit GFCI protection, compromising personnel safety in dwelling units.</td>
</tr>
<tr>
<td>Mark Daniel Cook</td>
<td>Disagree</td>
<td>Abstain 0</td>
</tr>
</tbody>
</table>
MEMORANDUM

TO: NEC® Correlating Committee

FROM: Sarah Caldwell, Committee Administrator

DATE: May 12, 2021

SUBJECT: NEC® Proposed TIA No. 1564 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 NOT achieved the ⅘ majority vote needed on both Ballot Item No. 1 (Correlation Issues) and Ballot Item No. 2 (Emergency Nature).

<table>
<thead>
<tr>
<th>12</th>
<th>Eligible to Vote</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Not Returned</td>
</tr>
</tbody>
</table>

**Correlation Issues:**

1. Abstentions (McDaniel)
2. Agree (w/comment: Gallo)
3. Disagree (Hickman, Porter)

**Emergency Nature:**

1. Abstentions (McDaniel)
2. Agree (w/comment: Hunter, Williams)
3. Disagree (Gallo, Hickman, Johnston, Kendall, Manche, Porter)

There are two criteria necessary to pass ballot [(1) simple majority (2) affirmative vote of ⅘ 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.

\[
12 \text{ eligible} \div 2 + 6 + 1 = 7
\]

(2) The number of affirmative votes needed to satisfy the ⅘ requirement is 9.

\[
12 \text{ eligible to vote} - 0 \text{ not returned} - 1 \text{ abstentions} = 11 \times 0.75 = 8.25
\]

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 **May 17, 2021**.
NEC CC TIA 1564 Ballot Final
Election:70_A2022_NEC_AAC_Log1564_tiballot
Results by Revision

**QUESTION NO. 1: I AGREE there are no CORRELATION ISSUES in accordance with 3.4.2 and 3.4.3 of the NFPA Regs.**

Eligible to Vote: 12
Not Returned: 0

<table>
<thead>
<tr>
<th>Vote Selection</th>
<th>Votes</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agree</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>John R. Kovacik</td>
<td></td>
<td>Agree</td>
</tr>
<tr>
<td>David L. Hittinger</td>
<td></td>
<td>Agree</td>
</tr>
<tr>
<td>Ernest J. Gallo</td>
<td></td>
<td>The submitter raises technical issues that may need to be addressed. The concerns raised are not in relation to correlation issues and therefore, not within the purview of the Correlating Committee. No correlations issues were included in the submitters proposal of the TIA.</td>
</tr>
<tr>
<td>Michael J. Johnston</td>
<td></td>
<td>Agree - No correlation issues</td>
</tr>
<tr>
<td>Alan Manche</td>
<td></td>
<td>Agree</td>
</tr>
<tr>
<td>David H. Kendall</td>
<td></td>
<td>Agree there is not a Correlating Issue.</td>
</tr>
<tr>
<td>Richard A. Holub</td>
<td></td>
<td>Agree</td>
</tr>
<tr>
<td>David A. Williams</td>
<td></td>
<td>Agree</td>
</tr>
<tr>
<td>Dean C. Hunter</td>
<td></td>
<td>I AGREE there are no CORRELATION ISSUES in accordance with 3.4.2 and 3.4.3 of the NFPA Regs.</td>
</tr>
<tr>
<td>Disagree</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Palmer L. Hickman</td>
<td></td>
<td>This TIA has not passed the Panel 2 ballot for either technical merit or emergency nature.</td>
</tr>
</tbody>
</table>
Christine T. Porter  

The proposed language removes GFCI protection from a very broad spectrum of these heating and cooling systems when the substantiation is for a potential concern very specific to a particular system with particular components. This does not justify the complete removal of GFCI Protection for all the systems described.

Roger D. McDaniel  

Although, there are no correlation issues, the TIA did not meet minimum criteria to pass ballot in order to recommend that the Standards Council issue this TIA.

<table>
<thead>
<tr>
<th>QUESTION NO. 2: I AGREE that the subject is of an EMERGENCY NATURE for one or more of the reasons noted in the Instructions box.</th>
</tr>
</thead>
</table>

**Eligible to Vote:** 12  
**Not Returned:** 0

<table>
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<tr>
<th>Vote Selection</th>
<th>Votes</th>
<th>Comments</th>
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</thead>
<tbody>
<tr>
<td>Agree</td>
<td>5</td>
<td>F</td>
</tr>
</tbody>
</table>

John R. Kovacik  

F.

David L. Hittinger  

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.

Richard A. Holub  

F.
David A. Williams

F and C This issue should be considered an emergency nature. The code has changed and the products are not readily available for the normal electrician to install and comply with the code. This places the AHJ and the contractor in a very difficult position. The AHJ requires GFCI protection on the air-conditioning unit and knowing putting the contractor in a bad situation. This doesn’t affect all units but there are a fair number of units will not function with GFCI protection. The contractor knows that the code requires GFCI protection and if he installs it, there is a chance of the GFCI device will trip and the appliance will not work. How do you tell a new homeowner that the code requires GFCI protection, but your new range will not work because of leakage current. They just want it to work without any issues. If the contractor doesn’t fix the problem their reputation will suffer. To fix the problem by removing the GFCI protection, they are taking a chance that an electrocution doesn’t occur. Granting the manufacturer additional time to resolve this problem correctly is the right thing to do.

Dean C. Hunter

Unlike TIA 1563, the solutions to eliminate the “unwanted” tripping have been an issue. Although I am of the belief that the breaker technology can “ride through” most of the power conversion leakage events, in some HVAC units the manufacturers use a control transformer which utilizes the equipment grounding conductor supplying the HVAC equipment for the grounded conductor return path. Obviously, this connection to the equipment case allows a large amount of leakage current on the equipment ground that is well above the Class A GFCI device. In a manual from a reputable HVAC manufacturer - it states; “When using residual current operated circuit breakers, be sure to use a high-speed type (0.1 seconds or less) 200 mA rated residual operating current”. So, the loss of the equipment grounding conductor could potentially result in energizing the outer metal case of the unit which could result in a shock, or worse, electrocution hazard. That being said, at this point, I am not aware that the equipment manufacturer(s) have addressed this issue. In the field, NEC compliance falls on the responsibility of the installer and the inspector. We can’t hold individuals accountable for assuring the electrical safety when the equipment standards allow such products to be installed by heating contractors. In my opinion, adding the additional time will allow for the both standard(s) and HVAC manufacturers to catch-up to this new requirement and not lay this burden on electricians and inspectors.

Disagree

Palmer L. Hickman

This TIA has not passed the Panel 2 ballot for either technical merit or emergency nature.

Ernest J. Gallo

There are issues raised in the TIA that should be addressed in the normal process and not via a TIA
Michael J. Johnston  
Does not meet the criteria to constitute an emergency nature.

Alan Manche  
The substantiation that has been provided does not support the emergency nature criteria for the broad encompassing proposed language. The proposed TIA language would potentially have an adverse impact on electrical safety and increase the electrical hazard based on the substantiation acted on by NEC CMP-2 during the development of the 2020 NEC.

David H. Kendall  
DISAGREE. Evidence has not been demonstrated by the submitter to support the broad and immediate removal of the life safety provisions of 210.8(F) from all mini-split and all multi-split units. This TIA language will reduce safety on systems that can viably be GFCI protected.

Christine T. Porter  
The language of this proposed TIA will reduce safety on systems that can and can perform with GFCI protection instead of just the ones that have a potential issue.

Abstain  
1

Roger D. McDaniel  
Although, there are no correlation issues, the TIA did not meet minimum criteria to pass ballot in order to recommend that the Standards Council issue this TIA.
Secretary, Standards Council,

Our equipment design teams are having a difficult time sorting through the plethora of new requirements coming down the pipe mandating increased efficiency, coupled with new Low Global Warming Potential refrigerant mandates, piled on top of new leakage current mandates.

In order to meet just efficiency mandates, we find ourselves needing to implement variable speed drives for fans, and now compressors. Yet these drives are known for their inherent leakage current, in addition to EMC/RFI emission and other anomalies. Rightfully so, leakage current can be a hazard when improperly designed or installed, or when a proper design or installation becomes compromised.

As it stands with readily available cost-effective technology, we can produce equipment that meets efficiency requirements, but it will have high frequency leakage current in excess of the GFCI device tripping threshold. Conversely, we can produce equipment that will operate under the GFCI device tripping threshold, but it will not meet efficiency minimums. These new standards totally lack harmonization and more importantly, practicality.

I support TIA 1564 but to include it in the NEC at this time seems an overreach and I would further request that until the various code making panels at UL and the NFPA can coordinate on this matter that it be removed from the NEC.

We’re willing to address these issues, prioritized by risk, but in the short implementation period allotted, we cannot meet all these compounded mandates.

Thanks,

Kenneth Wilson
Senior Development Engineer
Daikin Applied Americas

www.daikinapplied.com
From: Joseph Guenther
Sent: Monday, April 26, 2021 3:39 PM
To: Shared TIAs
Subject: Comment on Proposed TIA 1564 on NFPA 70

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

To whom it may concern,

I ask that the expansion of GFCI protection “to ducted or ductless mini-split and multi-split-type heating/ventilating/air-conditioning (HVAC) equipment, including variable refrigerant flow (VFR), variable air volume (VAV), and other HVAC, or water heating units employing power conversion equipment as a means to control compressor speed”, be struck from the NEC.

The only persons who should be working on these units are qualified personal. These qualified personal are required to disconnect all power from these units while servicing them. Therefore expanding the GFCI rule to them is unnecessary.

Sincerely,
Joseph Guenther

Sent from Mail for Windows 10
TIA 1564 – Public Comment

Schneider Electric is commenting in opposition to the NEC language revision proposed by TIA 1564. The language in TIA 1564 eliminates GFCI protection from nearly all residential HVAC systems, extending well beyond the substantiated systems of concern. NEC CMP-2 acted to require GFCI protection based on substantiation that included a child being electrocuted. Schneider Electric conducted a review of HVAC system installations in a sample of our employee’s homes. We found and corrected a nearly identical installation hazard in an employee’s home that was described in the substantiation that supported the NEC CMP-2 actions to implement GFCI protection. The language in TIA 1564 will leave the documented safety issues unprotected and a known safety issue that exists in homes today that are not in the scope of HVAC systems found in the substantiation. A real and documented “accident waiting to happen.”

The substantiation for TIA 1564 only points to mini-splits which demonstrates the limited scope of HVAC units with power conversion equipment. Industry information is also pointing to current levels on the grounding conductor from these HVAC units that are exceeding the GFCI threshold that would also not comply with NEC Article 250. The Standards Council may want to consider reviewing the record for TIA 1529 and acting to use the language in TIA 1529. This action would retain a significant portion of the public safety provision enacted by CMP-2 by only targeting the HVAC units substantiated in TIA 1564. The public record shows the language in TIA 1529 passed technical and emergency nature ballot in NEC CMP-2. TIA 1529 then failed ballot at the NEC Correlating Committee due to a single emergency nature vote. Schneider Electric supports the proposed NEC language revisions found in TIA 1529.
From: David Bixby  
Sent: Thursday, March 18, 2021 5:57 PM  
To: Shared TIA  
Cc: Wes Davis; manny  
Subject: Comment on Proposed TIA 1564 on NFPA 70  
Attachments: ACCA Comment NFPA TIA 1564.pdf; ACCA Comment NFPA TIA 1564.docx  
Importance: High

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To: Secretary, NFPA Standards Council

Please find attached ACCA’s comments supporting Proposed TIA 1564 on NFPA 70. Our comments are attached as both Adobe pdf and Word files.

Please contact me if you have any questions.

Thanks!

David C. Bixby

David Bixby  
Manager of Codes & Standards  
Air Conditioning Contractors of America (ACCA)

www.acca.org
March 18, 2021

Secretary, Standards Council  
National Fire Protection Association  
(Submitted via e-mail to TIAs_Errata_Fls@nfpa.org)

Subject: Comment on Proposed TIA 1564 for NFPA 70 - 2020

The Air Conditioning Contractors of America (ACCA) is a national association of heating, air conditioning, ventilation, and refrigeration (HVACR) contractors, representing more than 60,000 contracting professionals in every state. ACCA is also responsible for creating the nationally recognized and industry-endorsed standards to ensure HVACR systems are properly designed, installed, maintained, and serviced. These standards help ensure our workers, our customers, and the environment are safe.

ACCA is very concerned with the potential for nuisance trips on HVACR equipment installed outdoors that will have to comply with 210.8(F) in the 2020 Edition of NFPA 70.

With respect to TIA Log No.: 1564, shown below are ACCA’s comments.

ACCA supports the proposed TIA in that the potentially adverse impacts of 210.8(F) on outdoor installed HVACR equipment have not been resolved as far as nuisance trips. The potential for such shutdowns could render such equipment unusable and create an unjustified lack of confidence in the system by consumers. In addition, contractors and service personal would have to expend considerable time and resources responding to calls for nuisance trips, when there is no safety reason for responding.

If the state of large amperage GFCI’s protecting is such that there are nuisance trips, contractors could suffer from a reputation for unreliable equipment if they obey the code during changeouts or the liability if they do not.

/Continued…
The industry needs more time to properly evaluate the above situation before such a requirement can be enforced in the field by code officials. In addition, ACCA questions whether there was sufficient justification for imposing the new requirement on outdoor A/C disconnects other than those with receptacles. Again, more testing and investigation is needed.

ACCA notes that Massachusetts and Utah have deleted 210.8(F) from their adoption of the 2020 NEC. ACCA has also encouraged its members to request a similar deletion when other states adopt the new NEC as their state codes. As more states adopt the 2020 NEC with 210.8(F), and with the advent of the cooling season, there will be more nuisance trips that will force code officials, inspectors and contractors to determine how to make the installation code compliant while at the same time ensure operability. The only solution would be to grant a variance to install non-GFCI disconnects. We don’t believe that is a situation that the NFPA or its NEC Technical Committee would endorse.

ACCA looks forward to working with the NEC Code-Making Panel 2 in the future to develop a suitable proposal to address our concerns while at the same time uphold the safety aspects that GFCI devices provide.

Thank you,

David C. Bixby  
ACCA Manager of Codes & Standards  
Air Conditioning Contractors of America  
1330 Braddock Place, Suite 350  
Alexandria, VA 22314
Today in ND it was pointed out by an HVAC contractor that they are having several issues of a 240v GFCI breaker tripping when installed on their mini-splits and a/c units that have a built-in DC power invertors. We decided today to allow a standard breaker to be used and agree with the timeline the TIA 1564 states as an exception (January 1, 2023).

Thank you,

James Schmidt, Executive Director

P.O. Box 7335, Bismarck, ND 58507-7335
From: Glass, Robert S.
Sent: Tuesday, April 13, 2021 8:04 PM
To: [Shared TIAs]
Subject: Goodman Manufacturing Company Comments on TIA No 1564 - 2020 NEC Section 210.8(F)

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Please accept the attached comments in favor of delaying the effectivity of Section 210.8(F) of the 2020 NEC until January 1, 2023.

If you have any questions, please let us know.

Regards,

Robert

Robert Glass
Manager, State Regulatory Affairs
Goodman Manufacturing Company, L.P.
A member of Daikin group
12680 Lock 15 Road
Tuscaloosa, AL 35406
April 13, 2021

Mrs. Dawn Michele Bellis  
Director and NFPA Standards Council Secretary  
National Fire Protection Association  
1 Batterymarch Park  
Quincy, MA  02169-7471

Subject: Comment on Proposed TIA 1564 on NFPA 70  
(sent by e-mail to TIA_s_Errata_FIs@nfpa.org)

Dear Mrs. Bellis,

Goodman is submitting these comments in support of the Proposed TIA No. 1564, Reference: 210.8(F) regarding the 2020 National Electrical Code – NFPA 70®.

Goodman is a member of Daikin Group, one of the largest heating, ventilation, and air conditioning manufacturers in the world. Goodman is headquartered in Houston, Texas, and employs thousands of workers across the United States. The company manufactures residential and light commercial heating and cooling equipment, and its products are sold and installed by contractors in every American state, as well as in Canada.

We concur with the TIA, that the new requirement in the 2020 NEC for use of GFCI protection on certain outdoor outlets has created an issue with inverter-driven HVAC equipment that was not foreseen by the committee approving the 2020 NEC. The use of GFCIs with inverter-driven HVAC equipment causes nuisance tripping of the GFCI breaker, causing loss of cooling and/or heating function for the conditioned space.

Notably, most HVAC products available in the market today that are installed using outdoor outlets are certified to the UL 1995 product safety standard for air conditioners and heat pumps. The UL 1995 standard does not have any such leakage current testing requirements. Also note that the UL 1995 standard will be withdrawn by UL and be replaced by UL/CSA 60335-2-40. UL/CSA 60335-2-40 does have leakage testing requirements (allowing up to 10mA for HVAC products in applications covered by 2020 NEC 210.8(C)), however compliance with the new standard is not mandatory until 1/1/2024 and these requirements only apply at 60Hz.

Based on our initial investigation, the leakage currents by these inverter-driven products at 60 Hz do not exceed the 6mA maximum leakage current threshold as specified in UL 943. However, at frequencies above 60 Hz, there is leakage current exceeding 6mA. We are of the understanding that UL 943 Standards Technical Panel (STP) is in the process of studying with potential modification to UL 943 to address permissible leakage current as a function of frequency.
Goodman is committed to help find a solution and will participate where possible to find a solution.

Goodman concurs with the TIA request that this is of emergency nature, to address situations where nuisance tripping of GFCI breakers is occurring with high-efficient, invert-driven HVAC equipment. Without this TIA, AHJs and consumers are forced to choose between compliance and an operational system for heating and/or air-conditioning.

Goodman/Daikin customers have experienced several instances where nuisance tripping of the GFCI breakers on inverter-driven equipment has only been resolved by the elimination of the GFCI breaker in lieu of a non-GFCI breaker. This replacement of the breaker has resolved the issue in 100% of the nuisance installations.

The proposed delay in the effective date of the GFCI requirements for inverter-driven HVAC equipment outlined in Section 210.8(F) to 1/1/2023, as proposed in TIA No. 1564, will allow safety certification committees and manufacturers to address these GFCI requirements so that (1) safety of electrical workers, HVAC technicians and the general public are enhanced, (2) elimination of potential nuisance trips due to normal operation of the HVAC equipment, (3) safety certification standards for both HVAC equipment and GFCI circuit breakers can be updated to reflect product testing and evaluation to support these requirements and (4) that manufacturers (GFCI circuit breaker manufacturers and HVAC manufacturers) can have time to address these new requirements in the design and manufacture of their products.

Goodman encourages the committee to approve TIA No. 1564 and its proposed delay in effectivity for the requirements of Section 210.8(F) for inverter-driven HVAC equipment until 1/1/2023.

If you have any questions regarding this information and our recommendations, please do not hesitate to contact myself or Rusty Tharp, Senior Director of Regulatory Affairs.

Sincerely,

Robert S. Glass
Manager, State Regulatory Affairs
Foran, Rosanne

From: Hall, Cullen E
Sent: Monday, April 19, 2021 2:01 PM
To: Shared TIAs
Subject: Comment on Proposed TIA 1564 on NFPA 70

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Secretary, Standards Council,

There is a lack of harmonization between the current UL standards that HVAC equipment is designed to, the UL standards dictating the design of GFCI circuit breakers, the US Department of Energy’s requirements, the Federal Communications Commission, and the requirement in the NFPA’s NEC 210.8(F).

To meet the highest efficiency standards HVAC units, being phased in as per DOE requirements, a variable frequency drive (VFD) is effectively required in the HVAC condensing units and all VFDs have some amount of ground leakage current inherent to their design. This VFD leakage current is slightly increased due to FCC EMC requirements and the associated electrical filtering that is required. This leakage current is being detected by the GFCI breakers, that are not designed to differentiate between high frequency leakage current, and tripping erroneously. This leaves the consumer with a choice of a non-compliant yet functional installation or an installation that is compliant yet non-functional. As time goes on a more stringent energy efficiency standards come into effect the number of consumers that would experience this issue will only increase.

I agree with, and support, TIA 1564 and would further request that until the various code making panels at UL and the NFPA can coordinate on this matter that it be removed from the NEC. The HVAC manufactures are willing and able to address the concerns that drove creation of this section, however, coordination must occur in order that these concerns are addressed in a manner that can actually be implemented.

Thanks,
Cullen E. Hall
Electrical Engineering Manager
From: Whitelaw, Jeff  
Sent: Tuesday, April 20, 2021 2:04 PM  
To: TIAS_Errata_Fls@nfpa.org; Caldwell, Sarah <scaldwell@nfpa.org>  
Cc: Tucker, Douglas; Tidd, Jeremy  
Subject: TIA 1564 Support Letter

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Ms. Caldwell,

Please find attached a letter of support for TIA 1564. Please let me know if I should submit in a different manner.

regards,

Vice President, Industry Relations and Administration  
Mitsubishi Electric US, Inc  
Cooling & Heating  
[mehvac.com]

Learn more about our 100th Anniversary

http://us.mitsubishielectric.com

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Please consider the environment before printing.
Secretary, Standards Council  
National Fire Protection Association  
(Submitted via e-mail to TIAs_Errata_Fls@nfpa.org)

Subject: Comment on Proposed TIA 1564 for NFPA 70 – 2020

Mitsubishi Electric US, Inc., Heating and Air Conditioning Division (MEUS HAD), is a leading manufacturer of ductless and Variable Refrigerant Flow (VRF) heat pumps and air conditioning systems. While MEUS HAD supports the efforts of NFPA to improve safety standards, we support the proposal as written in the TIA Log No.: 1564.

MEUS HAD has concern about the safety of the changes made to the NEC 2020 without ensuring the alignment of HVAC equipment and equipment with the equipment safety standards. Currently products, components and this standard are not harmonized with GFCI amperage limits, and until such harmonization occurs, AHJ’s are forced to choose between a NEC 2020 compliant or operational installation. The latest changes to NEC2020 now conflict with UL standards such as UL 60335-2-40 product safety requirements.

Where a compliant installation is selected, there are expected to be, and currently exist, numerous instances of field tripping of the GFCI breaker. Such field tripping shuts down the system and could result in dangerous emergency situations for consumers who rely on their equipment as their only source of heating and/or cooling, up to and including death.

Dangerous situations could occur during the winter months where the consumer could be left without sufficient heat for their home, causing damage to the property, and in severe cases, death if the consumer does not, or cannot, leave the home and find shelter. Similarly, in summer months, cooling could be lost resulting in severe heat conditions in the home. These dangerous conditions are most severe for the elderly, but can be dangerous for anyone. MEUS-HAD believes that installations compliant to 210.8(F) will result in widespread non-operation of equipment in both the heating and cooling peak seasons, and could become an emergency for some. Heat and cold related deaths, a known hazard, may see significant rise if there is not a delay of 210.8(F) for inverter-driven equipment to allow time for manufacturers to change their equipment to remove the tripping concern.

Nuisance tripping will require contractors and service personnel to expend significant time and resources to responding to calls where they GFCI breaker has tripped, and continues to trip, even though there is no safety issue. This will result in an unjustified lack of confidence in the product and in the contractor or service personnel.
The purpose of the TIA is not to eliminate the GFCI protection, only to provide time for the NEC, Product Safety Standards (UL943 and UL 60335-2-40), appropriate product certifications, and manufacturers to harmonize to ensure products can comply with the safety standards. Industry needs more time to develop and test products so we may ensure compliance and safety.

MEUS-HAD looks forward to working with the NEC Code-Making Panel 2 to develop a suitable resolution to address our concerns while maintaining and improving on the safety aspects of using GFCI devices.

Thank you,

Sincerely,

Jeff Whitelaw

Jeff Whitelaw
VP Industry Relations and Administration
Mitsubishi Electric US, Inc.
Heating and Air Conditioning Division
To whom it may concern:

I agree completely with TIA 1564, the HVAC industry must be given able to time update their products, to be useable and still within code.

Thanks,

Bill Buras
Owner/President
Lakeside Heating & A/C
To the Secretary, Standards Council

I would like to address the Standards Council on this issue, specifically the use of GFCI for HVAC equipment using inverters, variable frequency drives, and variable phase drives.

Froom the TIA: “While lack of harmonization may not impact every installation, current product and component standards do not address leakage current at other than 60Hz for all utilization equipment from exceeding the Class A GFCI trip levels. GFCI component standards and product safety standards need time to update certification testing requirements and OEMs need time to redesign to these yet undefined certification requirements.”

Context: I am a huge fan of the GFCI breaker for as many circuits as possible, inside and outside the home. I moved a number of breakers from standard to GFCI type in my home. Specifically the HVAC equipment. I have not yet moved the inside oven or dryer to GFCI, but plan to in the future after analysis. Switching the 6ton and 3ton compressor units to GFCI performed well. Testing showed there was no phase shifting of the current between the A and B sides of the 240VAC residential power system. When I switched the mini-split to GFCI, there was a trip within 2 minutes. The following is my research and observation on this.

1) I would like to note that present testing methods described by NEMA and others in industry is simply to just try it. I am not a fan of that method without collecting evidence to support the outcome. In the case of the primary HVAC units I tested, the A side and B side currents tracked well with little anomalies. I have concerns about electrical noise on the line tripping the breaker, but I could find no evidence to support that statement.
   a. I suspect that length and gauge of wire will play a roll in the current phasing between the A side and B side rails. In my case, the data suggests that because the wiring used for my two HVAC units is 2 times larger in size then required by code, as well as less than 50 feet, I will not see phasing on the line caused from compressor EMI (electro-magnetic interference) activity.
   b. Data also suggests that as the capacitors for the compressor age, tripping will likely occur ... specifically, rather than the capacitor bank “popping” or “burning out”, the GFCI breaker should trip. It will likely make debug of the problem more difficult until HVAC service personnel learn and understand the new fault method.

2) Regarding the mini-split, I was able to place Fluke power line monitors on the lines, as well as scope taps to specifically look at the current and voltage. I have to admit, I was pretty shocked by what I saw. The noise from the mini-split was very bad ... there are no EMI control filters ... there was significant voltage and current noise.
   a. The data shows that the A side and B side current is out of phase by as much as 400ma. There is really no line side conducted noise filtering in the product. I was stunned to learn that there is little to no EMC guidance on HVAC equipment sold in the united states. Without requirements, it would be impossible to specify “ANY” GFCI breaker that could functionally operate with this load equipment.
b. I first decided to measure the phase shift of the power line with a 30-foot length. The length is about 30 feet. This helped reduce some of the current phase difference, but not by enough ... about 50ma better.
c. I placed a CORCOM differential mode and common mode filter rated for 30 Amps between the line and load. The filter significantly cleaned the line side, as expected. The current phase differential dropped to about 35ma. It was enough to prevent the GFCI from tripping for about 4 hours. The data suggests if the filtering where placed right at the load, in addition to the larger conductors, the false tripping might disappear.

3) This is a compatibility issue. It is not a ground – neutral shorting issue or an equipment failure. There isn’t any ground leakage current. This is all EMI / EMC. The GFCI circuit breaker and the load equipment must have specifications between them for inter-operability. The GFCI design doesn’t incorporate phase monitoring, while the mini-split motor and motor controls do not incorporate EMI filtering at any level that would be impactful.

I support the TiA, but I believe the Standards Council should consider a different approach.

1) Create an industry committee to study a series of loads and GFCI circuit breakers to determine all the compatibility issues. This might include recommending changes to EMI guidelines for equipment suppliers.
2) Consider placing the requirement on hold for all equipment that a false trip would create harm to humans or animals.
3) Drive all implementation changes to the 2026 code.

I have, and always will, place safety first. In this specific area, there is no compatibility between suppliers because GFCI designs never expected to see the phase current shifts in HVAC devices. The GFCI implementation expects all loads to meet consumer EMC guidelines, which doesn’t seem to be true in this specific scenario. It is on this point that I hope the Standards Council forms a group to investigate this.

Thank you and take care
Joel Goergen
Cisco Fellow
From: Bowley, Brice Alan (GE Appliances, Haier)
Sent: Tuesday, April 27, 2021 2:56 PM
To: Shared TIAs
Subject: TIA 1564
Attachments: NEC TIA Comments.docx

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I am respectfully submitting comments regarding TIA 1564. Appreciate your consideration on this matter.

Sincerely,

Brice Bowley
GE Appliance, a Haier company.
April 23, 2021

VIA EMAIL
Secretary, Standards Council
National Fire Protection Association

via Email: TIAs_Errata_Fls@nfpa.org

Re: Comment on Proposed TIA 1564 for NFPA 70 - 2020

Dear Committee Members:

GE Appliances, a Haier company supports AHRI’s proposed TIA.

The expanded GFCI protection in the 2020 NEC standards differs from the relevant product safety standards (UL 943, UL1995, UL 60335-2-40…). These standards have not been harmonized with this protection. The requirements of 210.8(F) create a product requirement that exceeds the listing requirements of these standards and will create tripping when no hazard is present. This incompatibility will result in installers, AHJs and consumers being forced to choose between a compliant installation and an operational installation.

The purpose of the proposed TIA is not to eliminate the GFCI protection but only postpone the effectivity of it to allow the relevant standards and products to be updated. This will provide the necessary time for the NEC, product standards and product certifications to be harmonized. HVAC equipment currently has design considerations in place within the appliance to minimize leakage current. While minimized to reduce the risk of shock and not trip traditional breakers these units will still generate enough current to ground to trip a GFCI breaker.

Manufacturers are facing an urgent need to respond to increasing GFCI incompatibility complaints as more locals adopt the 2020 NEC. The full range of environmental conditions (rain, -40F – 110F ambient, humidity…) need to be evaluated with GFCI protection. This evaluation is critical to ensure customers aren’t without heat or AC when the weather extremes occur.

UL Standards Technical Panel (STP) members are working to evaluate leakage current requirements. However, since this requirement did not exist previously, there are significant technical challenges that need to be resolved prior to submission of any proposals.

Respectfully submitted,

Brice Bowley
GE Appliances, a Haier company
Foran, Rosanne

From: Schoen, Joseph J
Sent: Tuesday, April 27, 2021 6:00 PM
To: Shared TIAs
Subject: Comment on Proposed TIA 1564 on NFPA 70

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Secretary, Standards Council,

I am writing to you today to urge your support in favor of adopting the proposed TIA 1564. The US Department of Energy has identified Variable Speed Drives as a tool for manufacturers to meet more stringent energy efficiency requirements [1] [2] and are increasingly being used in residential applications to save energy.

One of the characteristics of these energy saving devices is that they use high frequency switching of power in order to control and drive the motor. This high frequency switching has the potential to generate leakage current through capacitive coupling [3] that is inherent in motor systems. At low frequencies such as 60 Hz, these capacitive couplings have negligible effects. However, at the high frequencies typically used in Variable Speed Drives, these capacitive couplings can introduce high frequency leakage current [4].

The high frequency leakage current is not the result of a fault to ground [4]. Unfortunately, many GFCI devices on the market may not have been designed to reliably distinguish this difference [5], resulting in nuisance tripping in the absence of a true ground fault event. This is an unfortunate situation because it stands to hurt the perception of the public both on devices employing this energy efficient technology and on GFCI protection devices themselves.

I favor the adoption of TIA 1564 because time is needed to develop unified methods and standards to ensure the compatibility of these additional levels of protection and these energy efficient systems. Please vote to adopt TIA 1564 on NFPA 70.

Thank you,

Joseph J. Schoen
Electrical Systems Engineer
BSEE, Master Electrician


"These standards continue to push manufacturers to consider both more efficient motors and variable-speed technologies, among other product design improvements, in order to meet more stringent minimum efficiency requirements."

“The principal advantage of VFDs is immediate energy efficiency, which leads to substantial cost savings in many motor systems.”


“In a motor drive system, a voltage source converter with hard switches generates high dv/dt, which causes leakage currents due to stray capacitances in an electric motor.”


“The purpose of the EFT test was to simulate the emissions of a variable speed drive. Three out of eight GFCIs tested were found to trip at different voltage levels indicating that the EFT test could be useful to differentiate the performance of different types of GFCIs in terms of their ability to handle impulses from VSD products.”
<table>
<thead>
<tr>
<th>From:</th>
<th>Butsch, Jennifer [COMRES/AC/SID]</th>
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<tbody>
<tr>
<td>Sent:</td>
<td>Wednesday, April 28, 2021 10:55 AM</td>
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<tr>
<td>To:</td>
<td>Shared TIAs</td>
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<tr>
<td>Subject:</td>
<td>Comment on Proposed TIA 1564 on NFPA 70</td>
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<tr>
<td>Attachments:</td>
<td>2021.04.28 TIA 1564 Emerson Comments.pdf</td>
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Please find Emerson’s comments relating to TIA 1564 attached.

Regards,

Jennifer

Jennifer Butsch | Director Regulatory Affairs | Air Conditioning
Emerson Commercial and Residential Solutions | 1675 West Campbell Road | Sidney, OH 45365
April 28, 2021

NFPA Code-Making Panel 2

Re: Proposed TIA 1564, Reference 210.8(F)

Dear NFPA Code-Making Panel 2,

Emerson Climate Technologies, Inc. and its affiliated businesses within Emerson Commercial & Residential Solutions (collectively "Emerson") respectfully submits this letter in response to the proposed TIA No. 1564, regarding the requirement to expand GFCI protection to all outdoor units for dwellings that are supplied by single-phase branch circuits rated 150 volts or less to ground, 50 amperes or less. Emerson is concerned that this requirement is in conflict with other industry codes and standards such as UL1995 and UL 60335-2-40 and will cause unnecessary confusion not just to manufacturers, but to Authorities Having Jurisdiction, other code officials, and contractors.

Emerson is a manufacturer of variable frequency drives (VFDs) also known as power conversion equipment and variable speed compressors compressors used in ducted outdoor condensing units. While we appreciate the reason for the code update, our own internal analysis does not show a path in which leakage current from a paired compressor and VFD can reliably stay below 4mA. In discussions with UL, we also believe this limit may be closer to 3.5mA for temperatures below 20F. VFDs introduce high switching frequency harmonic content which could lead to nuisance tripping on GFCI devices.

We agree with AHRI’s assertion that installations of variable speed equipment compliant with 210.8(F) are likely to lead to nuisance tripping of the GFCI breakers which could result in dangerous conditions for people in extreme cold or hot weather. For this reason we are requesting support for the delayed implementation date of January 1, 2023 for ducted and ductless variable speed equipment. This will not only enable manufacturers more time to develop a reliable solution but also work with GFCI manufacturers on the unique challenges of multi-frequency devices.

Emerson appreciates the opportunity to provide these comments and is committed to work with NFPA in seeking an equitable and practical solution.

Sincerely,

Jennifer Butsch
Director, Regulatory Affairs
Foran, Rosanne

From: Winningham, Dave L.
Sent: Wednesday, April 28, 2021 1:39 PM
To: Shared TIAs
Subject: NFPA Proposed TIA 1564
Attachments: Lennox Comments Regarding NFPA Proposed TIA 1564.pdf

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From: Winningham, Dave L.
Sent: Wednesday, April 28, 2021 1:05 PM
To: TIAs_Errata_Fls@nfpa.org
Subject: NFPA Proposed TIA 1564

Secretary, Standards Council NFPA,

Please see the attached Lennox comments regarding the TIA 1564 for NFPA 70 – NEC 2020

Please contact me with any questions regarding.

Dave Winningham
Sr. Engineering Manager, Regulatory Affairs
Lennox International
April 28, 2021

Secretary, Standards Council
National Fire Protection Association

Submitted via: TIAs_Errata_FIs@nfpa.org


Lennox is a leading provider, based in the United States, of climate control solutions for heating, air-conditioning and refrigeration equipment (HVACR). Lennox is a publicly traded company, has thousands of employees, and offers a broad range of HVACR products to the marketplace. This industry is an important source of American jobs and provides equipment that is vital to the health and wellbeing of consumers and the preservation of food.

Lennox appreciates the consideration of TIA 1564 for NFPA 2020 NEC and strongly recommends that the Technical Committee approve the TIA to allow necessary time for compliance to the code change and prevent potential hazards created by nuisance trip inoperability of HVAC products at times of critical need. While this expanded GFCI protection in the 2020 NEC is intended to improve safety, HVAC component and equipment safety standards are not harmonized with GFCI amperage limits. Until both equipment and component standards are updated, designers, installers, AHJs, and consumers are forced to choose between an NEC 2020 compliant installation or an operational installation. Lennox seeks to address committee member concerns expressed to the proposed TIA on both Technical Merit and Emergency Nature.

Technical Merit

- The TIA proposes to resolve a conflict between the safety standards for inverter-driven HVAC and water heating (WH) products and the 2020 code. Most all HVAC products available in the market today that are installed using outdoor outlets are certified to the UL 1995 product safety standard for air conditioners and heat pumps. The UL 1995 standard does not include leakage current testing requirements for equipment other than cord-connected products. The current UL 1995 standard will be withdrawn by UL and be replaced by UL/CSA 60335-2-40. UL/CSA 60335-2-40 does have leakage testing requirements – allowing up to 10 mA for HVAC products in applications covered by 2020 NEC 210.8(C). Compliance with UL/CSA 60335-2-40 is not mandatory until January 1, 2024. A UL 60335-2-40 working group has been formed to investigate alternate proposals, including ground integrity confirmation. The requested three-year extension is appropriate while the product safety standard committee conducts its work. Lennox notes that the 10 mA limit in leakage required by UL 60335-2-40 is a level that would not cause significant harm.

- Lennox has investigated the leakage currents and found that inverter-driven products at 60 Hz do not exceed the 6 mA maximum leakage current threshold as specified in UL 943. However, at frequencies above 60 Hz, there can be leakage current exceeding 6 mA which result in nuisance tripping of the GFCI device. UL 943 Standards Technical Panel (STP) is in the process of
studying with potential modification to UL 943 to address permissible leakage current as a function of frequency.

- GFCI’s must also comply with the 60 Hz testing requirement in UL 943. There are no requirements for these products to be tested at higher frequencies. GFCI’s from different manufacturers clearly react differently at frequencies other than 60 Hz, as observed that nuisance tripping is agnostic of GFCI manufacturer. The three-year delay will also help GFCI manufacturers investigate product reaction at frequencies other than 60 Hz and interactions with inverter-driven equipment.

- In AHRI investigation, heat pumps (HP) manufactured by three companies paired with GFCI’s manufactured by at least two different companies resulted in nuisance tripping. The issue is agnostic to manufacturer. While incidents cited are only mini-split HPs, the physics causing nuisance tripping would be the same for any products containing power conversion equipment, hence the request to include additional products within the scope of delayed compliance. All these products comply with relevant safety standards, noted above. Any changes proposed by the working group of UL 60335-2-40 investigating nuisance tripping will apply to all products requested in proposed TIA 1564.

Emergency Nature

- There are two hurdles to effective enforcement of the new requirement in Article 210.8(F) of the 2020 NEC to require GFCIs on all outdoor outlets including those supplying HVAC equipment that speak to the emergency nature of a code change:
  - Existing listed equipment does not have leakage current measured as a required test during product certification, for the currently enforced listing standard (UL 1995).
  - The method of test defined to measure leakage current in the proposed new listing standard (UL 60335-2-40) does not reflect how GFCIs operate.

- Without this TIA, AHJs and consumers are forced to choose between compliance and an operational system for heating and/or air-conditioning. Consumers experiencing these nuisance trips relying on this equipment for their only or primary source of heating or cooling. Tripping of the GFCI breaker could result in dangerous conditions for people in cold or hot weather. As noted in the CDC article cited in the proposed TIA, “During 2004–2018, an average of 702 heat-related deaths occurred in the United States annually.”

- GFCI safety standards also need time to investigate the conflict with inverter-driven products at frequencies other than 60 Hz.

- Lennox understands that the stated reason for including this provision was the result of an incorrect installation, a situation that would not be remedied by additional requirements to code that are not followed.

- Massachusetts and Utah have deleted 210.8(F) from their adoption of the 2020 NEC recognizing the conflicts for inverter driven products. Similar actions to exclude this clause are being considered as adoption of the 2020 code moves forward in other States and jurisdictions.

Resolution of this issue will allow for continued adoption without exception as intended.
In summary, Lennox respectfully request that the Technical Committee approve the TIA and allow the HVAC and GFCI manufacturer the necessary time to harmonize standard and bring products into compliance without the adverse effects to consumers created by the current situation.

Regards,

Dave Winningham,
Sr. Engineering Manager, Regulatory Affairs
Hello,

I just wanted to voice my support of AHRI’s Tentative Interim Agreement (TIA) 1529 to National Electrical Code (NEC) 2020 (NFPA 70).

Due to leakage current inherent in inverter driven motors, GFCI protection is not compatible with current variable speed condensers produced by the manufacturers. Several of them agree that this will not work in the field.

I can appreciate and sympathize with the fatality that brought about this change. However, where else in the code do we design for multiple concurrent failure modes (metal enclosure that was not grounded AND became live)?

Joe Larson
Senior Development Engineer
Daikin Applied
| www.DaikinApplied.com

I apologize for the confusion, yes TIA 1564.

Thanks,

Joe Larson
Senior Development Engineer
Daikin Applied

Mr. Larson,
This will acknowledge receipt of your comment on Proposed TIA No. 1564 to NFPA 70. At the end of the Public Comment period, April 28, 2021, it will be forwarded to the NEC Panel 3 and Correlating Committee members for review and then to the Standards Council for consideration.

Just so we are on the same page, you meant TIA #1564, correct? In your email message it says TIA #1529, for NFPA 70.

Rosanne
Please accept the attached supplemental comments in support of proposed TIA No. 1564.

These comments specifically address concerns raised by the Technical and Correlating committees during their committee votes.

We encourage the committee members to reconsider any negative votes and to vote in favor of the TIA No. 1564 as this is urgently needed in the industry to avoid unwanted issues relating to inverter-driven HVAC equipment.

Regards,

Robert

Robert Glass
Manager, State Regulatory Affairs
Goodman Manufacturing Company, L.P.
A member of Daikin group
12680 Lock 15 Road
Tuscaloosa, AL 35406
April 28, 2021

Mrs. Dawn Michele Bellis
Director and NFPA Standards Council Secretary
National Fire Protection Association
1 Batterymarch Park
Quincy, MA 02169-7471

Subject: Supplemental Comments on Proposed TIA 1564 on NFPA 70
(sent by e-mail to TIAs_Errata_FIs@nfpa.org)

Dear Mrs. Bellis,

Goodman is submitting these comments to address negative comments on Proposed TIA No. 1564 from committee members, Reference: 210.8(F) regarding the 2020 National Electrical Code – NFPA 70®.

Goodman is a member of Daikin Group, one of the largest heating, ventilation, and air conditioning manufacturers in the world. Goodman is headquartered in Houston, Texas, and employs thousands of workers across the United States. The company manufactures residential and light commercial heating and cooling equipment, and its products are sold and installed by contractors in every American state, as well as in Canada.

Some negative comments received during the committee vote noted prior agreement with the proposal for TIA No. 1529, but were voting no on TIA No. 1564 since the scope had been expanded. I would like to point out that the TIA No. 1564 proposal simply provided more clarification than was provided in the original TIA No. 1529 to help avoid confusion in the field and for the committee but made NO CHANGE to the requirement that the TIA only applied to products “employing power conversion equipment as a means to control compressor speed.”

- TIA No. 1564 added “ducted or” in response to mini-split HVAC equipment because mini-split products are available BOTH as ducted and ductless – this was done for clarification.

- TIA No. 1564 added “multi-split” as clarification that mini-split products can be installed with multiple indoor units using a single outdoor unit and these are often referred to as “multi-split”. The clarification was spelled out to avoid any more possible confusion in the field.
• TIA No. 1564 added “including variable refrigerant flow (VFR), variable air volume (VAV), and other HVAC” purely as clarification for “and other HVAC” which was employed in TIA No. 1529.

• The parts that are the same between TIA No. 1529 and TIA No. 1564 include statements around units employing power conversion equipment as a means to control compressor speed. This is the functionality of HVAC equipment that has created the emergency issue that TIA No. 1564 is intended to address and resolve.

• Even though “or water heating units” was added in the TIA No. 1564 and would expand the scope, Goodman would support a modification to eliminate this portion of the proposed TIA No. 1564 if this would allow the TIA to be approved for further consideration by the Standards Committee.

As such, we urge all committee members to reconsider their votes and approve proposed TIA No. 1564 as it urgently needed in the marketplace for inverter-driven HVAC equipment.

If you have any questions regarding this information and our recommendations, please do not hesitate to contact myself or Rusty Tharp, Senior Director of Regulatory Affairs at either (713) 263-5906 or rusty.tharp@goodmanmfg.com.

Sincerely,

Robert S. Glass
Manager, State Regulatory Affairs
From: Glass, Robert S. <
Sent: Wednesday, April 28, 2021 9:53 PM
To: Shared TIAS
Cc: Tharp, Rusty
Subject: Additional Supplemental Comment #2 from Goodman Manufacturing Company - Re: TIA No. 1564
Attachments: Goodman Supplemental Comments #2 - 2020 NEC TIA No. 1564 - Final - 4-28-21.pdf

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

Attached are additional supplemental comments that we would like to submit to address committee member negative vote comments.

Regards,

Robert

Robert Glass
Manager, State Regulatory Affairs
Goodman Manufacturing Company, L.P.
A member of Daikin group
12680 Lock 15 Road
Tuscaloosa, AL 35406
April 28, 2021

Mrs. Dawn Michele Bellis  
Director and NFPA Standards Council Secretary  
National Fire Protection Association  
1 Batterymarch Park  
Quincy, MA 02169-7471

Subject: Supplemental Comments #2 on Proposed TIA 1564 on NFPA 70  
(sent by e-mail to TIA_eErratas_Requests@nfpa.org)

Dear Mrs. Bellis,

Goodman is submitting additional supplemental comments to address negative comments on Proposed TIA No. 1564 from committee members, Reference: 210.8(F) regarding the 2020 National Electrical Code – NFPA 70®.

Goodman is a member of Daikin Group, one of the largest heating, ventilation, and air conditioning manufacturers in the world. Goodman is headquartered in Houston, Texas, and employs thousands of workers across the United States. The company manufactures residential and light commercial heating and cooling equipment, and its products are sold and installed by contractors in every American state, as well as in Canada.

One commenter noted that it is not an emergency nature in part because no one has asked to reduce energy efficiency requirements. It should be noted that energy efficiency requirements are set by the United States Department of Energy (10 CFR 430.32) and that federal statute (42 USC 6295(o)(1)) prohibits any revised standard that would “increase the maximum allowable energy use.” Therefore, manufacturers of inverter-driven HVAC equipment cannot ask for reduced energy efficiency.

As such, we urge all committee members to reconsider their votes and approve proposed TIA No. 1564 as it urgently needed in the marketplace for inverter-driven HVAC equipment.

If you have any questions regarding this information and our recommendations, please do not hesitate to contact myself or Rusty Tharp, Senior Director of Regulatory Affairs.
Sincerely,

Robert S. Glass  
Manager, State Regulatory Affairs
May 17, 2021

Secretary, Standards Council
National Fire Protection Association
1 Batterymarch Park
Quincy, MA 02169
(Submitted via email to TIAs_Errata_Fls@nfpa.org)

Re: Appeal of NFPA 70 Proposed Tentative Interim Amendment (TIA) No. 1564

Dear NFPA Standards Council Secretary,

The Air-Conditioning, Heating, and Refrigeration Institute (AHRI) and the Leading Builders of America (LBA) (the “Co-appellants”) respectfully submit this appeal in response to the Code-Making Panel 2 (CMP-2) and the Correlating Committee votes on NEC® Proposed Tentative Interim Amendment (TIA) No. 1564 dated May 12, 2021. The Co-appellants request that NFPA Standards Council overturn the actions of CMP-2 issue TIA No. 1564. Delaying implementation of requirements in Section 210.8(F) is reasonable and appropriate given that the change to NEC 2020 is disharmonized from safety standard requirements governing impacted heating/ventilating/air-conditioning (HVAC) equipment and water heating units employing power conversion equipment as a means to control compressor speed.

AHRI represents 332 air-conditioning, heating, and refrigeration equipment manufacturers. In North America, the annual output of the HVACR and water heating industry is worth more than $44 billion. In the United States, the industry supports 1.3 million jobs and $256 billion in economic activity annually.

Leading Builders of America (LBA) was founded in 2009 to provide the largest homebuilders in the United States with a direct voice in the policymaking process in Washington, combining their reach and expertise to address the key issues impacting the health of the industry. LBA’s 20 member companies are: Ashton Woods Homes; Beazer Homes; Brookfield Residential; David Weekley Homes; D.R. Horton; Hovnanian Enterprises; KBHome; Lennar Corporation; LGI Homes; MDC Holdings (Richmond American); Meritage Homes; M/I Homes; Perry Homes; PulteGroup; Shea Homes; Taylor Morrison; The Drees Companies; Toll Brothers; TRI Pointe Group; Woodside Homes. LBA members build in 34 states and the District of Columbia: Alabama, Arizona, California, Colorado, Delaware, District of Columbia, Florida, Georgia, Hawaii, Idaho, Illinois, Indiana, Iowa, Kentucky, Louisiana, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Nevada, New Jersey, New Mexico, North Carolina, Ohio, Oklahoma, Oregon, Pennsylvania, Rhode Island, South Carolina, Tennessee, Texas, Virginia, Washington, West Virginia, and Utah. LBA members produce a wide range of home types
including traditional single-family homes, townhomes, condominiums, apartments, retirement and second homes.

This appeal is filed in accordance with Section 1.6 of Regulations Governing the Development of NFPA Standards (Regs).

1. Name, affiliation, and address of the appellant

   Appellant: Laura Petrillo-Groh  
   Senior Regulatory Advisor  
   Air-Conditioning, Heating and Refrigeration Institute (AHRI)  
   2311 Wilson Blvd, Ste. 400  
   Arlington, VA 22201  

   Co-appellant: William Koffel on behalf of Leading Builders of America (LBA)  
   1455 Pennsylvania Avenue, NW  
   Suite 400 Washington, DC 20004

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

The Co-appellants request that NFPA Standards Council overturn the actions of CMP-2 and the Correlating Committee in the final ballot issued May 12, 2021, and issue TIA No. 1564. TIA No. 1564 meets NFPA’s criteria for both Technical Merit and Emergency Nature. The delay in implementing requirements in Section 210.8(F) for equipment employing certain compression control is necessary for both equipment and receptacle manufacturers to develop and implement changes to safety standards (both UL 943 and UL 60335-2-40) for products. While some products covered by this new requirement may work, there is no assurance without appropriate revisions to leakage current limitations and associated text in the product and component standards, that all listed (certified) products will operate.

3. Argument setting forth the grounds for the Appeal

TIA No. 1564 seeks to delay implementation of the requirement for outdoor outlets for dwellings serving ducted or ductless mini-split and multi-split-type heating/ventilating/air-conditioning (HVAC) equipment, including variable refrigerant flow (VFR), variable air volume (VAV), and other HVAC, or water heating units employing power conversion equipment as a means to control compressor speed be installed on a circuit with ground-fault circuit-interrupter (GFCI) protection. Similar to TIA No. 1529, TIA No. 1564 simply provided more clarification than was provided in the original TIA No. 1529. The clarification was intended to help avoid confusion in the field and for the Committee. However, no changes were made to the requirement that the TIA only applied to products “employing power conversion equipment as a means to control compressor speed.” Even though “or water heating units” was added in TIA No. 1564 and would expand the scope, the compressor’s power conversion technology is the same as for the HVAC equipment included in the scope. Logically, such equipment would suffer the same incompatibility with GFCI’s causing nuisance and repeat tripping observed in HVAC equipment.
The Co-appellants contend that TIA No. 1564 meets NFPA’s criteria for both Technical Merit and Emergency Nature. However, business interests of certain CMP-2 members prevailed over the logic presented in the TIA.

**Technical Merit**

Regarding Technical Merit, TIA No. 1564 proposes to resolve a conflict between the safety standards for inverter-driven HVAC and water heating (WH) products and the 2020 NEC. Today, in the market, most HVAC products available are installed using outdoor outlets certified to the UL 1995 product safety standard for air conditioners and heat pumps. The UL 1995 standard does not include leakage current testing requirements for equipment other than cord-connected products. The UL 1995 standard will be withdrawn by UL and be replaced by UL/CSA 60335-2-40.

UL/CSA 60335-2-40 does have leakage testing requirements – allowing up to 10 mA for HVAC products in applications covered by 2020 NEC 210.8(C). Compliance with UL/CSA 60335-2-40 is not mandatory until January 1, 2024. A UL 60335-2-40 working group has been formed to investigate alternate proposals, including ground integrity confirmation. The requested extension to January 1, 2023 is appropriate while the product safety standard committee conducts its work. AHRI notes that the 10 mA limit in leakage required by UL 60335-2-40 is a level that would not cause significant harm to or loss of human life.¹

AHRI member companies have investigated the leakage currents and found that inverter-driven products at 60 Hz do not exceed the 6 mA maximum leakage current threshold as specified in UL 943. However, at frequencies above 60 Hz, leakage current exceeding 6 mA have been measured. UL 943 Standards Technical Panel (STP) is in the process of studying with potential modification to UL 943 to address permissible leakage current as a function of frequency.

In AHRI’s investigation, heat pumps (HP) manufactured by three companies paired with GFCI’s manufactured by at least two different companies resulted in nuisance tripping. The issue is agnostic to manufacturer. While incidents cited are only mini-split HPs, the physics causing nuisance tripping would be the same for any products containing power conversion equipment, hence the request to include additional products within the scope of delayed compliance. All these products comply with relevant safety standards, noted above. Any changes proposed by the working group of UL 60335-2-40 investigating nuisance tripping will apply to all products requested in proposed TIA 1564.

GFCI’s must also comply with the 60 Hz testing requirement in UL 943. There are no requirements for these products to be tested at higher frequencies. GFCI’s from different manufacturers clearly react differently at frequencies other than 60 Hz, as observed that nuisance tripping is agnostic of GFCI manufacturer. The delay in implementation of the requirement until January 1, 2023 will also help GFCI manufacturers investigate product reaction at frequencies other than 60 Hz and interactions with inverter-driven equipment.

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Emergency Nature

Regarding Emergency Nature, TIA No. 1564 meets Section 5.4(f) of the Regs. Proposed TIA No. 1564, “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.” Without this TIA, Authorities Having Jurisdiction (AHJs) and consumers are forced to choose between compliance and an operational system for heating and/or air-conditioning. Consumers experiencing these nuisance trips relying on this equipment for their only or primary source of heating or cooling. Tripping of the GFCI breakers could result in dangerous conditions for people in cold or hot weather.

As noted in the CDC article cited in the proposed TIA No. 1564, “During 2004–2018, an average of 702 heat-related deaths occurred in the United States annually.”² No CMP-2 member acknowledged or responded to this known hazard caused by implementation of Section 210.8(F) in ballot responses. TIA No. 1564 cited a CDC report noting 10,527 heat-related deaths in a 15 year period (702/year), or 6,220 deaths where heat was the primary factor (414/year). That CDC report states the following, “Past studies have demonstrated a relationship between ambient temperatures and mortality (8). In particular, extreme heat exposure can exacerbate certain chronic medical conditions, including hypertension and heart disease (4,5). In addition, medications that are typically used to treat these chronic medical conditions such as beta-blockers, diuretics, and calcium-channel blockers, can interfere with thermoregulation and result in a reduced ability to respond to heat stress (5).”³ These statistics are significant and if this code conflict is not corrected, increase this summer.

The country is just entering the first cooling season since NEC 2020 has been in effect in jurisdictions. In the past few weeks technicians in jurisdictions with NEC 2020 in effect had to have additional people on call just to handle the sheer volume of calls resulting from tripping experienced on installations where the GFCI breaker installed for the air-conditioner. Upon arrival, technicians responding to these calls noted the GFCI breaker for the AC has tripped, reset the breaker, and note the AC is running. The pattern has been for a repeat call a few hours later that the AC has again stopped working. Many homeowners are reporting the breaker tripping two to four times every 24 hours. A technician has reported that after returning to a home on the second or third time in the same day, the breaker is no longer able to be reset. In many cases, the HVAC technician requests that the homeowner call an electrician. Upon arrival, the electrician cannot find any issues with the breaker. This code conflict has been a challenge for electricians as well. HVAC technicians are reporting frustration from homeowners and the constant nuisance-tripping calls delaying technicians from responding to true emergency calls for no cooling. AHRI understands that the loss of life cited as the reason for including this provision was the result of an incorrect installation, a situation that would not be remedied by additional requirements to code that was not being followed.⁴ However, given the significant loss of life

https://www.cdc.gov/mmwr/volumes/69/wr/pdfs/mm6924a1-H.pdf
³ Id.
⁴ “An electrical fire occurred in the basement of defendant Miller’s residence at 7259 S. Seeley Ave., Chicago, on August 15, 2005. General contractor Service Construction Co. was retained to repair the property damage, and deft Chicago Edison Electrical & Lighting Co. was hired as the electrical subcontractor. As part of the contracted work, Chicago Edison installed an electrical disconnect box that provided power to the home’s outdoor air-
recorded in the U.S. annually from heat-related deaths, the delay in implementing code changes to January 1, 2023 is appropriate.

We again note the many instances documented in TIA No. 1564 of field tripping of the GFCI breaker on HVAC units containing power conversion equipment. In these eight cases, the only solution was for the AHJ to approve a temporary allowance to install a non-GFCI breaker. Known instances of attempt to use GFCI breaker on products with inverter driven compressors, with only resolution to provide heating/cooling to residence by using non-GFCI breaker.

Lastly, there are two hurdles to effective enforcement of the new requirement in Article 210.8(F) of the 2020 NEC to require GFCIs on all outdoor outlets including those supplying HVAC equipment that speak to the emergency nature of a code change. First, existing listed equipment does not have leakage current measured as a required test during product certification, for the currently enforced listing standard (UL 1995). Second, the method of test defined to measure leakage current in the proposed new listing standard (UL 60335–2–40) does not reflect how GFCIs operate.

4. **Statement of the precise relief requested**

The Co-appellants request that NFPA Standards Council overturn the actions of CMP-2 and the Correlating Committee in the final ballot issued May 12, 2021, and issue TIA No. 1564.

5. **Whether a hearing on the appeal is being requested**

The Co-appellants request a hearing on this appeal. Manufacturers and home builders are compiling additional information on the frequency of incidents that support this appeal.

Thank you for considering this appeal. If you have any questions regarding this submission, please do not hesitate to contact us.

conditioning condenser unit. The repairs were completed on April 10, 2006. On August 3, 2007, 12-year-old Vontrell Pargo jumped over a fence onto Miller’s property and landed on the AC condenser unit. However, the condenser had an electrical ground fault which caused the unit’s outer metal housing to become electrified. Vontrell was fatally electrocuted when he simultaneously came into contact with both the condenser and the fence. The child was survived by his parents and one sibling. The estate contended Chicago Edison Electrical was negligent for failing to properly ground the disconnect box, improperly hooking up power to a non-functional air-conditioning unit, failing to turn the power off, and failing to inspect their work. The defense asserted the electrical work was properly performed, Chicago Edison had left the power to the AC unit off, and evidence indicated untrained third-parties had attempted repairs and created the dangerous condition.” (Source: [http://www.juryverdictreporters.com/LBPC/Files/JVR/Awards2015/files/assets/basic-html/page14.html](http://www.juryverdictreporters.com/LBPC/Files/JVR/Awards2015/files/assets/basic-html/page14.html))

It should also be noted that the house where the incident occurred was built in 1954 and would not be subject to Section 210.8(F) unless the branch circuit was extended or modified—which was unlikely. Therefore, the change to the code does not provide protection to older homes, such as the one where this incident happened. Source: [https://www.zillow.com/homes/7259-S-.Seeley-Ave,-Chicago_rb/4009997_zpid/](https://www.zillow.com/homes/7259-S-.Seeley-Ave,-Chicago_rb/4009997_zpid/)
Sincerely,

Laura Petrillo-Groh, PE  
Senior Regulatory Advisor, AHRI  
Direct: (703) 600-0335  
Email: LPetrillo-Groh@ahrinet.org

William Koffel on behalf of Leading Builders of America (LBA)  
Email: wkoffel@koffel.com
July 6, 2021

Secretary, Standards Council
National Fire Protection Association
1 Batterymarch Park
Quincy, MA 02169
(Submitted via email to TIAs_Errata_Fls@nfpa.org)

Re: Supplementary Info Supporting the Appeal of NFPA 70 Proposed Tentative Interim Amendment (TIA) No. 1564

Dear NFPA Standards Council Secretary,

The Air-Conditioning, Heating, and Refrigeration Institute (AHRI) and the Leading Builders of America (LBA) (the “Co-appellants”) respectfully submit this letter to support the May 17 appeal in response to the Code-Making Panel 2 (CMP-2) and the Correlating Committee votes on NEC® Proposed Tentative Interim Amendment (TIA) No. 1564. The additional data not only supports the Co-appellants request that NFPA Standards Council overturn the actions of CMP-2 issue TIA No. 1564. Delaying implementation of requirements in Section 210.8(F) is reasonable and appropriate given that the change to NEC 2020 is disharmonized from safety standard requirements governing impacted heating/ventilating/air-conditioning (HVAC) equipment and water heating units employing power conversion equipment as a means to control compressor speed. This additional data also supports the inclusion of single-stage HVAC equipment in delayed implementation.

AHRI represents 332 air-conditioning, heating, and refrigeration equipment manufacturers. In North America, the annual output of the HVACR and water heating industry is worth more than $44 billion. In the United States, the industry supports 1.3 million jobs and $256 billion in economic activity annually.

Leading Builders of America (LBA) was founded in 2009 to provide the largest homebuilders in the United States with a direct voice in the policymaking process in Washington, combining their reach and expertise to address the key issues impacting the health of the industry. LBA’s 20 member companies are: Ashton Woods Homes; Beazer Homes; Brookfield Residential; David Weekley Homes; D.R. Horton; Hovnanian Enterprises; KBHome; Lennar Corporation; LGI Homes; MDC Holdings (Richmond American); Meritage Homes; M/I Homes; Perry Homes; PulteGroup; Shea Homes; Taylor Morrison; The Drees Companies; Toll Brothers; TRI Pointe Group; Woodside Homes. LBA members build in 34 states and the District of Columbia: Alabama, Arizona, California, Colorado, Delaware, District of Columbia, Florida, Georgia, Hawaii, Idaho, Illinois, Indiana, Iowa, Kentucky, Louisiana, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Nevada, New Jersey, New Mexico, North
Carolina, Ohio, Oklahoma, Oregon, Pennsylvania, Rhode Island, South Carolina, Tennessee, Texas, Virginia, Washington, West Virginia, and Utah. LBA members produce a wide range of home types including traditional single-family homes, townhomes, condominiums, apartments, retirement and second homes.

Information from Houston-area builders shows a 30% tripping rate (based on 2721 homes built by seven different builders) for homes built under the 2020 NEC. Sixty-nine percent (69%) of the affected homes had single-stage compressor units. Refer to the table, below, for data collected from Houston. The coded GFCI and HVAC brand represent national brands that have been participating in resolving the field problems. This data is current as of June 14, 2021, and the collection process is ongoing in Houston, and other states.

**Incidence Rate of GFCI Nuisance Tripping HVAC Circuit**

**Houston Market built under 2020 NEC**

<table>
<thead>
<tr>
<th>Builder</th>
<th>Homes Constructed</th>
<th>Homes with GFCI Nuisance Trip</th>
<th>Total Homes Affected</th>
<th>Compressor Type</th>
<th>GFCI Brand</th>
<th>HVAC Brand</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Builder #1</td>
<td>26</td>
<td>73%</td>
<td>19</td>
<td>Single-speed</td>
<td>?</td>
<td>?</td>
<td>5/14/21</td>
</tr>
<tr>
<td>Builder #2</td>
<td>36</td>
<td>100%</td>
<td>36</td>
<td>?</td>
<td>?</td>
<td>?</td>
<td>5/14/21</td>
</tr>
<tr>
<td>Builder #3</td>
<td>280</td>
<td>32%</td>
<td>90</td>
<td>2-stage</td>
<td>A</td>
<td>X</td>
<td>5/14/21</td>
</tr>
<tr>
<td>Builder #4 vs</td>
<td>297</td>
<td>43% (127)</td>
<td>127</td>
<td>Variable speed</td>
<td>B</td>
<td>Y</td>
<td>6/11/21</td>
</tr>
<tr>
<td>Builder #5 ss</td>
<td>111</td>
<td>8% (9)</td>
<td>9</td>
<td>Single-speed</td>
<td>B</td>
<td>Y</td>
<td>6/11/21</td>
</tr>
<tr>
<td>Builder #6</td>
<td>302</td>
<td>3%</td>
<td>9</td>
<td>Single-speed</td>
<td>?</td>
<td>?</td>
<td>5/14/21</td>
</tr>
<tr>
<td>Builder #7</td>
<td>1669</td>
<td>31% (516)</td>
<td>516</td>
<td>Single-speed</td>
<td>B</td>
<td>X</td>
<td>6/11/21</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>2721</strong></td>
<td><strong>30%</strong></td>
<td><strong>806</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

AHRI staff has collected data from our unitary manufacturers, table below. As of June 18, 2021, the majority of calls/issues attributed to GFCI nuisance tripping in jurisdictions adopting NEC 2020 without modification are occurring in single-stage split systems. These numbers are preliminary, as it will take time to determine how many “no-cooling” service calls are due to GFCI tripping issues and for that information to get back to the manufacturers. Experience shows that the tripping occurs across multiple HVAC manufacturers and breaker manufacturers. Data collection is continuing.

**Number of calls/issues attributed to GFCI nuisance tripping in jurisdictions adopting NEC 2020 without modification – June 17, 2021**

<table>
<thead>
<tr>
<th>Compressor Technology</th>
<th>System Type</th>
<th>Split System</th>
<th>Packaged Unit</th>
<th>Ductless Mini-Split</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single-Stage</td>
<td>100+</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Two-Stage</td>
<td>16</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Variable Speed</td>
<td>29</td>
<td>0</td>
<td>35</td>
<td></td>
</tr>
</tbody>
</table>

Additionally, AHRI members have reported that the GFCI performance interruption has occurred in Colorado, Illinois, Minnesota, Nebraska, Texas, and Washington. While the GFCI manufacturer is not
always known, incident reports included different breaker sizes of several different breaker manufacturers. Most calls and issues occurred in split-system equipment (80 percent of reported cases) – mostly with single-stage compressors. Ductless mini-split variable speed systems also reported this issue.

NFPA should also consider the number of states that have adopted NEC 2020 with modifications to 210.8(F) and the two TIAs that have been subsequently submitted to CMP-2 regarding this section. As reported on NFPA website, 11 states have adopted the 2020 edition of the NEC. Ten of those states have adopted a modification, or outright deletion, of 210.8(F) and one state, Minnesota, has submitted a TIA to modify this section.¹

This additional information supports the appeal, filed in accordance with Section 1.6 of Regulations Governing the Development of NFPA Standards (Regs), and supports changes to the relief requested.

**Statement of the precise relief requested**

The Co-appellants request that NFPA Standards Council overturn the actions of CMP-2 and the Correlating Committee in the final ballot issued May 12, 2021, and issue the change to Section 210.8(F) noted, below:

*Revise Section 210.8(F) to read as follows:*

¹ States with modifications to Section 210.8(F) to the 2020 NEC
- CO: The State Electrical Board granted a temporary variance to Section 210.8(F).
  https://content.govdelivery.com/accounts/CODORA/bulletins/2e613c2
- GA: Section 210.8(F) was deleted in an amendment after adoption
  https://files.constantcontact.com/9e67b5b9001/33a9c19e-9db5-477d-8527-b8cbd9d09910.pdf
  https://files.constantcontact.com/9e67b5b9001/690dc7c1-2c68-4b9b-a7fc-82a66ed5417b.pdf
- IA: Section 210.8(F) was deleted in an amendment after adoption
  https://dps.iowa.gov/divisions/electrical-examining-board/electrical-code-updates
- MA: GFCI protection was removed for outdoor, non-receptacle outlets during the adoption process.
  https://www.mass.gov/doc/527-cmr-12-massachusetts-electrical-code-amendments/download
- MN: An exception is provided for mini-split & A/C units with DC invertors, but nothing is posted for public view. The installer is required to fill out a form including information describing what the contractor has done to the resolve the issue. ND has a similar policy.
- ND: See MN.
  https://www.ndseb.com/
- OR: Section 210.8(F) was modified to only apply to outdoor receptacles for other than dwelling units.
- SD: Section 210.8(F) was not adopted with the 2020 NEC.
- TX: An emergency rule delayed the requirements of Section 210.8(F) effective May 20, 2021.
  https://www.tdlr.texas.gov/electricians/elec.htm
  https://www.tdlr.texas.gov/Agendas/Commagendas/agenda051821.htm
- WA: The state is delaying enforcement of Section 210.8(F) until January 1, 2023.
210.8 Ground-Fault Circuit-Interrupter Protection for Personnel. ...

(F) Outdoor Outlets. All outdoor outlets for dwellings, other than those covered in 210.8(A)(3), Exception to (3), that are supplied by single-phase branch circuits rated 150 volts to ground or less, 50 amperes or less, shall have ground-fault circuit-interrupter protection for personnel. This requirement shall become effective January 1, 2023, for heating/ventilating/air-conditioning (HVAC) equipment and for water heating units with power conversion equipment as a means to control compressor speed.

Thank you for considering the additional information and the revised relief requested to the appeal. If you have any questions regarding this submission, please do not hesitate to contact us.

Sincerely,

Laura Petrillo-Groh, PE
Senior Regulatory Advisor, AHRI
Direct: (703) 600-0335
Email: LPetrillo-Groh@ahrinet.org

William Koffel on behalf of Leading Builders of America (LBA)
Email: wkoffel@koffel.com
June 4, 2021

Report on TIA 1564 Appeal

The appeal to Standards Council of TIA No. 1564 has been received and reviewed by the Chair of CMP 2 David G. Humphrey. The Chair supports the panel’s action based on the vote of the technical committee and the issues to be detailed below and, recommends that the appeal be denied.

The technical committee vote was 9-5 in favor of support on the merits and 8-6 in support of the concept of the TIA being of an emergency nature. Neither met the 3/4 threshold needed to pass ballot.

The submitter of the TIA asserts the public input addressing the new section 210.8(F) should not have been acted upon favorably as the standard for this equipment (UL 1995) did not address the permissible leakage current threshold. This concept in effect would place a duty on the technical committee to initiate standards revision and wait for the revised standard to be adopted prior to acting upon new safety requirements in the form of public inputs. In essence this would put code development in a subordinate position to standards development.

A common theme among those voting in opposition to TIA 1564 is that ample time has passed to address the issue of leakage current at HVAC equipment. This issue has been on the table since January of 2018 which was the time of the 2020 NEC first revision meeting in Hilton Head, SC., nearly 3 ½ years to date and the concept prior to that. The current standard UL 1995 is scheduled to sunset on January 1, 2024 and be replaced by (UL 60335-2-40) which is beyond the extension date requested by the submitter of TIA 1564. There is no evidence provided by the submitter that changes in the standard (UL 60355-2-40) will effectively address the issue of leakage current in excess of the GFCI breaker threshold. This TIA may be perceived as more of an attempt to “kick the can down the road” in hope of relief at the 2023 public comment stage or at the technical committee meeting than to resolve the technical issues at hand. Those technical committee members in opposition to the TIA also assert that 2020 NEC section 210.8(F) is an important safety requirement for which implementation delays could well result in additional electrical shock injury or electrocution.

Among the reasons of those in support of the TIA is the unenviable position in which code enforcement personnel are placed when unwanted tripping occurs at a piece of HVAC equipment due to leakage current in excess of the GFCI breaker trip threshold. The assertion by the submitter that on a new install the inspector may be forced to choose between code compliance or an installation that works, albeit at a reduced level of safety is not without merit. Additional concerns of local and state governmental agencies taking action to address this issue could result in the exclusion of the GFCI safety protection that section 210.8(F) affords at the state or local level long after this issue of unwanted tripping is resolved.

Sincerely,

David G. Humphrey
Chair CMP 2
NFPA 70®-2020 Edition
National Electrical Code®
TIA Log No.: 1573
Reference: 520.21
Comment Closing Date: June 2, 2021
Submitter: Steven Terry, Electronic Theatre Controls, Inc.
www.nfpa.org/70

1. Revise Section 520.21 to read as follows:

520.21 General. Fixed stage switchboards shall comply with 520.21(1) through (4), (5):
(1) Fixed stage switchboards shall be listed.
(2) Fixed stage switchboards shall be readily accessible but shall not be required to be located on or adjacent to the stage. Multiple fixed stage switchboards shall be permitted at different locations.
(3) A fixed stage switchboard shall contain overcurrent protective devices for all branch circuits supplied by that switchboard.
(4) A fixed stage switchboard shall be permitted to supply both stage and non-stage equipment.
(5) Fixed stage switchboards shall comply with the marking and working space requirements in 408.18(C) but shall not be required to comply with the load terminal location requirements in 408.18(C)(1), (C)(2), and (C)(3).

Substantiation: 408.18(c) 1, 2, and 3 were added to the NEC in the 2020 edition. The purpose of these sections was to minimize the risk of shock and/or arc flash when making or modifying connections to an energized switchboard. Typical listed stage switchboards covered by 520.21 are high-density units containing dead-front dimmer or relay modules that plug onto busbars and load circuit connectors. They are not general-purpose switchboards, but special-purpose switchboards covered by the UL334 Outline of Investigation for Theater Lighting Distribution and Control Equipment. This document in turn requires certain, but not all, portions of the UL891 Standard for Switchboards to be applied to these devices.

1. The listing conditions of these devices prohibit work of any kind on connections while the switchboard is energized. This prohibition is part of the warnings and instructions for the switchboard.
2. From a practical point of view, the construction of these units does not physically allow for wiring changes while energized due to their high density of busbars and load connections.
3. Even if it were practically possible or allowed by the switchboard listing, which it is not, there is no plausible use case for a stage switchboard where work on connections would be required while the switchboard remained energized.
4. There is no practical way to modify the design of these products to comply with 408.18(C) 1, 2, and 3.
5. Similar constructions from multiple manufacturers have been in safe use for more than 40 years. None of these constructions could likely comply with 408.18(C) 1, 2, or 3. Those requirements are aimed at general-purpose switchboards and their use cases that require modification of connections while the switchboard is energized. Such use cases do not apply to stage switchboards.
**Emergency Nature:** The proposed TIA intends to correct a circumstance in which the revised NFPA Standard has resulted in an adverse impact on a product or method that was inadvertently overlooked in the total revision process or was without adequate technical (safety) justification for the action.

Driven by sections 408.18(C) 1, 2, and 3 in the 2020 edition, clause 8.8.2.3.14 of the UL891 Standard for Switchboards has been modified to create new construction requirements for switchboards to match those of 408.18(C) 1, 2, and 3. UL is now conducting an Industry File Review to verify compliance with this clause. Products that are unable to comply will have their listings withdrawn. This will mean that most, if not all, currently manufactured stage switchboards will no longer be able to be manufactured and will no longer be available to the market. This will have a large negative impact on occupancies covered by article 520.
MEMORANDUM

TO: Code-Making Panel 15
FROM: Sarah Caldwell, Committee Administrator
DATE: June 16, 2021
SUBJECT: NEC® Proposed TIA No. 1573 FINAL TC BALLOT RESULTS

The public comment circulation has passed, therefore, according to Section 5.6(a) in the NFPA Regs, the final results show this TIA HAS achieved the ¾ majority vote needed on both Ballot Item No. 1 (Technical Merit) and Ballot Item No. 2 (Emergency Nature).

21 Eligible to Vote
2 Not Returned (Dagenais, Dozier)

<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>18 Agree (w/comment: Savage, Sr.)</td>
<td>18 Agree (w/comment: Rock, Savage, Sr.)</td>
</tr>
<tr>
<td>1 Disagree (Finen)</td>
<td>1 Disagree (Finen)</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.
   
   \[21 \text{ eligible} \div 2 = 10.5 = (11)\]

2. The number of affirmative votes needed to satisfy the ¾ requirement is 15.
   
   \((21 \text{ eligible to vote} - 2 \text{ not returned} - 0 \text{ abstentions} = 19 \times 0.75 = 14.25)\)

Ballot comments are attached for your review.

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

**Appeal Closing Date** for this TIA is **June 21, 2021**.
NEC CMP-15 TIA 1573 Ballot Final Report
Election:70_A2022_NEC_P15_Log1573_tiaballot
Results by Revision

**QUESTION NO. 1: I AGREE with the TECHNICAL MERITS of the Proposed TIA Log No. 1573 to Revise Section 520.21.**

Eligible to Vote: 21
Not Returned: 2
David A. Dagenais, Matthew B. Dozier

<table>
<thead>
<tr>
<th>Vote Selection</th>
<th>Votes</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agree</td>
<td>18</td>
<td></td>
</tr>
</tbody>
</table>

- Lawrence E. Todd: Agree
- Gary A. Beckstrand: I AGREE with the TECHNICAL MERITS of the Proposed TIA Log No. 1573 to Revise Section 520.21.
- Walter N. Vernon, IV: Agree
- Mitchell K. Hefter: Agree
- Michael L. Savage, Sr.: I agree with the merits based on my response under TIA 1574.
- Stephen M. Lipster: Agree
- James C. Seabury III: Agree
- Wendy L. Russell: Agree
- Edwin S. Kramer: Agree
- Mark R. Hilbert: Agree
- Chad Kennedy: Agree
- Kevin T. Porter: Agree
- Brian E. Rock: Agree
- Chad E. Beebe: Agree
- Pamela Gwynn: agree
- Bernie Donnie Bell: AGREE
- Don Rabel: I agree
- Michael D. Skinner: I agree.
The new requirements in 408.18 affect several types of switchboards that have been on the market for decades. The change to 408.18 was a necessary improvement to safety and this suggested amendment to those improvements will reduce safety. The requirements of 408.18 (C) apply whether energized or not energized as shown in 408.18(C)(2). Without interlocking or other means there is no assurance these stage switchboards will be worked on de-energized.

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

<table>
<thead>
<tr>
<th>Vote Selection</th>
<th>Votes</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agree</td>
<td>18</td>
<td></td>
</tr>
</tbody>
</table>

- Lawrence E. Todd: A,F
- Gary A. Beckstrand: I AGREE that the subject is of an EMERGENCY NATURE for one or more of the reasons noted in the Instructions box.
- Walter N. Vernon, IV: A.
- Mitchell K. Hefter: F
- Michael L. Savage, Sr.: I agree with the merits based on my response under TIA 1574.
- Stephen M. Lipster: 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.
- James C. Seabury III: Agree
- Wendy L Russell: F
Edwin S. Kramer: A. The standard contains an omission that was overlooked during the regular revision process.

Mark R. Hilbert: A.

Chad Kennedy: A.

Kevin T. Porter: 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.

Brian E. Rock: 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, including related end-product standards.

Chad E. Beebe: 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.

Pamela Gwynn: agree

Bernie Donnie Bell: A and E.

Don Rabel: I agree

Michael D. Skinner: 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.

Disagree: 1

Chris M. Finen: There is insufficient substantiation provided to show why there are design limitations with stage switchboards to comply with the new safety enhancements in 408.18(C) (1),(2), and (3) and that this change is emergency in nature. The product standards are setting the requirements and all switchboards should comply with these new safety upgrades.

Abstain: 0
MEMORANDUM

TO: NEC® Correlating Committee

FROM: Sarah Caldwell, Committee Administrator

DATE: June 16, 2021

SUBJECT: NEC® Proposed TIA No. 1573 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).

12 Eligible to Vote
2 Not Returned (Gallo, Williams)

<table>
<thead>
<tr>
<th>Correlation Issues:</th>
<th>Emergency Nature:</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 Abstentions</td>
<td>0 Abstentions</td>
</tr>
<tr>
<td>10 Agree</td>
<td>10 Agree (w/comment: Kendall)</td>
</tr>
<tr>
<td>0 Disagree</td>
<td>0 Disagree</td>
</tr>
</tbody>
</table>

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

\[12 \text{ eligible} \div 2 = 6 + 1 = (7)\]

(2) The number of affirmative votes needed to satisfy the ¾ requirement is 8.

\[(12 \text{ eligible to vote} - 2 \text{ not returned} - 0 \text{ abstentions} = 10 \times 0.75 = 7.5)\]

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 June 21, 2021.
QUESTION NO. 1: I AGREE there are no CORRELATION ISSUES in accordance with 3.4.2 and 3.4.3 of the NFPA Regs.

Eligible to Vote: 12  
Not Returned : 2  
Ernest J. Gallo, David A. Williams

<table>
<thead>
<tr>
<th>Vote Selection</th>
<th>Votes</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agree</td>
<td>10</td>
<td>Palmer L. Hickman Agree, Michael J. Johnston Agree, John R. Kovacik Agree, Roland E. Deike, Jr. AGREED, Chad Kennedy Agree, David L. Hittinger Agree, Christine T. Porter agree, Richard A. Holub Agree, Dean C. Hunter I agree there are no CORRELATION issues in accordance with 3.4.2 and 3.4.3 of the NFPA Regulations.</td>
</tr>
</tbody>
</table>

Disagree 0  
Abstain 0

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

Eligible to Vote: 12  
Not Returned : 2
<table>
<thead>
<tr>
<th><strong>Vote Selection</strong></th>
<th><strong>Votes</strong></th>
<th><strong>Comments</strong></th>
</tr>
</thead>
</table>
| **Agree**         | 10        | Palmer L. Hickman: Agree  
|                   |           | Michael J. Johnston: F     
|                   |           | John R. Kovacik: F        
|                   |           | Roland E. Deike, Jr.: A   
|                   |           | Chad Kennedy: F           
|                   |           | David L. Hittinger: A and F |
| Christine T. Porter: 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. |
| **Disagree**      | 0         | Richard A. Holub: A       
|                   |           | Dean C. Hunter: The proposed TIA intends to correct a circumstance in which the revised NFPA Standard has resulted in an adverse impact on a product that was inadvertently overlooked in the revision process. |
|                   |           | David H. Kendall: 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, including related end-product standards. |
| **Abstain**       | 0         |
Foran, Rosanne

Subject: FW: Comment on Proposed TIA 1573 on NFPA 70

From: Reynaldo Trevino
Sent: Saturday, May 22, 2021 12:56 PM
To: Foran, Rosanne <rforan@NFPA.org>
Subject: Re: Comment on Proposed TIA 1573 on NFPA 70

opposing the specific words mentioned below

Reynaldo Trevino

On Friday, May 21, 2021, 06:09:11 PM CDT, Foran, Rosanne <rforan@NFPA.org> wrote:
Mr. Trevino,
This will acknowledge receipt of your comment on Proposed TIA No. 1573 to NFPA 70. At the end of the Public Comment period, June 2, 2021, it will be forwarded to the NEC Panel 15 and NEC Correlating Committee members for review, and then to the Standards Council for consideration.
Just so we are on the same page, you are opposing this TIA? Or supporting it?
Thank you.
~ Rosanne
Regards,
Rosanne Foran
Standards Operations Coordinator | NFPA

---

From: Reynaldo Trevino
Sent: Wednesday, May 19, 2021 9:55 AM
To: Shared TIAs <STIAs@nfpa.org>
Cc: Reynaldo Trevino
Subject: Comment on Proposed TIA 1573 on NFPA 70

"shall not be required to be located on or adjacent to the stage."

This change above on TIA 1573, Reference: 520.21, needs some rationale. There may be safety issues that require panel next to stage. Delete if no rationale.

Reynaldo M Trevino, P.E.
Foran, Rosanne

From: Michael Lay  
Sent: Wednesday, April 21, 2021 10:50 AM  
To: Shared TIAs  
Subject: Comment on Proposed TIA 1573 on NFPA 70

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

To whom it may concern:

I would like to register a comment in favor of the adoption of TIA 1573.

While the addition of 408.18(c) 1, 2, and 3 to the 2020 edition of the NEC was an improvement in advancing the issue of life safety of energized general-purpose switchboards, its overly broad requirements causes an unintentional challenge when applied against the special purpose switchboards (dead-front dimmer/relay banks) that are used for Theatrical Lighting distribution in staged performances, concerts, touring shows, and other live performances.

These dead-front dimmer/relay banks have had an outstanding safety record spanning many decades, and the highly-specialized construction (and associated operations and maintenance documentation) prohibits an end user, maintenance electrician or other qualified personnel from making any wiring changes while this special purpose switchboard is energized.

Sadly, there is also no practical way to modify the design of these products to comply with the language associated in 408.18(c) 1, 2, and 3.

Unless this TIA is adopted, a large percentage of performance facilities everywhere will have their dead-front dimmer/relay banks listings withdrawn which would cause them to cease operations, without any safety improvement whatsoever being achieved.

I would respectfully request the adoption of TIA 1573. Thank you.

Michael Lay  
System Designer  
Candela Controls, Inc.  
751 Business Park Blvd #101  
Winter Garden, FL 34787

Member, ESTA Electrical Power Working Group

The information transmitted (including attachments) is covered by the Electronic Communications Privacy Act, 18 U.S.C. 2510-2521, is intended only for the person(s) or entity/entities to which it is
From: Karl G. Ruling  
Sent: Friday, April 23, 2021 6:05 PM  
To: Shared TIAs  
Subject: Comment on TIA Log 1573, Reference: 520.21

I am writing in support of Mr. Terry’s proposed TIA on Article 520.21, TIA log 1573. The high density dimmer and relay racks currently used in Article 520 occupancies cannot be modified to comply with 408.18(C) 1, 2, and 3. The current design of these units has not been found to be a safety problem in the field, and they have been in use for over four decades.

The requirements of 408.18(C) 1, 2, or 3 seem to be aimed at general-purpose switchboards and their use cases that require modification of connections while the switchboard is energized. Such use cases do not apply to stage switchboards.

Best regards,  
Karl G. Ruling  
Senior Technical Standards Manager  
Technical Editor, Protocol  
ESTA  
271 Cadman Plaza  
P.O. Box 23200  
Brooklyn, NY 11202-3200  
USA
I recommend acceptance of the proposed language in the referenced TIA document for Section 520.21.

The referenced devices have been in safe usage for well over 40 years in current and previous designs with no harmful or deadly effect to the users. The non-continuous use of the equipment by users, due to scheduling of shows and activities in the facility, provides more than ample opportunity for the equipment to be de-energized for proper and safe work when maintenance is required. The current article would provide an undo burden on the equipment manufacturer for a condition that does not exist, and would delist all of the current equipment on the market. It would further impact the market in an un-necessary redesign and relisting of all the currently available equipment, impacting current and future projects, for an issue that is managed and controlled by current procedures and standards.

Bill Ellis, President
NFPA 70®-2020 Edition

National Electrical Code®

TIA Log No.: 1574
Reference: 520.53

Comment Closing Date: June 2, 2021

Submitter: Steven Terry, Electronic Theatre Controls, Inc.
www.nfpa.org/70

1. Revise Section 520.53 to read as follows:

**520.53 Construction.** Portable stage switchboards shall be listed and shall comply with 520.53(A) through (E). The load terminal location requirements in 408.18(C)(1), (C)(2), and (C)(3) shall not apply to portable stage switchboards.

**Substantiation:** 408.18(c) 1, 2, and 3 were added to the NEC in the 2020 edition. The purpose of these sections was to minimize the risk of shock and/or arc flash when making or modifying connections to an energized switchboard. Typical listed stage switchboards covered by 520.21 are high-density units containing dead-front dimmer or relay modules that plug onto busbars and load circuit connectors. They are not general-purpose switchboards, but special-purpose switchboards covered by the UL334 Outline of Investigation for Theater Lighting Distribution and Control Equipment. This document in turn requires certain, but not all, portions of the UL891 Standard for Switchboards to be applied to these devices.

1. The listing conditions of these devices prohibit work of any kind on connections while the switchboard is energized. This prohibition is part of the warnings and instructions for the switchboard.
2. From a practical point of view, the construction of these units does not physically allow for wiring changes while energized due to their high density of busbars and load connections.
3. Even if it were practically possible or allowed by the switchboard listing, which it is not, there is no plausible use case for a stage switchboard where work on connections would be required while the switchboard remained energized.
4. There is no practical way to modify the design of these products to comply with 408.18(C) 1, 2, and 3.
5. Similar constructions from multiple manufacturers have been in safe use for more than 40 years. None of these constructions could likely comply with 408.18(C) 1, 2, or 3. Those requirements are aimed at general-purpose switchboards and their use cases that require modification of connections while the switchboard is energized. Such use cases do not apply to stage switchboards.

**Emergency Nature:** The proposed TIA intends to correct a circumstance in which the revised NFPA Standard has resulted in an adverse impact on a product or method that was inadvertently overlooked in the total revision process or was without adequate technical (safety) justification for the action.
Driven by sections 408.18(C) 1, 2, and 3 in the 2020 edition, clause 8.8.2.3.14 of the UL891 Standard for Switchboards has been modified to create new construction requirements for switchboards to match those of 408.18(C) 1, 2, and 3. UL is now conducting an Industry File Review to verify compliance with this clause. Products that are unable to comply will have their listings withdrawn. This will mean that most, if not all, currently manufactured stage switchboards will no longer be able to be manufactured and will no longer be available to the market. This will have a large negative impact on occupancies covered by article 520.
MEMORANDUM

TO: Code-Making Panel 15

FROM: Sarah Caldwell, Committee Administrator

DATE: June 16, 2021

SUBJECT: NEC® Proposed TIA No. 1574 FINAL TC BALLOT RESULTS

The public comment circulation has passed, therefore, according to Section 5.6(a) in the NFPA Regs, the final results show this TIA HAS achieved the ¾ majority vote needed on both Ballot Item No. 1 (Technical Merit) and Ballot Item No. 2 (Emergency Nature).

21 Eligible to Vote
2 Not Returned (Dagenais, Dozier)

<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>18 Agree (w/comment: Savage, Sr.)</td>
<td>18 Agree (w/comment: Rock, Savage, Sr.)</td>
</tr>
<tr>
<td>1 Disagree (Finen)</td>
<td>1 Disagree (Finen)</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.

[21 eligible ÷ 2 = 10.5 = (11)]

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

(21 eligible to vote - 2 not returned - 0 abstentions = 19 × 0.75 = 14.25)

Ballot comments are attached for your review.

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

Appeal Closing Date for this TIA is June 21, 2021.
NEC CMP-15 TIA 1574 Ballot Final Report
Election:70_A2022_NEC_P15_Log1574_tiaballot
Results by Revision

**QUESTION NO. 1: I AGREE with the TECHNICAL MERITS of the Proposed TIA Log No. 1574 to revise Section 520.53.**

<table>
<thead>
<tr>
<th>Eligible to Vote: 21</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not Returned : 2</td>
</tr>
<tr>
<td>David A. Dagenais, Matthew B. Dozier</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Vote Selection</th>
<th>Votes</th>
<th>Comments</th>
</tr>
</thead>
</table>
| Agree          | 18    | Lawrence E. Todd: Agree  
|                |       | Gary A. Beckstrand: I AGREE with the TECHNICAL MERITS of the Proposed TIA Log No. 1574 to Revise Section 520.53.  
|                |       | Walter N. Vernon, IV: Agree  
|                |       | Mitchell K. Heftner: Agree  
|                |       | Michael L. Savage, Sr.: As these types of switchboard are normally operated and maintained by qualified industry professionals I agree with the merits.  
|                |       | Stephen M. Lipster: Agree  
|                |       | Wendy L Russell: Agree  
|                |       | Edwin S. Kramer: Agree  
|                |       | Mark R. Hilbert: Agree  
|                |       | Chad Kennedy: Agree  
|                |       | Kevin T. Porter: Agree  
|                |       | Brian E. Rock: Agree  
|                |       | Chad E. Beebe: agree  
|                |       | James C. Seabury III: Agree  |
The new requirements in 408.18 affect several types of switchboards that have been on the market for decades. The change to 408.18 was a necessary improvement to safety and this suggested amendment to those improvements will reduce safety. The requirements of 408.18 (C) apply whether energized or not energized as shown in 408.18(C)(2). Without interlocking or other means there is no assurance these stage switchboards will be worked on de-energized.

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

<table>
<thead>
<tr>
<th>Eligible to Vote: 21</th>
<th>Not Returned : 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>David A. Dagenais, Matthew B. Dozier</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Vote Selection</th>
<th>Votes</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agree</td>
<td>18</td>
<td>A,F</td>
</tr>
<tr>
<td>Lawrence E. Todd</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gary A. Beckstrand</td>
<td>I AGREE that the subject is of an EMERGENCY NATURE for one or more of the reasons noted in the Instructions box.</td>
<td></td>
</tr>
<tr>
<td>Walter N. Vernon, IV</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td>Mitchell K. Hefter</td>
<td>F</td>
<td></td>
</tr>
<tr>
<td>Name</td>
<td>Response</td>
<td></td>
</tr>
<tr>
<td>---------------------------</td>
<td>----------</td>
<td></td>
</tr>
<tr>
<td>Michael L. Savage, Sr.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stephen M. Lipster</td>
<td>The proposed TIA intends to correct a circumstance in which the revised NFPA Standard has resulted in an adverse impact on a product or method that was inadvertently overlooked in the total revision process or was without adequate technical (safety) justification for the action.</td>
<td></td>
</tr>
<tr>
<td>Wendy L Russell</td>
<td>F</td>
<td></td>
</tr>
<tr>
<td>Edwin S. Kramer</td>
<td>'A&quot;</td>
<td></td>
</tr>
<tr>
<td>Mark R. Hilbert</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td>Chad Kennedy</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td>Kevin T. Porter</td>
<td>F. The proposed TIA intends to correct a circumstance in which the revised NFPA Standard has resulted in an adverse impact on a product or method that was inadvertently overlooked in the total revision process or was without adequate technical (safety) justification for the action.</td>
<td></td>
</tr>
<tr>
<td>Brian E. Rock</td>
<td>Comments: 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, including related end-product standards.</td>
<td></td>
</tr>
<tr>
<td>Chad E. Beebe</td>
<td>The proposed TIA intends to correct a circumstance in which the revised NFPA Standard has resulted in an adverse impact on a product or method that was inadvertently overlooked in the total revision process or was without adequate technical (safety) justification for the action.</td>
<td></td>
</tr>
<tr>
<td>James C. Seabury III</td>
<td>Agree</td>
<td></td>
</tr>
<tr>
<td>Bernie Donnie Bell</td>
<td>A and E</td>
<td></td>
</tr>
<tr>
<td>Michael D. Skinner</td>
<td>F. The proposed TIA intends to correct a circumstance in which the revised NFPA Standard has resulted in an adverse impact on a product or method that was inadvertently overlooked in the total revision process or was without adequate technical (safety) justification for the action.</td>
<td></td>
</tr>
<tr>
<td>Don Rabel</td>
<td>Agree</td>
<td></td>
</tr>
</tbody>
</table>
Pamela Gwynn
Disagree 1

Chris M. Finen
There is insufficient substantiation provided to show why there are design limitations with stage switchboards to comply with the new safety enhancements in 408.18(C) (1),(2), and (3) and that this change is emergency in nature. The product standards are setting the requirements and all switchboards should comply with these new safety upgrades.

Abstain 0
MEMORANDUM

TO: NEC® Correlating Committee

FROM: Sarah Caldwell, Committee Administrator

DATE: June 16, 2021

SUBJECT: NEC® Proposed TIA No. 1574 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).

12 Eligible to Vote
  2 Not Returned (Gallo, Williams)

<table>
<thead>
<tr>
<th>Correlation Issues:</th>
<th>Emergency Nature:</th>
</tr>
</thead>
<tbody>
<tr>
<td>0   Abstentions</td>
<td>0   Abstentions</td>
</tr>
<tr>
<td>10  Agree</td>
<td>10  Agree (w/comment: Kendall)</td>
</tr>
<tr>
<td>0   Disagree</td>
<td>0   Disagree</td>
</tr>
</tbody>
</table>

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

\[12 \text{ eligible} \div 2 = 6 + 1 = (7)\]

(2) The number of affirmative votes needed to satisfy the ¾ requirement is 8.

\[12 \text{ eligible to vote} - 2 \text{ not returned} - 0 \text{ abstentions} = 10 \times 0.75 = 7.5\]

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 June 21, 2021.
NEC CC TIA 1574 Ballot Final
Election:70_A2022_NEC_AAC_Log1574_Ballot
Results by Revision

**QUESTION NO. 1: I AGREE there are no CORRELATION ISSUES in accordance with 3.4.2 and 3.4.3 of the NFPA Regs.**

<table>
<thead>
<tr>
<th>Eligible to Vote: 12</th>
<th>Not Returned: 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ernest J. Gallo, David A. Williams</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Vote Selection</th>
<th>Votes</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agree</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Palmer L. Hickman</td>
<td>Agree</td>
<td></td>
</tr>
<tr>
<td>Michael J. Johnston</td>
<td>No correlation issues</td>
<td></td>
</tr>
<tr>
<td>John R. Kovacik</td>
<td>Agree</td>
<td></td>
</tr>
<tr>
<td>Roland E. Deike, Jr.</td>
<td>AGREE</td>
<td></td>
</tr>
<tr>
<td>Chad Kennedy</td>
<td>Agree</td>
<td></td>
</tr>
<tr>
<td>David L. Hittinger</td>
<td>Agree</td>
<td></td>
</tr>
<tr>
<td>Christine T. Porter</td>
<td>agree</td>
<td></td>
</tr>
<tr>
<td>Richard A. Holub</td>
<td>Agree</td>
<td></td>
</tr>
<tr>
<td>Dean C. Hunter</td>
<td>I agree there are no CORRELATION issues in accordance with 3.4.2 and 3.4.3 of the NFPA Regulations.</td>
<td></td>
</tr>
<tr>
<td>David H. Kendall</td>
<td>Agree, there is not a Correlating Issue.</td>
<td></td>
</tr>
<tr>
<td>Disagree</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Abstain</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>
QUESTION NO. 2: I AGREE that the subject is of an EMERGENCY NATURE for one or more of the reasons noted in the Instructions box.

Eligible to Vote: 12
Not Returned: 2
Ernest J. Gallo, David A. Williams

<table>
<thead>
<tr>
<th>Vote Selection</th>
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</thead>
<tbody>
<tr>
<td>Agree</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Palmer L. Hickman</td>
<td></td>
<td>Agree</td>
</tr>
<tr>
<td>Michael J. Johnston</td>
<td></td>
<td>F</td>
</tr>
<tr>
<td>John R. Kovacik</td>
<td></td>
<td>F</td>
</tr>
<tr>
<td>Roland E. Deike, Jr.</td>
<td></td>
<td>A</td>
</tr>
<tr>
<td>Chad Kennedy</td>
<td></td>
<td>F</td>
</tr>
<tr>
<td>David L. Hittinger</td>
<td></td>
<td>A and F</td>
</tr>
<tr>
<td>Christine T. Porter</td>
<td></td>
<td>F</td>
</tr>
<tr>
<td>Richard A. Holub</td>
<td></td>
<td>A</td>
</tr>
<tr>
<td>Dean C. Hunter</td>
<td></td>
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</tbody>
</table>

The proposed TIA intends to correct a circumstance in which the revised NFPA Standard has resulted in an adverse impact on a product that was inadvertently overlooked in the revision process.

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>David H. Kendall</td>
<td></td>
<td>F</td>
</tr>
</tbody>
</table>

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, including related end-product standards.

| Disagree | 0 |
| Abstain  | 0 |
To whom it may concern:

I would like to register a comment in favor of the adoption of TIA 1574.

While the addition of 408.18(c) 1, 2, and 3 to the 2020 edition of the NEC was an improvement in advancing the issue of life safety of energized general-purpose switchboards, it's overly broad requirements causes an unintentional challenge when applied against the special purpose switchboards (dead-front dimmer/relay banks) that are used for Theatrical Lighting distribution in staged performances, concerts, touring shows, and other live performances.

These dead-front dimmer/relay banks have had an outstanding safety record spanning many decades, and the highly-specialized construction (and associated operations and maintenance documentation) prohibits an end user, maintenance electrician or other qualified personnel from making any wiring changes while this special purpose switchboard is energized.

Sadly, there is also no practical way to modify the design of these products to comply with the language associated in 408.18(c) 1, 2, and 3.

Unless this TIA is adopted, a large percentage of performance facilities everywhere will have their dead-front dimmer/relay banks listings withdrawn which would cause them to cease operations, without any safety improvement whatsoever being achieved.

I would respectfully request the adoption of TIA 1574. Thank you.

Michael Lay
System Designer
Candela Controls, Inc.
751 Business Park Blvd #101
Winter Garden, FL 34787

Member, ESTA Electrical Power Working Group

The information transmitted (including attachments) is covered by the Electronic Communications Privacy Act, 18 U.S.C. 2510-2521, is intended only for the person(s) or entity/entities to which it is addressed and may contain confidential and/or privileged material. Any review, re-transmission,
I am writing in support of Mr. Terry's proposed TIA Log No.: 1574, Reference: 520.53.

408.18(c) 1, 2, and 3 were added to the NEC in the 2020 edition. The purpose of these sections was to minimize risks when making or modifying connections to an energized switchboard. Typical listed stage switchboards are high-density units containing dead-front dimmer or relay modules plugged onto busbars and load circuit connectors. The listing conditions of these devices prohibit work of any kind on connections while the switchboard is energized. This prohibition is part of the warnings and instructions for the switchboard. They are not general-purpose switchboards, but special-purpose switchboards.

Best regards,
Karl G. Ruling
Senior Technical Standards Manager
Technical Editor, Protocol
ESTA
271 Cadman Plaza
P.O. Box 23200
Brooklyn, NY 11202-3200
USA
I recommend acceptance of the proposed language in the referenced TIA document for Section 520.23.

The referenced devices have been in safe usage for well over 40 years in current and previous designs with no harmful or deadly effect to the users. The non-continuous use of the equipment by users, due to scheduling of shows and activities in the facility, provides more than ample opportunity for the equipment to be de-energized for proper and safe work when maintenance is required.

Further, this equipment is portable in design, with means for disconnection of power, loads, and control, allowing for the equipment in question to be removed from operation and replaced, then allowing for the equipment to be serviced in a full de-energized condition.

The current article would provide an undo burden on the equipment manufacturer for a condition that does not exist, and would delist all of the current equipment on the market. It would further impact the market in an un-necessary redesign and relisting of all the currently available equipment, impacting current and future projects, for an issue that is managed and controlled by current procedures and standards.

Bill Ellis, President

Florida Certified Limited Energy Contractor ES0000320
Georgia Low Voltage Contractor LVG105206
Mississippi Communication Systems and Low Voltage Electrical Contractor 21589-SC
New Jersey Telecommunications Limited Wiring Exemption 1358
Tennessee S-Low Voltage Controls 00067946
Louisiana Commercial 62615
Alabama Low Voltage S-52769

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NFPA 70®-2020 Edition
National Electrical Code®
TIA Log No.: 1589
Reference: Section 210.8(F)
Comment Closing Date: July 19, 2021
Submitter: Dan Buuck, National Association Home Builders, and Clayton Traylor, Leading Builders of America
www.nfpa.org/70

1. Revise Section 210.8(F) to read as follows:

210.8 Ground-Fault Circuit-Interrupter Protection for Personnel. …
(F) Outdoor Outlets. All outdoor outlets for dwellings, other than those covered in 210.8(A)(3), Exception to (3), that are supplied by single-phase branch circuits rated 150 volts to ground or less, 50 amperes or less, shall have ground-fault circuit-interrupter protection for personnel. This requirement shall become effective January 1, 2023, for heating/ventilating/air-conditioning (HVAC) equipment.

Substantiation: GFCI protection was expanded in the 2020 NEC without HVAC component and equipment safety standards being harmonized with GFCI amperage limits. Currently the UL standard that HVAC equipment is listed to (UL 1995) has no requirements for leakage current if the unit is hard wired, as most residential air conditioners/heat pumps are. In the future, HVAC equipment will be listed to UL 60335-2-40, which sets a limit of 10 milliamps of leakage current. However, this new standard is not mandatory until 1/1/2024. UL 943 is the standard to which GFCI breakers are listed and are required to trip at 5 milliamps of current. Even if HVAC equipment is listed to the UL 60335-2-40 standard, there is no guarantee it will be compatible with UL listed GFCI breakers. This lack of coordination is what is leading to the nuisance tripping that customers are dealing with.

Until both equipment and component standards are updated, designers, installers, AHJs, and consumers are forced to choose between an NEC 2020 compliant installation or an operational installation. In jurisdictions that have adopted 2020 NEC with 210.8(F) intact, there have been numerous instances of field tripping of the GFCI breaker on ductless mini splits, units containing power conversion equipment, and on many single-stage units.

In his negative ballot on Second Revision 7676 (NFPA 70-2018) Mark Hilbert noted “it is unknown if AC units will operate on a GFCI protected circuit as sufficient testing has not been conducted to answer this question. What if the AC unit is in an area where there is high humidity and hot conditions and the GFCI trips when the owners are not present for extended periods of time? This can result in interior property damage and unhealthy conditions from mold, etc.” Several of the negative ballots, including Mr. Hilbert’s, also noted that the reported incidents that were the basis for the new requirement were a set of very specific unfortunate circumstances that might not be prevented had GFCI protection been installed.
The effects of this new requirement in the 2020 edition of the code has come to light over the past 1 to 2 weeks with the first hot/humid weather in Texas. Leading Builders of America (LBA) has collected the following data over the past couple days.

- Builder A has indicated a 73% failure rate (GFCI breaker tripping) for non-mini-split, non-variable speed systems. In other words, 100% of Builder A’s failures are on single-speed conventional cooling systems.
- Builder B has 36 homes where the HVAC system is operational. 100% of those homes have experienced a circuit trip. All of Builder B’s failures are on single-stage systems. They currently have 10 open warranty tickets for closed (occupied) units where the circuit is tripping consistently, leaving the homeowners with effectively no HVAC.

TIA No. 1564 was recently balloted and was unable to pass on both the technical merit and emergency nature. Some of the negative ballots suggested that the language proposed had issues that could create confusion for compliance and enforcement. Those language issues have been addressed in this proposed TIA. Some negative ballots also suggested limiting the application to power conversion technology. Unfortunately, recent incident experience has indicated that the problem is more widespread. It should be abundantly clear that the proposed change in this TIA has both technical merit and is desperately needed at this time. Being at the beginning of the heating season, we have only seen the tip of the iceberg of the problems that this TIA can solve.

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

The 2020 CDC report *Heat-Related Deaths – United States, 2004-2018* (https://www.cdc.gov/mmwr/volumes/69/wr/pdfs/mm6924a1-H.pdf) states, “During 2004–2018, an average of 702 heat-related deaths occurred in the United States annually.” The report states the following on p732, “Past studies have demonstrated a relationship between ambient temperatures and mortality (8). In particular, extreme heat exposure can exacerbate certain chronic medical conditions, including hypertension and heart disease (4,5). In addition, medications that are typically used to treat these chronic medical conditions such as beta-blockers, diuretics, and calcium-channel blockers, can interfere with thermoregulation and result in a reduced ability to respond to heat stress (5).” [Emphasis added]. These statistics are significant and if this code conflict is not corrected, will increase this summer.

It is clear that the tripping of the breakers constitutes a dire safety issue for all new construction in hot regions where electrical systems are being installed according to the 2020 edition of the NEC. Without this TIA, designers, installers, AHJs, and consumers are forced to choose between a compliant or an operational installation. This incompatibility is happening in a very large number of installations and is causing extreme economic duress for those involved to resolve these issues as well as for new homeowners, who must keep resetting the breaker to maintain healthy humidity and temperature levels in the home.
Anyone may submit a comment by the closing date indicated above. Please identify the TIA number and forward to the Secretary, Standards Council.
MEMORANDUM

TO: Code-Making Panel 2

FROM: Sarah Caldwell, Committee Administrator

DATE: July 28, 2021

SUBJECT: NEC® Proposed TIA No. 1589 FINAL TC BALLOT RESULTS

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

<table>
<thead>
<tr>
<th>Technical Merit:</th>
<th>Emergency Nature:</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 Abstentions</td>
<td>1 Abstentions (Cook)</td>
</tr>
<tr>
<td>6 Agree (w/comment: Humphrey, Lujan)</td>
<td>5 Agree (w/comment: Humphrey, Johnson, Lujan)</td>
</tr>
<tr>
<td>7 Disagree (Campolo, Cook, Domitrovich, El-Sherif, Manche, Pavese, Reyes)</td>
<td>7 Disagree (Campolo, Domitrovich, El-Sherif, Manche, McCamish, Pavese, Reyes)</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.

\[15 \text{ eligible} \div 2 = 7.5 = (8)\]

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

- **Technical Merit:** (15 eligible to vote - 2 not returned - 0 abstentions = 13 × 0.75 = 9.75 = 10)
- **Emergency Nature:** (15 eligible to vote - 2 not returned - 1 abstentions = 12 × 0.75 = 9)

Ballot comments are attached for your review.

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

**Appeal Closing Date** for this TIA is **August 2, 2021**.
QUESTION NO. 1: I AGREE with the TECHNICAL MERITS of the Proposed TIA Log No. 1589 to Revise Section 210.8(F).

Eligible to Vote: 15
Not Returned: 2

Thomas L. Harman, Mathher
Abbassi

<table>
<thead>
<tr>
<th>Vote Selection</th>
<th>Votes</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agree</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>John McCamish</td>
<td></td>
<td>Agree.</td>
</tr>
<tr>
<td>David G. Humphrey</td>
<td></td>
<td>Though GFCI protection is an important safety feature for exterior HVAC, equipment technology and standards have not caught up with the requirement that section 210.8(F) puts forth. Documented cases of unwanted tripping are occurring in areas that have adopted the 2020 edition of the NEC. This places a burden on the enforcement community when an installation experiences unwanted tripping resulting in the loss of HVAC equipment operation. Enforcing the code as written and thus requiring GFCI protection on the HVAC outlet may well result in an inoperable heating and cooling system. This invites tampering in order to make the system operational and invites local and state authority meddling with the requirements of section 210.8(F) and perhaps the requirements of 210.8 overall. The prudent course of action would be to provide the reasonable delay this TIA requests in order to solve this technical issue and allowing GFCI protection for this equipment to be instituted in the near future.</td>
</tr>
<tr>
<td>Charles L. Boynton</td>
<td>Agree</td>
<td></td>
</tr>
<tr>
<td>David W. Johnson</td>
<td>Agree</td>
<td></td>
</tr>
</tbody>
</table>
Cesar Lujan

This TIA is preferable to TIA 1593, because it offers the solution necessary to deal with the GFCI tripping issues that have been recorded in connection with single-stage condenser units. Information from Houston-area builders shows a 30% tripping rate (based on 2721 homes built by seven different builders). 69% of the affected homes had single-stage compressor units. AHRI has collected data from Colorado, Illinois, Minnesota, Nebraska, Texas, and Washington on 180 calls with GFCI nuisance tripping. Of those cases, 56% involved single-stage compressor units. These numbers are preliminary, as it will take time to determine how many “no-cooling” service calls are due to GFCI tripping issues and for that information to get back to the manufacturers. Experience shows that the tripping occurs across multiple HVAC manufacturers and breaker manufacturers. This TIA is limited to 18 months before reverting back to the original 2020 NEC language. This limited delay will give the manufacturers time to work on the compatibility issue and, in the meantime, offer relief to installers, code enforcement, and home occupants. UL 60335-2-40, the standard for electrical heat pumps, air-conditioners and dehumidifiers, formed a team of industry experts to determine a solution to the incompatibility issue. There are promising options that are actively under evaluation, and the team is working on providing an update to the standard.

Fred Neubauer

Agree

Disagree

7

Steve Campolo

There are some HVAC products that do not contain features that trip GFCI’s. Alternative equipment exists.

Alan Manche

TIA 1589 seeks to remove GFCI protection from all HVAC units which has not been substantiated. The substantiation points to two home builders having 100 percent failure of HVAC installations tripping GFCI protection on conventional single-speed units. Without further information, this could point to a serious systemic concern in the installation with potential safety concerns. This TIA eliminates electrical protection on HVAC systems well beyond those with documented and requested areas of relief by the HVAC industry. The HVAC industry has consistently requested and supported language to delay protection on units with power conversion equipment until January 1, 2023. Unfortunately, the proposed language in TIA 1589 eliminates GFCI protection from HVAC installations where NEC CMP-2 acted on substantiation due to a child being electrocuted.

Christopher J. Pavese

Technical substantiation was not provided to support this TIA
Thomas A. Domitrovich

It is inaccurate to conclude from the substantiation provided with the TIA that there is a compatibility issue or even a GFCI failure issue. The detailed review of those installations may demonstrate an electrical installation issue or that the HVAC system has a systemic issue. If there are concerns with respect to single stage units, documentation should be provided. NEMA continues to insist upon remedy to the known loss-of-life due to electrocutions resulting from general permissive allowances in the Code.

Frederick P. Reyes

UL continues to support the application of GFCI protection while recognizing the need to align operational attributes of utilization equipment. There are currently existing and new installations where ground fault protected branch circuits effectively supply mini-split HVAC equipment as well as variable speed drive (VSD) loads such as 240Vac VSD pool pumps. While some loads of this type have worked without issue, it is acknowledged that not all mini-splits-type HVAC equipment can operate within the limits of GFCI’s and additional work is needed to address this issue. For these reasons, UL supported TIA’s 1529, 1564, and 1593. TIA 1589 would pause 210.8(F) for ALL HVAC equipment until January 2023. The substantiation cites situations that were observed “over the past 1 to 2 weeks of the first hot/humid weather”. The data provided did not indicate that the installations had been investigated to determine the cause of the tripping if the interruption is attributed to overcurrent protection, ground fault interruption, or some other. This is in contrast to the more researched and documented issues with HVAC equipment with VSD technologies. Until the issue is better documented and understood, UL does not support the expansion of the “exception” beyond that noted in the other TIA’s.

Mark Daniel Cook

The language is too broad. Not every unit is an issue

Nehad El-Sherif

The substantial provide does not justify the exemption of some HVAC units (e.g., single-stage AC) that have leakage current lower than GFCIs threshold and are know to be compatible with GFCIs with no interoperability issues.

Abstain

0
QUESTION NO. 2: I AGREE that the subject is of an EMERGENCY NATURE for one or more of the reasons noted in the Instructions box.

<table>
<thead>
<tr>
<th>Vote Selection</th>
<th>Votes</th>
<th>Comments</th>
</tr>
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<tbody>
<tr>
<td>Agree</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>David G. Humphrey</td>
<td></td>
<td>The cases of unwanted tripping are occurring now. This TIA should be acted upon as of an emergency nature for the reasons detailed in support of the TIA.</td>
</tr>
<tr>
<td>Charles L. Boynton</td>
<td></td>
<td>F</td>
</tr>
<tr>
<td>David W. Johnson</td>
<td></td>
<td>A. The standard contains an omission that was overlooked during the regular revision process. CMP 2 should have enacted a post date for the enforcement of Section 210.8(F) to give the industry time to harmonize all equipment and safety standards to ensure a compliant installation of an operational system for the end user.</td>
</tr>
<tr>
<td>Cesar Lujan</td>
<td></td>
<td>Some parts of the country may not be seeing tripping associated with single-stage compressor units yet, but it is to be expected that these issues will proliferate as the summer continues. And the danger of heat exposure will increase, as well. The current requirement in 210.8(F) can easily cause a much greater health issue than the one the panel was attempting to fix. The CDC states that heat-related deaths are one of the deadliest weather-related health outcomes in the United States and that air-conditioning is the number one protective factor against heat-related illness and death (<a href="http://www.cdc.gov/pictureofamerica/pdfs/Picture_of_America_Heat-Related_Illness.pdf">www.cdc.gov/pictureofamerica/pdfs/Picture_of_America_Heat-Related_Illness.pdf</a>). Older adults and people with chronic medical conditions need reliable air conditioning (<a href="http://www.cdc.gov/disasters/extremeheat/specificgroups.html">www.cdc.gov/disasters/extremeheat/specificgroups.html</a>). They are more likely to take prescription medicines that affect the body’s ability to control its temperature or sweat. People with a chronic medical condition are more likely to have conditions that are risk factors for heat-related illness. Relief is needed now. The highest number of heat-related deaths are reported during July and August.</td>
</tr>
<tr>
<td>Fred Neubauer</td>
<td></td>
<td>Agree</td>
</tr>
</tbody>
</table>

Eligible to Vote: 15
Not Returned: 2
Thomas L. Harman, Mathher Abassi
Steve Campolo: There are some HVAC products that do not contain features that trip GFCI’s. Alternative equipment exists. Also, it was reported that certain energy saving rules created the need for motor controls that cause the leakage current. No efforts or requests to postpone the energy saving rules have been submitted. Temporarily using energy inefficient equipment would keep the life savings GFCI provision intact at the price of more energy usage. Additionally, after learning (from a representative of the submitters) at the time of this TIA, there is no solution. With no solution and hoping an acceptable one will be developed; how can 2023 compliance be assured? Further, it was explained that should TIA1589 fail and TIA1593 pass, the submitters will still pursue an appeal on TIA 1589. Motor speed control can be accomplished with other than pulse width modulated techniques.

John McCamish: The scope of this TIA is too broad in application to all HVAC units. The issue that was reported is limited to those units with variable speed drives. See TIA 1593.

Alan Manche: The proposed TIA would potentially have an adverse impact on electrical safety and increase the electrical hazard based on the substantiation acted on by NEC CMP-2 during the development of the 2020 NEC.

Christopher J. Pavese: An Emergency Nature was not established.

Thomas A. Domitrovich: Evidence of a widespread issue to more than a few specific models was not demonstrated by the proposed TIA1589 submitter. Further, the extent of this TIA goes well beyond the scope of previously submitted and failed TIAs 1529 and 1564, now to ALL HVAC equipment, was not adequately substantiated.

Frederick P. Reyes: N/A

Nehad El-Sherif: The requirements in 210.8(F) were introduced in response to an incident involving the death of a child due to electrocution by an outdoor AC unit. The proposed language (if approved) will exempt all HVAC units from GFCI protection, thus compromising safety.

Abstain: 1

Mark Daniel Cook: I disagree that this requires immediate attention
MEMORANDUM

TO: NEC® Correlating Committee

FROM: Sarah Caldwell, Committee Administrator

DATE: July 28, 2021

SUBJECT: NEC® Proposed TIA No. 1589 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 NOT achieved the ¾ majority vote needed on both Ballot Item No. 1 (Correlation Issues) and Ballot Item No. 2 (Emergency Nature).

<table>
<thead>
<tr>
<th>Eligible to Vote</th>
<th>Not Returned</th>
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<tbody>
<tr>
<td>12</td>
<td>0</td>
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</table>

**Correlation Issues:**
- 0 Abstentions
- 11 Agree
- 1 Disagree (Hickman)

**Emergency Nature:**
- 0 Abstentions
- 4 Agree (w/comment: Ayer)
- 8 Disagree (Gallo, Hickman, Hunter, Johnston, Kendall, Kovacik, Manche, Porter)

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.

   \[12 \text{ eligible} \div 2 = 6 + 1 = 7\]

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

   \[(12 \text{ eligible to vote} - 0 \text{ not returned} - 0 \text{ abstentions} = 12 \times 0.75 = 9)\]

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 **August 2, 2021**.
NEC CC TIA No. 1589 Ballot Final
Election:70_A2022_NEC_AAC_Log1589_tiaballot
Results by Revision

QUESTION NO. 1: I AGREE there are no CORRELATION ISSUES in accordance with 3.4.2 and 3.4.3 of the NFPA Regs.

<table>
<thead>
<tr>
<th>Vote Selection</th>
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<tr>
<td><strong>Agree</strong></td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>Lawrence S. Ayer</td>
<td></td>
<td>Agree.</td>
</tr>
<tr>
<td>John R. Kovacik</td>
<td></td>
<td>Agree</td>
</tr>
<tr>
<td>Dean C. Hunter</td>
<td></td>
<td>I agree there are no correlation issues in accordance with 3.4.2 and 3.4.3 of the NFPA Regulations.</td>
</tr>
<tr>
<td>Michael J. Johnston</td>
<td></td>
<td>Agree</td>
</tr>
<tr>
<td>Alan Manche</td>
<td></td>
<td>Agree</td>
</tr>
<tr>
<td>Roger D. McDaniel</td>
<td></td>
<td>Agree</td>
</tr>
<tr>
<td>Richard A. Holub</td>
<td></td>
<td>Agree.</td>
</tr>
<tr>
<td>Ernest J. Gallo</td>
<td></td>
<td>I agree that there are no correlation issues</td>
</tr>
<tr>
<td>David H. Kendall</td>
<td></td>
<td>Agree there is not a Correlating Issue.</td>
</tr>
<tr>
<td>David A. Williams</td>
<td></td>
<td>Agree</td>
</tr>
<tr>
<td>Christine T. Porter</td>
<td></td>
<td>No correlation issues</td>
</tr>
<tr>
<td><strong>Disagree</strong></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Palmer L. Hickman</td>
<td></td>
<td>The ballot did not pass the Technical Committee ballot.</td>
</tr>
<tr>
<td><strong>Abstain</strong></td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>
QUESTION NO. 2: I AGREE that the subject is of an EMERGENCY NATURE for one or more of the reasons noted in the Instructions box.

Eligible to Vote: 12
Not Returned: 0

<table>
<thead>
<tr>
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<tbody>
<tr>
<td><strong>Agree</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lawrence S. Ayer</td>
<td>4</td>
<td>C. I agree that the subject is of emergency nature. However I would prefer TIA-1593 over this one since 1593 has almost unanimous support.</td>
</tr>
<tr>
<td>Roger D. McDaniel</td>
<td></td>
<td>A. The standard contains an error or an omission that was overlooked during the regular revision process.</td>
</tr>
<tr>
<td>Richard A. Holub</td>
<td></td>
<td>A</td>
</tr>
<tr>
<td>David A. Williams</td>
<td></td>
<td>A</td>
</tr>
<tr>
<td><strong>Disagree</strong></td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Palmer L. Hickman</td>
<td></td>
<td>The ballot did not pass the Technical Committee ballot for the emergency nature question.</td>
</tr>
<tr>
<td>John R. Kovacik</td>
<td></td>
<td>The proposed TIA could potentially have an adverse impact on electrical safety and should be handled through the normal code-change process.</td>
</tr>
<tr>
<td>Dean C. Hunter</td>
<td></td>
<td>I would agree that the emergency nature is apparent for some types/models of HVAC equipment, but not all HVAC equipment as indicated in the TIA.</td>
</tr>
<tr>
<td>Michael J. Johnston</td>
<td></td>
<td>The Code Panel disposition is affirmative with TIA 1593 which deals with the same issue. This vote aligns with that of CMP-2.</td>
</tr>
<tr>
<td>Alan Manche</td>
<td></td>
<td>The proposed language eliminates electrical protection on HVAC systems that extends well beyond the substantiated concerns found across industry proposed TIAs 1529, 1564, and 1593.</td>
</tr>
<tr>
<td>Ernest J. Gallo</td>
<td></td>
<td>I do not believe this is of emergency nature</td>
</tr>
<tr>
<td>David H. Kendall</td>
<td></td>
<td>Disagree. Evidence of a widespread issue to more than a few specific models was not demonstrated by the proposed TIA 1589 submitter. Further, the extent of this TIA goes well beyond the scope of previously submitted and failed TIAs 1529 and 1564 now to ALL HVAC equipment was not adequately substantiated.</td>
</tr>
<tr>
<td>Christine T. Porter</td>
<td></td>
<td>the substantiation did not support emergency designation</td>
</tr>
<tr>
<td><strong>Abstain</strong></td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>
From: Matt Hermanson  
Sent: Friday, June 18, 2021 1:36 PM  
To: Shared TIs  
Subject: Comment on Proposed TIA 1589 on NFPA 70

The addition of 210.8(F) in the 2020 was a reaction to the tragic death of a child in Chicago. The child was running through the yard and made contact with the shell of the condensing unit while a fault to the frame/shell was taking place.

However, most people are not taking into account a very important point that differentiates the wiring methods used in Chicago and many of the suburbs versus the wiring methods used in the majority of the country.

In the greater Chicagoland area much of the residential built environment was built with EMT rather than NM cable because of local code requirements. And as a result, much of this built environment uses the EMT raceway as the equipment grounding conductor.

I understand that the flexible whip used from the premise wiring system to the condensing unit was broken. As a result, the condensing unit circuit no longer had a working equipment grounding conductor. If the condensing unit circuit had the benefit of a complete working equipment grounding conductor, raceway-type or wire-type, the overcurrent protective device should have opened long before the child wandered into the yard in the first place.

GFCI devices do not last forever. GFCI devices are rarely, if at all, tested as directed by their manufacturers. Yes, 230.67 now requires a listed SPD for each service. The installation of a listed SPD should help the various GFCI devices survive events that typically shorten their life. But since any old POS SPD that meets the listing requirements makes an installation compliant with 230.67, that is a very flimsy hook to hang your hat on. Remember that since 90% of the SPD market is 100% price driven, 90% of the SPD's available are designed to a price point rather than a performance or endurance point.

Just requiring a wire-type equipment grounding conductor from the condensing unit all the way back to the service equipment and electrically connected to the main bonding jumper would provide a far more robust safety scheme for the hazard experienced by the child in Chicago that 210.8(F) is based upon. Yes, the addition of even the cheapest SPD should help all GFCI devices survive for a longer period of time than without a SPD installed. But even the best SPD will not enable a GFCI device to be more robust than a wire-type equipment grounding conductor.

210.8(F) as written in the 2020 NEC is a feel-good reaction, at best, to the Chicago tragedy.

How many elderly people are you willing to allow to die during extreme heat events to justify this weak attempt to prevent another one-time tragedy?

How many more KwHrs are you willing to waste because customers must now choose non-VRF equipment rather more-efficient VRF equipment?

210.8(F) as written, makes no logical sense what-so-ever.

Matthew Hermanson
I believe the TIA should be rejected for a number of reasons.

1) I have seen no claims that all brands of HVAC equipment have this deficiency. If some brands show excessive noise or leakage current, market forces will encourage them to reduce the problem to where they don't cause nuisance tripping.

2) I have seen claims in one or two trade forums that this problem is not experienced with at least one major modern listed brand of GFCI CB. Unless the calibration of that brand violates the specifications in UL 943, this means several things:
   
a) the amount of leakage or noise causing these nuisance trips is not that extreme, and thus should be correctable; and
   
b) if necessary, until that is done, dwellings utilizing other loadcenter brands should be able to solve the problem with electromechanical feeders serving GFCI disconnects that will not nuisance-trip.

3) Most important, putting off the requirement risks additional electrocutions. Given the first two points, referring to heat-related deaths resulting from failure of equipment does not justify giving manufacturers extra seasons' passes before they product compliant equipment that will prevent both heat deaths and electrocutions, according to design EE's I've consulted. If shunting incoming noise to a drain is the only way a particular piece of equipment can protect its electronics, they can select other options. They might even specify a three-wire circuit and not shunt noise to ground, but instead float the MOV or other protective device and connect it to a multiwire-type GFCI's neutral. This would allow the equipment ground to serve as a path for fault current.

4) Putting off the requirement till 2023 does not force all HVAC manufacturers to operate on the more-level playing field that might be created by the 2024 edition of the UL standard, even if it is published on time and successfully resolves this problem by harmonizing the product standard with the Code--and the NEC cannot make safety contingent on the possibility of that happening.

I am writing for myself, for Robert Welborne, P.E., and for Karl Mirpanah, P.E.

David E. Shapiro
I described these comments I submitted as representing myself, Robert Welborne, and Karl Mirpanah. We stand by them. It turns out that they in fact represent the full Executive Board of the George Washington Chapter, IAEI, including Michael M. Thomas, whose response had not gotten to me yesterday.

To emphasize this: we represent our chapter, not the international organization.

Cordially,

David
Comment No. 1
SUPPORT w/comment

210.8 HVAC Ground-Fault Circuit (F) Outdoor Outlets. All dwelling outdoor outlets shall have ground-fault circuit-interrupter protection capabilities; Effective January 1, 2023, for HVAC equipment excluding items in 210.8(A)(3), Exception to (3). Applicable to grounded single-phase branch circuits rated 150 volts or less and 50 amperes or less.

Rationale: Admin, make it readable. Say what is important first with details on 2nd or 3rd sentence. Acronyms are already mentioned there is only one HVAC no need to spell it out NFPA. Is his protection for personnel or anyone that comes in contact? No need to state what GFCI does here. Reduced 62 words to 47 words, keep it short if possible. Title may be off since not sure what comes before 210.8

Reynaldo M Trevino, P.E.
It seems as though the manufacturers of the HVAC equipment are producing equipment with leakage current higher than what a GFCI trip settings are. This would indicate that there is leakage current that is unacceptable and dangerous to life safety. The problem is not the GFCI but the equipment. There is no need to delay the requirement. The manufacturer’s need to produce equipment that is safe.
Commenting in support of TIA 1589.

John Eckert  
The CT Group  
900 Montgomery Street  
Laurel, MD 20707
Hello,

I am submitting the attached letter on behalf of the Independent Electrical Contractors. We do not support TIA 1589.

Thank you,

David Hittinger
Director of Codes and Standards
Independent Electrical Contractors
June 9, 2021

Dawn Bellis, Secretary NFPA Standards Council:

The Independent Electrical Contractors does not support TIA 1589. The TIA proposes a delay in the implementation of the requirements for all air-conditioning equipment citing that the revised code has resulted in an adverse impact on the electrical installations for air conditioning equipment that will not remain operational when supplied with ground fault circuit interrupter (GFCI) type circuit breaker. As written in the 2020 National Electrical Code, the GFCI requirement applies to all outdoor outlets for dwellings, other than those covered in 210.8(A)(3), exception to (3), that are supplied by single-phase branch circuits rated 150 volts to ground or less, 50 amperes or less.

The evaluative language in the substantiation focuses the on the GFCI requirement for all outdoor air-conditioning outlets. GFCI protection does work on some air-conditioning equipment. GFCI protection is specifically designed to protect people against shock from an electrical system by monitoring the imbalance of current between conductors of a given circuit. The substantiation language of the TIA indicates that the equipment in question does indeed have a current imbalance. Equipment manufacturers should be encouraged to actively pursue corrective measures to eliminate the current imbalance.

We do not support the delay in the requirement that would apply to all air-conditioning equipment.

Sincerely,

David Hittinger

Director of Codes and Standards
Good day,

I am writing in support of the TIA as it would provide relief from the current GFCI requirement in 210.8(F) for circuits supplying outdoor air conditioning, heating and ventilating equipment. As a member of CMP-2 at the time, I voted against this requirement as I felt that sufficient testing had not taken place to assure there would not be unnecessary tripping of the GFCI device. Unnecessary tripping can lead to unsafe conditions. Besides the effects high heat of the summer season can have on individuals in many areas of the country, what if the AC unit is in an area where there is high humidity coupled with hot conditions and the GFCI trips when the owners are not present for extended periods of time? This can result in interior property damage and unhealthy conditions from mold, etc.

Placing an effective date of January 1, 2023 will provide time to do additional testing and, if necessary, a further effective date in the 2023 NEC. Although I would support any TIA that puts a January 1, 2023 effective date on the requirements in 210.8(F) for AC equipment, this TIA does not limit the application which is appropriate at this time.

Thank you,

Mark R. Hilbert

Sent from Mail for Windows 10
I concur with delaying implementation of this requirement. In addition to the presented justification, I have seen a few situations where the available GFCI circuit breakers were not listed with sufficient “amp-interrupting-capacity” to meet requirements of available fault current and/or the requirements of the design.

David Bell, PE  
Engineering Supervisor  
State Construction Office  
Department of Administration

Physical Address:  
301 N. Wilmington Street, Suite 450  
Raleigh, NC 27601  
Mailing Address:  
1307 Mail Service Center  
Raleigh, NC 27699-1307

Email correspondence to and from this address is subject to the North Carolina Public Records Law and may be disclosed to third parties.
To whom it may concern,

I’m writing in support of TIA Log 1589. As a production residential electrical contractor in Colorado, we have experienced numerous and costly service calls this summer for homes built under the 2020 NEC. We have been put in the position of providing a code compliant installation, or one that works. I have first-hand knowledge that air conditioning equipment of the types both with and without “power conversion equipment” are nuisance tripping the required GFCI breakers. Our builders and our homeowners are extremely displeased - we need relief now!

Thank you,

James R. Slotnick, President

Applied Electric, Inc.
4549 Tabor St., Unit A
Wheat Ridge, CO 80033
To: Secretary, NFPA Standards Council

Please find attached ACCA's comments supporting Proposed TIA 1589 on NFPA 70 - 2020. Our comments are attached as an Adobe pdf file (signed) and a Word file.

Please contact me if you have any questions.

Thanks!

David C. Bixby

David Bixby
Manager of Codes & Standards
Air Conditioning Contractors of America (ACCA)
www.acca.org
July 16, 2021

Secretary, Standards Council
National Fire Protection Association
(Submitted via e-mail to TIA@nfpa.org)

Subject: Comment on Proposed TIA Log No.: 1589 for NFPA 70 – 2020

The Air Conditioning Contractors of America (ACCA) is a national association of heating, air conditioning, ventilation, and refrigeration (HVACR) contractors, representing more than 60,000 contracting professionals in every state. ACCA is also responsible for creating the nationally recognized and industry-endorsed standards to ensure HVACR systems are properly designed, installed, maintained, and serviced. These standards help ensure our workers, our customers, and the environment are safe.

ACCA’s contractor members are increasingly encountering problems with field nuisance trips on HVACR equipment installed outdoors as a result of complying with 210.8(F) in the 2020 Edition of NFPA 70. Now that the cooling season has peaked, and more states are adopting this requirement, the number of nuisance trips have grown substantially.

With respect to TIA Log No.: 1589, shown below are ACCA’s comments.

ACCA supports the proposed TIA in that the growing adverse impacts of 210.8(F) on outdoor HVACR equipment have not been resolved, and thus the industry needs time to create solutions. As ACCA has pointed out previously on similar proposed TIAS, these nuisance shutdowns are rendering such equipment unusable and create an unjustified lack of confidence in the system by consumers. In addition, contractors and service personal must expend considerable time and resources responding to calls for nuisance trips, when there is no safety reason for doing so.

As if this issue were not already serious enough to merit immediate action, consider that the GFNI reset is located outside at the unit so occupants (or contractors) must travel around shrubbery, retaining walls, and in some areas basement window wells in the dark of night. In winter, add ice and snow to the hazards with outdoor package units.

/Continued…
At the urging of our members, ACCA developed a template for our members to request their state and local jurisdictions to delete this requirement when their state adopts the 2020 NEC as their code. In some states, this local effort has been successful. The delay of this requirement has become imperative for all concerned.

In conclusion, the industry needs more time to properly evaluate the above situation and provide solutions before such a requirement can be enforced and followed safely in the field. In addition, ACCA questions whether there was sufficient justification for imposing the new requirement on outdoor A/C disconnects other than those with receptacles. Again, more testing and investigation is needed.

ACCA looks forward to working with the NEC Code-Making Panel 2 in the future to develop a suitable proposal to address our concerns while at the same time uphold the safety aspects that GFCI devices provide.

Thank you,

David C. Bixby
ACCA Manager of Codes & Standards
Air Conditioning Contractors of America
1330 Braddock Place, Suite 350
Alexandria, VA 22314
Dear Ms. Bellis,

Please accept this public comment letter from AHRI supporting TIA 1589

Rgds,

MEK

Mary E. Koban
Air-Conditioning, Heating, and Refrigeration Institute
Senior Director Regulatory Affairs
July 16, 2021

Ms. Dawn Michele Bellis  
Director and NFPA Standards Council Secretary  
National Fire Protection Association  
1 Batterymarch Park  
Quincy, MA 02169-7471  
(Submitted via email to TIAs_Eratta_Fls@nfpa.org)

Re: AHRI Letter in Support of NFPA 70 Proposed TIA 1589

Dear Ms. Bellis,

This letter is submitted in response to the proposed Tentative Interim Amendment (TIA) 1589 submitted by Dan Buuck, National Association of Home Builders, and Clayton Traylor, Leading Builders of America. Specially, TIA 1589 requested a 3-year suspension of NEC 20 210.8 Ground-Fault Circuit-Interrupter Protection for Personnel (F) Outdoor Outlets.

AHRI represents more than 300 of the equipment, component and refrigerant manufacturers in the Heating, Ventilation, Air Conditioning and Refrigeration (HVACR) industry. In America, the annual economic activity resulting from the HVACR industry is approximately $256 billion. In the United States alone, AHRI member companies, along with distributors, contractors, and technicians, collectively employ more than 1.3 million people.

This TIA appropriately requests a 3-year suspension of the new requirement in the 2020 NEC for use of ground-fault circuit-interrupter (GFCI) protection in section 210.8 (F). This requirement has created an issue in single stage, two stage, and variable speed compressors used in ducted and ductless mini-split units. The expansion of GFCI protection in the 2020 NEC to cover exterior outlets on new dwelling units other than just those rated 125V is a necessary enhancement to safety. Recent field experience with new installations performed in accordance with the 2020 NEC has demonstrated increased GFCI tripping in multiple states across multiple product types. This issue is increasing in magnitude and is not specific to equipment type, manufacturer, or installation location.

Most HVAC products available in the market today that are installed using outdoor outlets are certified to the UL 1995 product safety standard for air conditioners and heat pumps. The UL 1995 standard does not include leakage current testing requirements. The UL 1995 standard will be withdrawn by UL by January 1, 2024 and be replaced by UL/CSA 60335-2-40. UL/CSA 60335-2-40, under Council for Harmonization of Electrotechnical Standards of the Nations in the Americas (CANENA) working group 14, investigated this issue and developed language for the 4th edition to address this issue. The CANENA
AHRI Comments on NFPA 70 TIA 1589
July 16, 2021

working group included language for protective earthing (grounding) to ensure product safety due to leaking current, but also noted that there were some issues employing GFCIs. Further work is needed by the industry to understand what is causing this issue as there may be different tripping mechanisms in single stage equipment versus two-stage and multi-stage compressors. Equipment manufacturers, electrical component suppliers, and AHRI are working to better understand this issue. The goal of these collaborators is to resolve this issue in the next year and then to conduct field testing.

Therefore, this TIA is timely and must be granted as it addresses situations where nuisance tripping of GFCI breakers is occurring with single stage, two stage, and variable speed compressors used in HVAC equipment. Without this TIA, the authorities having jurisdiction (AHJs) and consumers are forced to choose between compliance and an operational system for heating and/or air-conditioning.

If you have any questions regarding this submission, please do not hesitate to contact me.

Sincerely,

Mary E. Koban
Senior Director Regulatory Affairs, AHRI
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CAUTION: Always use caution when opening attachments. Make sure you know the sender and are you expecting one.


Feel free to contact me regarding any questions regarding these comments.

Regards,
Dave Winningham
Sr. Engineering Manager, Regulatory Affairs
Lennox International
July 19, 2021

Secretary, Standards Council
National Fire Protection Association

Submitted via: TIAs_Errata_FIs@nfpa.org


Lennox International is a leading provider, based in the United States, of climate control solutions for heating, air-conditioning. Lennox is a publicly traded company, has thousands of employees, and offers a broad range of HVACR products to the marketplace. This industry is an important source of American jobs and provides equipment that is vital to the health and wellbeing of consumers and the preservation of food.

Lennox strongly recommends that the Technical Committee approve TIA 1589 for NFPA 2020 NEC to allow necessary time to reconcile the conflicts between the standards for HVAC and GFCI products and prevent significant hazards created by nuisance trip inoperability of HVAC products at times of critical need. While expanded GFCI protection in the 2020 NEC is intended to improve safety, HVAC component and equipment safety standards are not compatible with GFCI standards. This incompatibility has created a much larger safety issue than it was intended to resolve by exposing consumers to extreme heat or cold conditions from inoperability of HVAC products caused by GFCI nuisance trips. Until both HVAC equipment and GFCI standards are updated, designers, installers, AHJs, and consumers are forced to choose between an NEC 2020 compliant installation or an operational installation. The HVAC industry has a long history of safe and reliable operation and these products are critical to the safety of consumers to insure safe and healthy indoor environments for its occupants. Lennox seeks to address committee member concerns expressed to the proposed TIA on both Technical Merit and Emergency Nature.

**Technical Merit**

- Approval of TIA 1589 allows time to resolve a conflict between the safety standards for HVAC and water heating (WH) products and the 2020 NEC code GFCI requirement. Most all HVAC products available in the market today are installed using outdoor outlets are certified to the UL 1995 product safety standard for air conditioners and heat pumps. The UL 1995 standard does not include leakage current testing requirements for equipment other than cord-connected products. The current UL 1995 standard will be withdrawn by UL and be replaced by UL/CSA 60335-2-40. Currently UL/CSA 60335-2-40 does have leakage testing requirements – allowing up to 10 mA for HVAC products in applications covered by 2020 NEC 210.8(C) but this is in conflict with GFCI standard limits. To this point there is insufficient data regarding leakage current of HVAC products and interaction with the current state of GFCI product current thresholds and time constants. Although HVAC products have a long history of safe application, further work on the 4th edition of UL 60335-2-40 includes a working group formed to investigate the incompatibility issue and is proposing further test requirements to evaluate that.
leakage current of HVAC equipment is at safe levels. In addition, an AHRI research project is also being launched to fully evaluate leakage current of HVAC products to assist in determining the appropriate action for both HVAC and GFCI standards. The requested three-year extension is appropriate while the research is conducted and product safety standard committees for both HVAC and GFCI products conducts its work.

- Lennox has investigated the leakage currents and found that HVAC products at 60 Hz do not exceed the 6-mA maximum leakage current threshold as specified in UL 943. However, at frequencies above 60 Hz or in transient conditions of short duration there can be leakage current exceeding 6 mA which result in nuisance tripping of the GFCI device. UL 943 Standards Technical Panel is in the process of studying with potential modification to UL 943 to address permissible leakage current as a function of frequency and the AHRI research project that is being launched will held to characterize leakage current for HVAC products to advise the GFCI standards.

- GFCI’s must comply with the 60 Hz testing requirement in UL 943. There currently are no requirements for these products to be tested at higher frequencies. GFCI’s from different manufacturers clearly react differently at frequencies other than 60 Hz. The time constants used in GFCI products also needs to be addressed as the current time threshold is a maximum and many GFCI devices use simple logic that reacts much quicker also resulting in nuisance trips during short duration events (which are not a human hazard) where the leakage current exceeds the GFCI threshold. The three-year delay will help GFCI manufacturers investigate product reaction at frequencies other than 60 Hz and interactions with HVAC equipment and to determine the appropriate path forward.

- The TIA from the National Home Builders Association and Leading Builders of America cites wide instances of nuisance trips on new equipment in new homes. The issue is agnostic to HVAC equipment manufacturer. Lennox has incurred hundreds of instances of nuisance trips across a wide spectrum of products and installations. All these products comply with relevant safety standards, noted above, and have a long-standing history of safe and reliable operation without the additional GFCI requirement.

**Emergency Nature**
The proposed TIA intends to correct a circumstance in which the revised NFPA Standard has resulted in an adverse impact on a product or method that was inadvertently overlooked in the process and did not consider the significant safety issue created by the conflict between the HVAC and GFCI standards.

- Without this TIA, AHJs and consumers are forced to choose between compliance and an operational system for heating and/or air-conditioning. Consumers experiencing these nuisance trips rely on this equipment for their only source of heating or cooling and to maintain a healthy indoor environment. Tripping of the GFCI breakers could result in dangerous conditions for people in cold or hot weather. As noted in the CDC report cited in the proposed TIA, “During 2004–2018, an average of 702 heat-related deaths occurred in the United States annually.” “Past studies have demonstrated a relationship between ambient temperatures and mortality (8). In particular, extreme heat exposure can exacerbate certain chronic medical conditions, including hypertension and heart disease (4,5). In addition, medications that are typically used to treat these chronic medical conditions such as betablockers, diuretics, and calcium-channel blockers,
can interfere with thermoregulation and result in a reduced ability to respond to heat stress (5).” This incompatibility is happening in a large number of installations and is causing extreme economic duress for those involved to resolve these issues as well as for new homeowners, who must keep resetting the breaker to maintain healthy humidity and temperature levels in the home. Nuisance trips can also result in property damage and associated economic hardship to repair.

- Of the 11 States that have adopted NEC 2020, 10 have deleted, delayed, or taken other action regarding 210.8(F) their adoption of the 2020 NEC clearly recognizing the conflicts between HVAC and GFCI products. Similar actions will continue to exclude this clause as adoption of the 2020 code moves forward in other States and jurisdictions. These actions clearly demonstrate that 210.8(F) has created a much larger consumer safety issue than it was intended to resolve and is inappropriate until the conflicts between the products standards are fully understood and appropriate changes implemented.

- Lennox understands that the stated reason for including this provision was the result of an incorrect installation, a situation that would not be remedied by additional GFCI requirements to code that are not followed.

In summary, Lennox strongly request that the Technical Committee approve the TIA and allow the HVAC and GFCI manufacturers the necessary time to resolve the conflicts in standards and bring products into compliance of those revised standard without the adverse effects to consumers created by the current situation.

Regards,

Dave Winningham,
Sr. Engineering Manager, Regulatory Affairs
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<thead>
<tr>
<th><strong>From:</strong></th>
<th>Winningham, Dave L.</th>
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<tr>
<td><strong>Sent:</strong></td>
<td>Monday, July 19, 2021 4:29 PM</td>
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<tr>
<td><strong>To:</strong></td>
<td>Shared TIAs</td>
</tr>
<tr>
<td><strong>Subject:</strong></td>
<td>Allied Air Enterprises support of Proposed TIA 1589 for NFPA – 2020 Edition of National Electric Code</td>
</tr>
<tr>
<td><strong>Attachments:</strong></td>
<td>Allied Air Enterprises Comments Regarding NFPA TIA 1589 07192021.pdf</td>
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**CAUTION:** Always use caution when opening attachments. Make sure you know the sender and are you expecting one.

Please see the attached TIA 1589 Comments – **Allied Air Enterprises support of Proposed TIA 1589 for NFPA – 2020 Edition of National Electric Code**.

Feel free to contact me regarding any questions regarding these comments.

Regards,
Dave Winningham
Sr. Engineering Manager, Regulatory Affairs
Allied Air Enterprises
July 19, 2021

Secretary, Standards Council  
National Fire Protection Association

Submitted via: TIAs_Errata_FIs@nfpa.org


   Allied Air Enterprises, a Lennox International company is a leading provider, based in the United States, of climate control solutions for heating, air-conditioning. Lennox is a publicly traded company, has thousands of employees, and offers a broad range of HVACR products to the marketplace. This industry is an important source of American jobs and provides equipment that is vital to the health and wellbeing of consumers and the preservation of food.

   Allied strongly recommends that the Technical Committee approve TIA 1589 for NFPA 2020 NEC to allow necessary time to reconcile the conflicts between the standards for HVAC and GFCI products and prevent significant hazards created by nuisance trip inoperability of HVAC products at times of critical need. While expanded GFCI protection in the 2020 NEC is intended to improve safety, HVAC component and equipment safety standards are not compatible with GFCI standards. This incompatibility has created a much larger safety issue than it was intended to resolve by exposing consumers to extreme heat or cold conditions from inoperability of HVAC products caused by GFCI nuisance trips. Until both HVAC equipment and GFCI standards are updated, designers, installers, AHJs, and consumers are forced to choose between an NEC 2020 compliant installation or an operational installation. The HVAC industry has a long history of safe and reliable operation and these products are critical to the safety of consumers to insure safe and healthy indoor environments for its occupants. Allied seeks to address committee member concerns expressed to the proposed TIA on both Technical Merit and Emergency Nature.

   Technical Merit

   • Approval of TIA 1589 allows time to resolve a conflict between the safety standards for HVAC and water heating (WH) products and the 2020 NEC code GFCI requirement. Most all HVAC products available in the market today are installed using outdoor outlets are certified to the UL 1995 product safety standard for air conditioners and heat pumps. The UL 1995 standard does not include leakage current testing requirements for equipment other than cord-connected products. The current UL 1995 standard will be withdrawn by UL and be replaced by UL/CSA 60335-2-40. Currently UL/CSA 60335-2-40 does have leakage testing requirements – allowing up to 10 mA for HVAC products in applications covered by 2020 NEC 210.8(C) but this is in conflict with GFCI standard limits. To this point there is insufficient data regarding leakage current of HVAC products and interaction with the current state of GFCI product current thresholds and time constants. Although HVAC products have a long history of safe application, further work on the 4th edition of UL 60335-2-40 includes a working group formed to investigate the incompatibility issue and is proposing further test requirements to evaluate that leakage current of HVAC equipment is at safe levels. In addition, an AHRI research project is also being launched to fully
evaluate leakage current of HVAC products to assist in determining the appropriate action for both HVAC and GFCI standards. The requested three-year extension is appropriate while the research is conducted and product safety standard committees for both HVAC and GFCI products conducts its work.

- Allied has investigated the leakage currents and found that HVAC products at 60 Hz do not exceed the 6-mA maximum leakage current threshold as specified in UL 943. However, at frequencies above 60 Hz or in transient conditions of short duration there can be leakage current exceeding 6 mA which result in nuisance tripping of the GFCI device. UL 943 Standards Technical Panel is in the process of studying with potential modification to UL 943 to address permissible leakage current as a function of frequency and the AHRI research project that is being launched will help to characterize leakage current for HVAC products to advise the GFCI standards.

- GFCI’s must comply with the 60 Hz testing requirement in UL 943. There currently are no requirements for these products to be tested at higher frequencies. GFCI’s from different manufacturers clearly react differently at frequencies other than 60 Hz. The time constants used in GFCI products also needs to be addressed as the current time threshold is a maximum and many GFCI devices use simple logic that reacts much quicker also resulting in nuisance trips during short duration events (which are not a human hazard) where the leakage current exceeds the GFCI threshold. The three-year delay will help GFCI manufacturers investigate product reaction at frequencies other than 60 Hz and interactions with HVAC equipment and to determine the appropriate path forward.

- The TIA from the National Home Builders Association and Leading Builders of America cites wide instances of nuisance trips on new equipment in new homes. The issue is agnostic to HVAC equipment manufacturer. Allied has incurred hundreds of instances of nuisance trips across a wide spectrum of products and installations. All these products comply with relevant safety standards, noted above, and have a long-standing history of safe and reliable operation without the additional GFCI requirement.

**Emergency Nature**

The proposed TIA intends to correct a circumstance in which the revised NFPA Standard has resulted in an adverse impact on a product or method that was inadvertently overlooked in the process and did not consider the significant safety issue created by the conflict between the HVAC and GFCI standards.

- Without this TIA, AHJs and consumers are forced to choose between compliance and an operational system for heating and/or air-conditioning. Consumers experiencing these nuisance trips rely on this equipment for their only source of heating or cooling and to maintain a healthy indoor environment. Tripping of the GFCI breakers could result in dangerous conditions for people in cold or hot weather. As noted in the CDC report cited in the proposed TIA, “During 2004–2018, an average of 702 heat-related deaths occurred in the United States annually.” “Past studies have demonstrated a relationship between ambient temperatures and mortality (8). In particular, extreme heat exposure can exacerbate certain chronic medical conditions, including hypertension and heart disease (4,5). In addition, medications that are typically used to treat these chronic medical conditions such as betablockers, diuretics, and calcium-channel blockers, can interfere with thermoregulation and result in a reduced ability to respond to heat stress (5).” This incompatibility is happening in a large number of installations and is causing extreme economic duress for those involved to resolve these issues as well as for
new homeowners, who must keep resetting the breaker to maintain healthy humidity and temperature levels in the home. Nuisance trips can also result in property damage and associated economic hardship to repair.

- Of the 11 States that have adopted NEC 2020, 10 have deleted, delayed, or taken other action regarding 210.8(F) their adoption of the 2020 NEC clearly recognizing the conflicts between HVAC and GFCI products. Similar actions will continue to exclude this clause as adoption of the 2020 code moves forward in other States and jurisdictions. These actions clearly demonstrate that 210.8(F) has created a much larger consumer safety issue than it was intended to resolve and is inappropriate until the conflicts between the products standards are fully understood and appropriate changes implemented.

- Allied understands that the stated reason for including this provision was the result of an incorrect installation, a situation that would not be remedied by additional GFCI requirements to code that are not followed.

In summary, Allied strongly request that the Technical Committee approve the TIA and allow the HVAC and GFCI manufacturers the necessary time to resolve the conflicts in standards and bring products into compliance of those revised standards without the adverse effects to consumers created by the current situation.

Regards,

David Winningham,
Sr. Engineering Manager, Regulatory Affairs
Appellant: Daniel Buuck  
National Association of Home Builders  
1201 15th Street NW  
Washington, DC 20005

Statement: The results of the Technical Committee Ballot and Correlating Committee Ballot for Proposed TIA 1589 to NFPA 70 failed ballot.

Argument: The complete record indicates that insufficient testing was done prior to implementing the requirement and that subsequent testing has indicated the incompatibility between the HVAC equipment and GFCIs. The National Association of Home Builders strongly encourages relief to be given on this requirement, since the incompatibility has not been resolved.

Because of the ongoing incompatibility issue, occupants of dwellings can be subjected to heat exposure, hospitalization and/or death under seasonal weather conditions.

The ballots refer to a single incident in which a child was electrocuted. At the time the requirement was adopted by CMP-2 there was concern expressed about whether the change should be based upon the referenced incident due to questions regarding the installation of the equipment. Additional details of the incident and the installation of the equipment were provided in Public Comments submitted in support of the TIA.

Several ballot comments indicate that the issue has not been substantiated and one references data from only two builders. A review of the complete record, including the Public Comments, clearly notes that this is not the case.

It is apparent from the ballot results that the CMP failed to consider the information provided during the Public Comment period.

Statement: The Council should consider the complete record regarding the issue from when the requirement was first introduced into the NEC through the balloting and public comments on the five TIAs that have been submitted on this section and issue TIA No. 1589 to the NEC.

Alternatively, the Council should appoint a Task Group of representatives of CMP-2 and those that have submitted TIAs or Public Comments regarding the five TIAs and direct the Task Group to prepare a sixth TIA to be balloted prior to the next Council meeting.

Hearing: The Appellant requests a hearing on the Appeal.

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1 See Public Comments 6, 10, 11, 12  
2 See CMP 2 Ballot Results for Second Revision No. 7676-NFPA 70-2018  
3 It should be noted that Public Comment No. 4 was incorrectly noted as being opposed to the TIA when it was clearly in support of the TIA  
4 For example, see Public Comment No. 8, submitted by an electrical contractor
Appellant: William E. Koffel, P.E., FSFPE
Representing: Leading Builders of America
Koffel Associates, Inc.
8815 Centre Park Drive, Suite 200
Columbia, MD 21045

Statement: The Appeal relates to the results of the CMP Ballot and Correlating Committee Ballot for Proposed TIA 1589 to NFPA 70 failed ballot.

Argument: The ballots refer to a single incident in which a child was electrocuted. At the time the requirement was adopted by CMP 2 for the 2023 Edition of the NEC there was concern expressed about whether the change should be based upon the referenced incident due to questions regarding the installation of the equipment.1 Additional details of the incident and the installation of the equipment were provided in Public Comments submitted in support of the TIA.2

Several ballot comments indicate that the issue has not been substantiated and one references data from only two builders. A review of the complete record, including the Public Comments, clearly notes that this is not the case.3

The complete record also indicates that insufficient testing was done prior to implementing the requirement and that subsequent testing has indicated the incompatibility between the HVAC equipment and GFCI’s.4

It is apparent from the ballot results that the CMP failed to consider the information provided during the Public Comment period. Section 3.3 of the Guide for the Conduct of Participants in the NFPA Standards Development Process states that TC/CC members should actively and diligently perform their duties. Paragraph 3.3 (c) further states that:

This includes fully preparing for and consistently attending all appropriate committee and task group meetings; reading and becoming familiar with all issues relating to Public Inputs and Public Comments....

It is recognized that there will be differences of opinions regarding this and other issues. However, the ballot comments of several CMP and CC members failed to recognize facts that included in the Public Comments or to dispute the validity of such information. The ballot comments seem to indicate that the members voted a position without reading and becoming familiar with all issues.

Statement: The Council should consider the complete record regarding the issue from when the requirement was first introduced into the NEC, 2023 Edition through the balloting and public comments on the five TIA’s that have been submitted on this section and issue TIA No. 1589 to the NEC. The record also

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1 See CMP 2 Ballot Results for Second Revision No. 7676-NFPA 70-2018
2 It should be noted that Public Comment No. 4 was incorrectly noted as being opposed to the TIA when it was clearly in support of the TIA
3 For example, see Public Comment No. 8, submitted by an electrical contractor
4 See Public Comments 6, 10, 11, 12
indicates that most states that have adopted the 2023 Edition of the NEC have modified the subject paragraph; in some instances in a manner consistent with proposed TIA No. 1589.\(^5\)

Alternatively, the Council should appoint a Task Group of representatives of CMP 2 and those that have submitted TIA’s or Public Comments regarding the five TIA’s and direct the Task Group to prepare a sixth TIA to be balloted prior to the next Council meeting.

**Hearing:** The Appellant requests a hearing on the Appeal.

Respectfully Submitted,

**KOFFEL ASSOCIATES, INC.**

[Signature]

William E. Koffel, P.E., FSFPE, SASHE
President
Licensed in DC, MD, NY, OH, PA, VA, WA

---

\(^5\) See Public Comments 11 and 12
August 6, 2021

Report on TIA 1589 Appeal

The appeal to Standards Council of TIA No. 1589 has been received and reviewed by the Chair of CMP 2 David G. Humphrey. The Chair supports the panel’s action based on the vote of the technical committee and the issues to be detailed below and recommends that the appeal be denied.

The technical committee vote was 6-7 with in favor of support on the merits and 5-7 in support of the concept of the TIA being of an emergency nature. Neither met the 3/4 threshold needed to pass ballot.

GFCI has proven to be a life saving device and over the years has expanded to many areas of dwellings and commercial properties. Examples include commercial restaurant equipment, both residential and commercial laundry equipment, and many more. These types of equipment have been shown to operate without issue when protected by GFCI devices. During the many years of GFCI application the trip threshold for these devices has been a consistent 4 to 6 milliamperes. Leakage current above this threshold has been recognized as potentially dangerous or even lethal to some persons under certain conditions.

The current TIA (1589) is the result of alleged unwanted tripping of GFCI breakers installed to protect individuals that may come in contact with outdoor HVAC equipment. If such tripping is occurring, it is evident that leakage current in excess of the 4 to 6 milliamperc trip safety threshold is present. How much above may vary but certainly above what is widely considered a safe level of leakage current. It should be noted that these occurrences have not been evidenced with all types and brands of HVAC equipment suggesting that technology is available to remedy this excessive leakage current problem.

CMP 2 during the 2020 NEC revision process expanded GFCI protection under a new section 210.8(F) to require dwelling unit outdoor outlets single phase 150 volts to ground and 50 amperes or less to be GFCI protected. This requirement includes most dwelling unit outdoor HVAC equipment.

As nearly two years have passed since 2020 NEC adoption and over three and a half years since this public input was first created and approved by CMP 2, ample time has passed for industry to address this issue. The submitter of TIA 1589 does acknowledge that UL 60335-2-40 will limit leakage current to 10 milliamperes with an effect date of Jan. 1st, 2024. This however does not address the issue of GFCI protection that is designed to trip at approximately 5 milliamperes. Evidence has yet to be provided as to what, if any, steps are in progress to resolve this leakage current issue thus making residential HVAC units compatible with GFCI protection. Extending the adoption date of this section via TIA to Jan. 1, 2023 has not been shown to in any way resolve this issue.

It should be noted that CMP 2 overwhelmingly supported TIA 1593 addressing HVAC equipment with variable frequency drives as TIA 1594 is focused on specific equipment components that may be technically remedied to not produce leakage current above the aforementioned leakage current threshold by time of the delay requested.

Sincerely,

David G. Humphrey
Chair CMP 2
1. Revise 210.8(F) to read as follows:

210.8 Ground-Fault Circuit-Interrupter Protection for Personnel. ...

(F) Outdoor Outlets. All outdoor outlets for dwellings, other than those covered in 210.8 (A)(3), Exception to (3), that are supplied by single-phase branch circuits rated 150 volts to ground or less, 50 amperes or less, shall have ground-fault circuit-interrupter protection for personnel. This requirement shall become effective on January 1, 2023 for mini-split-type heating/ventilating/air-conditioning (HVAC) equipment and other HVAC units employing power conversion equipment as a means to control compressor speed.

Informational Note: Power conversion equipment is the term used to describe the components used in HVAC equipment that is commonly referred to as a variable speed drive. The use of power conversion equipment to control compressor speed differs from multistage compressor speed control.

Exception: Ground-fault circuit-interrupter protection shall not be required on lighting outlets other than those covered in 210.8(C).

Substantiation: This expansion of GFCI protection in the 2020 NEC, for the purpose of covering exterior outlets through 250-volts at dwelling units, is a necessary enhancement for electrical safety. Code Making Panel 2 supported the expansion of GFCI protection to cover these outdoor outlets based on the electrocution of a young boy who came into contact with the energized enclosure of an outdoor HVAC unit.

The purpose of this TIA is not to eliminate the GFCI protection for all HVAC outdoor equipment, but to extend the date of enforcement for the circuit supplying the HVAC units employing power conversion equipment.

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

In the state of Minnesota, we began enforcing Section 210.8(F) on April 5, 2021 and we have already documented many cases of operational tripping occurrences which have been difficult for inspectors and electricians to resolve. The only solution at this time is for the AHJ to approve a temporary allowance for the installation of a circuit breaker without GFCI protection so that these HVAC units can operate.
The language in this TIA is in direct alignment with the once-proposed TIA 1529 that was supported by Code Making Panel 2 for Technical and Emergency Nature. The Correlating Committee also agreed that no correlating issues existed with this language; however, the TIA narrowly failed ballot with regards to the Emergency Nature. Recently, proposed TIA 1564, which included “all HVAC equipment” failed ballot, but had multiple voting member comments supporting the language in TIA 1529. Also, TIA 1564 language contains substantiation to support reasons for delaying the date to address the operational GFCI tripping.

As we enter into the peak cooling season in Minnesota and in other states where the 2020 NEC has been adopted, it is expected that this issue will continue to grow and be problematic for the enforcement and installation community. Delaying the implementation date allows for the affected stakeholders to reach a solution to the operational tripping occurrences and provides AHJs with the ability to permit installations of cooling equipment that is essential to the health and safety of residents in warm climates.
MEMORANDUM

TO: Code-Making Panel 2  
FROM: Sarah Caldwell, Committee Administrator  
DATE: July 28, 2021  
SUBJECT: NEC® Proposed TIA No. 1593 FINAL TC BALLOT RESULTS

The public comment circulation has passed, therefore, according to Section 5.6(a) in the NFPA Regs, the final results show this TIA HAS achieved the ¾ majority vote needed on both Ballot Item No. 1 (Technical Merit) and Ballot Item No. 2 (Emergency Nature).

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<th>Vote</th>
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<th>Emergency Nature:</th>
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<td>0 Abstentions</td>
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<tr>
<td>12</td>
<td>Agree (w/comment: Domitrovich, Humphrey, Lujan, Reyes)</td>
<td>12 Agree (w/comment: Humphrey, Domitrovich, Johnson, Lujan)</td>
</tr>
<tr>
<td>1</td>
<td>Disagree (Campolo)</td>
<td>1 Disagree (Campolo)</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.

\[
15 \text{ eligible} \div 2 = 7.5 = (8)\]

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

\[
(15 \text{ eligible to vote} - 2 \text{ not returned} - 0 \text{ abstentions} = 13 \times 0.75 = 9.75 = 10)
\]

Ballot comments are attached for your review.

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

**Appeal Closing Date** for this TIA is **August 2, 2021**.
QUESTION NO. 1: I AGREE with the TECHNICAL MERITS of the Proposed TIA Log No. 1593 to Revise Section 210.8(F).

Eligible to Vote: 15
Not Returned: 2
Thomas L. Harman, Mathher Abbassi

<table>
<thead>
<tr>
<th>Vote Selection</th>
<th>Votes</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agree</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>John McCamish</td>
<td>agree</td>
<td></td>
</tr>
<tr>
<td>Alan Manche</td>
<td>Agree</td>
<td></td>
</tr>
<tr>
<td>David G. Humphrey</td>
<td></td>
<td>Though GFCI protection is an important safety feature for exterior HVAC, equipment technology and standards have not caught up with the requirement that section 210.8(F) puts forth. Documented cases of unwanted tripping are occurring in areas that have adopted the 2020 edition of the NEC. This places a burden on the enforcement community when an installation experiences unwanted tripping resulting in the loss of HVAC equipment operation. Enforcing the code as written and thus requiring GFCI protection on the HVAC outlet may well result in an inoperable heating and cooling system. This invites tampering in order to make the system operational and invites local and state authority meddling with the requirements of section 210.8(F) and perhaps the requirements of 210.8 overall. The prudent course of action would be to provide the reasonable delay this TIA requests in order to solve this technical issue and allowing GFCI protection for this equipment to be instituted in the near future.</td>
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<tbody>
<tr>
<td>Charles L. Boynton</td>
<td>Agree</td>
</tr>
<tr>
<td>Christopher J. Pavese</td>
<td>Agree</td>
</tr>
<tr>
<td>Thomas A. Domitrovich</td>
<td>See separate Technical Merit Ballot Comment file, e-mailed to <a href="mailto:SCaldwell@nfpa.org">SCaldwell@nfpa.org</a> due to the Ballot form's field limitation.</td>
</tr>
<tr>
<td>David W. Johnson</td>
<td>Agree</td>
</tr>
<tr>
<td>Fred Neubauer</td>
<td>Agree</td>
</tr>
</tbody>
</table>
Frederick P. Reyes

UL continues to support the application of GFCI protection while recognizing the need to align operational attributes of utilization equipment. There are currently existing and new installations where ground fault protected branch circuits effectively supply mini-split HVAC equipment as well as variable speed drive (VSD) loads such as 240Vac VSD pool pumps. While some loads of this type have worked without issue, it is acknowledged that not all mini-splits-type HVAC equipment can operate within the limits of GFCI’s and additional work is needed to address this issue.

Mark Daniel Cook

Agree

Cesar Lujan

NAHB prefers TIA 1589 to this one, because it offers the solution necessary to deal with the GFCI tripping issues that have been recorded in connection with single-stage condenser units. Information from Houston-area builders shows a 30% tripping rate (based on 2721 homes built by seven different builders). 69% of the affected homes had single-stage compressor units. AHRI has collected data from Colorado, Illinois, Minnesota, Nebraska, Texas, and Washington on 180 calls with GFCI nuisance tripping. Of those cases, 56% involved single-stage compressor units. These numbers are preliminary, as it will take time to determine how many “no-cooling” service calls are due to GFCI tripping issues and for that information to get back to the manufacturers. Some parts of the country may not be seeing tripping associated with single-stage compressor units yet, but it is to be expected that these issues will proliferate as the summer continues. Experience shows that the tripping occurs across multiple HVAC manufacturers and breaker manufacturers. Even though this TIA does not include single-stage equipment, it is preferable to having neither TIA approved. Both TIAs are limited to 18 months before reverting back to the original 2020 NEC language. This limited delay will give the manufacturers time to work on the compatibility issue and, in the meantime, offer relief to installers, code enforcement, and home occupants. UL 60335-2-40, the standard for electrical heat pumps, air-conditioners and dehumidifiers, formed a team of industry experts to determine a solution to the incompatibility issue. There are promising options that are actively under evaluation, and the team is working on providing an update to the standard.

Nehad El-Sherif

Agree

Disagree
Steve Campolo

There are some HVAC products that do not contain features that trip GFCI’s. Alternative equipment exists. Also, it was reported that certain energy saving rules created the need for motor controls that cause the leakage current. No efforts or requests to postpone the energy saving rules have been submitted. Temporarily using energy inefficient equipment would keep the life savings GFCI provision intact at the price of more energy usage. Additionally, after learning (from a representative of the submitters) at the time of this TIA, there is no solution. With no solution and hoping an acceptable one will be developed; how can 2023 compliance be assured? Further, it was explained that should TIA 1589 fail and TIA1593 pass, the submitters will still pursue an appeal on TIA1589. Motor speed control can be accomplished with other than pulse width modulated techniques.

Abstain 0

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

Eligible to Vote: 15
Not Returned: 2
Thomas L. Harman, Mathher Abbassi

Vote Selection | Votes | Comments
--- | --- | ---
Agree | 12 |
John McCamish | 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. The scope of this TIA is limited to the units that were impacted due to the revision.

Alan Manche | F |
David G. Humphrey | The cases of unwanted tripping are occurring now. This TIA should be acted upon as of an emergency nature for the reasons detailed in support of the TIA.

Charles L. Boynton | F |
Christopher J. Pavese | D |
Thomas A. Domitrovich

Evidence of a widespread issue to more than a few specific models was not demonstrated by the proposed TIA1593 submitter. NEMA continues to insist upon remedy to the known loss-of-life due to electrocutions resulting from general permissive allowances in the Code. NEMA consequently does recognize the loss of time since failed TIA 1529 and TIA 1564 for the SDO, manufacturers of these HVAC products, and Certification Bodies (CBs) to implement commercial availability in compliance with 210.8(F) prior to the proposed effective date January 1, 2023. NEMA will not support further extensions beyond that January 1, 2023 effective date for manufacturers of these HVAC products, the SDO, and the CBs to achieve 210.8(F) compliance. CONTINUATION OF TECHNICAL MERIT

David W. Johnson

A. The standard contains an omission that was overlooked during the regular revision process. CMP 2 should have enacted a post date for the enforcement of Section 210.8(F) to give the industry time to harmonize all equipment and safety standards to ensure a compliant installation of an operational system for the end user.

Fred Neubauer
Agree

Frederick P. Reyes
Emergency Nature Letter Code - F

Mark Daniel Cook
Agree

Cesar Lujan

As the summer progresses, the danger of heat exposure will increase, as well. The current requirement in 210.8(F) can easily cause a much greater health issue than the one the panel was attempting to fix. The CDC states that heat-related deaths are one of the deadliest weather-related health outcomes in the United States and that air-conditioning is the number one protective factor against heat-related illness and death (www.cdc.gov/pictureofamerica/pdfs/Picture_of_America_Heat-Related_Illness.pdf). Older adults and people with chronic medical conditions need reliable air conditioning (www.cdc.gov/disasters/extremeheat/specificgroups.html). They are more likely to take prescription medicines that affect the body's ability to control its temperature or sweat. People with a chronic medical condition are more likely to have conditions that are risk factors for heat-related illness. Relief is needed now. The highest number of heat-related deaths are reported during July and August.

Nehad El-Sherif
Disagree F

Steve Campolo
Abstain

There are some HVAC products that do not contain features that trip GFCI’s. Alternative equipment exists.
The Substantiation surrounding this TIA has not changed significantly from those presented previously for proposed and failed TIAs 1529 and 1564.

NEMA supports Class A GFCI protection as a life-preserving safety technology specified in the National Electrical Code® [NEC®] and other North American installation codes for nearly half a century. NEMA further recognizes, given the time elapsed since 210.8(F) was published in the 2020 NEC®, HVAC solutions that have leakage current levels not compatible with Class A GFCI protection have been identified. Some HVAC units place objectionable leakage current on the equipment grounding conductor in excess of the trip thresholds of Class A GFCI protection. This TIA provides a temporary relief to provide the HVAC manufacturers and HVAC end-product standards developer with time to evaluate and remedy the problem for those products.

NEMA desires to see consumers enjoy the benefits of GFCI technology preventing loss of life. To this end, in the interim time, as manufacturers address product design to not violate NEC® requirements around objectionable current, NEMA requests that resources be provided to homeowners, installers, contractors, home builders and others who would specify and or install HVAC equipment to know which products are compatible with Class A GFCI protection. The electrical industry must be made aware of the significance of this violation of NEC® requirements for objectionable current to elevate the importance of attention to details associated with the grounding and bonding during the installation of this HVAC equipment (and other equipment supplied by dwelling outdoor outlets) to reduce the likelihood of electrical shock.

The uncontested facts around this issue are as follows:

1. Some HVAC manufacturers have publicly recognized and acknowledged that some of their products use the Equipment Grounding Conductor (EGC) as a current carrying conductor.
2. Current on the equipment grounding conductor is known as “Objectionable Current” in the NEC®.
3. Objectionable current is addressed in the NEC® by requiring the grounding of systems, circuit conductors, surge arresters, surge protective devices, and non-current-carrying materials and equipment be installed and arranged in a manner that prevents this objectionable current from flowing over the equipment grounding conductors or other grounding paths. The reference is found in 250.6, Objectional Current.
4. Section 250.6(B) provides a few alternative remedies for stopping objectionable current, but clearly requires the effective ground-fault current path required by 250.4(A)(5) and the ground-fault current path required by 250.4(B)(4) to remain intact and effective. It is important that the remedies or solutions attempted to reduce objectionable current meet the basic requirements of 250.6(B).
5. The current being injected over the EGC occurs over a range of frequencies around 60 Hz to high frequencies.
6. The severity of the shock hazard is high if the EGC is unintentionally or intentionally disconnected and if a human places themselves in the ground-fault current path.
7. The UL 943 requirements open the circuit (4 mA – 6 mA) before the let-go threshold current limits are exceeded.
8. Class A GFCI protection, specified in the National Electrical Code® and other North American installation codes for over half a century, provides protection against fault currents in excess of 6 mA and is predicated upon the Dalziel equation that is based upon human physiology. It affords RECOVERABLE SURVIVEABILITY based upon removal of power if currents resulting in MUSCLE TETANIZATION are encountered (i.e., let-go currents).

9. The UL 943 requirements only recognize 60 Hz, no other frequencies, are considered during GFCI certification testing. The effect on the human physiology has not been tested at all frequencies as the research performed by Professor Charles Dalziel was conducted at frequency range of 60 Hz to 10 kHz.

10. Appliance and utilization equipment standards include requirements for some appliances limiting permitted leakage currents to values compatible with Class A GFCI protection.

11. The end-product standards for HVAC equipment have never and still do not included requirements to limit the current being injected over the EGC.

12. The origination of the problem is that the standard development organization [SDO] UL harmonized its new HVAC standard with an IEC HVAC standard. The new UL HVAC standard is UL 60335-2-40. In the UL 60335-2-40 adoption of the IEC standard IEC 60335-2-40, compatibility with North American requirements were not fully addressed in the U.S. National Differences. The leakage current level allowed in the IEC standard is based on the RCD trip threshold of 10 - 30 mA. This IEC 60335-2-40 level is based upon levels that could result in UNRECOVERABLE SURVIVEABILITY that removes current if ground-fault and leakage currents needed to attain CARDIAC FIBRILLATION. Unfortunately, the UL harmonized standard did not adjust the allowed leakage current to ensure compatibility with Class A GFCI protection prevalent throughout North and Central Americas.

13. The “sunsetting” UL 1995 HVAC standard in its Scope clause 1.11 indicates that “the requirements apply to equipment designed to be used in nonhazardous locations in accordance with the rules of CSA C22.1 [the Canadian Electrical Code Part I], ANSI/NFPA 70 [the National Electrical Code®], CSA B52, ANSI/ASHRAE 15, NFPA 90A, and NFPA 90B.” The newly-emerging UL HVAC Standard UL 60335-2-40 makes no similar claim of installation and use compatibility with these codes, especially the National Electrical Code®.

14. A proposal submitted to the UL product standard (UL 60335-2-40) to limit the leakage current of HVAC equipment to a value lower than the GFCI trip threshold was not successful recently. For change to occur, the Standard Technical Panel of the SDO must accept and explicitly acknowledge such compatibility in its UL 60335-2-40 standard.

15. Some HVAC units have been documented to inject currents that exceed the UL 943 thresholds of 4 mA – 6 mA, whereas some HVAC units have been documented to not inject currents that exceed the UL 943 thresholds of 4 mA – 6 mA at 60 Hz.

16. HVAC solutions do exist that are compatible with Class A GFCI protection installed upstream due to minimal or no leakage current over the EGC.

17. Deaths due to electrical shock have been documented in association with HVAC equipment found in dwellings, both indoors and outdoors.

18. One fatality incident due to electric shock (12-year-old Vontrell Pargo) was presented to the Code Making Panel with sufficient information that would suggest that Class A GFCI protection could have prevented the incident.

19. HVAC manufacturers have publicly recognized that some of their solutions are not compatible with Class A GFCI protection and some of their solutions are compatible with Class A GFCI protection.

20. HVAC manufacturers do not currently publish data indicating which of their units are compatible with Class A GFCI protection.
21. Homeowners, contractors, designers, and builders have no documentation available to them to help them understand which units are compatible with Class A GFCI protection.

22. Homeowners that have purchased and installed equipment not compatible with Class A GFCI technology are left with no solution to comply with requirements beyond replacing their HVAC system which is cost prohibitive.

23. Any solution that removes the Class A GFCI protection instead of using a compatible HVAC solution violates the NEC.

24. Local recognition of this problem occurred relatively recently with the introduction and enforcement in some jurisdictions of the 2020 version of the National Electrical Code®.
MEMORANDUM

TO: NEC® Correlating Committee

FROM: Sarah Caldwell, Committee Administrator

DATE: July 28, 2021

SUBJECT: NEC® Proposed TIA No. 1593 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>
<tr>
<th>Eligible to Vote</th>
<th>Not Returned</th>
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<tbody>
<tr>
<td>12</td>
<td>0</td>
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</table>

**Correlation Issues:**

<table>
<thead>
<tr>
<th>Abstentions</th>
<th>Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>12</td>
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</tbody>
</table>

**Emergency Nature:**

<table>
<thead>
<tr>
<th>Abstentions</th>
<th>Agree (w/comment: Ayer, Hickman, Johnston, Kendall)</th>
<th>Disagree (Gallo)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>11</td>
<td>1</td>
</tr>
</tbody>
</table>

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

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

\[
\text{[12 eligible ÷ 2 = 6 + 1 = (7)]}
\]

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

\[
\text{(12 eligible to vote - 0 not returned - 0 abstentions = 12 × 0.75 = 9)}
\]

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 **August 2, 2021.**
ELIGIBLE TO VOTE: 12
NOT RETURNED: 0

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<tbody>
<tr>
<td>Agree</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>Palmer L. Hickman</td>
<td></td>
<td>Agree.</td>
</tr>
<tr>
<td>Lawrence S. Ayer</td>
<td></td>
<td>Agree.</td>
</tr>
<tr>
<td>John R. Kovacik</td>
<td></td>
<td>Agree</td>
</tr>
<tr>
<td>Dean C. Hunter</td>
<td></td>
<td>I agree there are no correlation issues in accordance with 3.4.2 and 3.4.3 of the NFPA Regulations.</td>
</tr>
<tr>
<td>Michael J. Johnston</td>
<td></td>
<td>Agree no correlation issues.</td>
</tr>
<tr>
<td>Alan Manche</td>
<td></td>
<td>Agree</td>
</tr>
<tr>
<td>Roger D. McDaniel</td>
<td></td>
<td>Agree</td>
</tr>
<tr>
<td>Richard A. Holub</td>
<td></td>
<td>Agree</td>
</tr>
<tr>
<td>Ernest J. Gallo</td>
<td></td>
<td>I agree that there are no correlation issues</td>
</tr>
<tr>
<td>David H. Kendall</td>
<td></td>
<td>Agree there is not a Correlating Issue.</td>
</tr>
<tr>
<td>David A. Williams</td>
<td></td>
<td>Agree</td>
</tr>
<tr>
<td>Christine T. Porter</td>
<td></td>
<td>Agree</td>
</tr>
</tbody>
</table>

Disagree 0
Abstain 0
QUESTION NO. 2: I AGREE that the subject is of an EMERGENCY NATURE for one or more of the reasons noted in the Instructions box.

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<td>Agree</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>Palmer L. Hickman</td>
<td></td>
<td>The ballot passed the Technical Committee ballot for emergency nature. I agree with the reasoning stated therewith.</td>
</tr>
<tr>
<td>Lawrence S. Ayer</td>
<td></td>
<td>C. I agree that the subject is of emergency nature. However I prefer this TIA over TIA-1589 since 1593 has almost unanimous support.</td>
</tr>
<tr>
<td>John R. Kovacik</td>
<td>F</td>
<td></td>
</tr>
<tr>
<td>Dean C. Hunter</td>
<td></td>
<td>The proposed TIA intends to correct a circumstance in which the revised NFPA Standard has resulted in an adverse impact on a product or method that was inadvertently overlooked in the total revision process.</td>
</tr>
<tr>
<td>Michael J. Johnston</td>
<td>F</td>
<td>The Code Panel disposition is affirmative with TIA 1593 which deals with the same issue. This vote aligns with that of CMP-2.</td>
</tr>
<tr>
<td>Alan Manche</td>
<td>F</td>
<td></td>
</tr>
<tr>
<td>Roger D. McDaniel</td>
<td></td>
<td>D. The proposed TIA intends to offer to the public a benefit that would lessen a recognized (known) hazard or ameliorate a continuing dangerous condition or situation.</td>
</tr>
<tr>
<td>Richard A. Holub</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td>David H. Kendall</td>
<td></td>
<td>F. Evidence of a widespread issue to more than a few specific models was not demonstrated by the proposed TIA 1593 submitter. NEMA continues to insist upon remedy to the known loss-of-life due to electrocutions resulting from general permissive allowances in the Code. NEMA consequently does recognize the loss of time since failed TIA 1529 and TIA 1564 for the SDO, manufacturers of these HVAC products, and Certification Bodies [CBs] to implement commercial availability in compliance with 210.8(F) prior to the proposed effective date January 1, 2023. NEMA will not support further extensions beyond that January 1, 2023 effective date for manufacturers of these HVAC products, the SDO, and the CBs to achieve 210.8(F) compliance.</td>
</tr>
<tr>
<td>David A. Williams</td>
<td>A</td>
<td></td>
</tr>
</tbody>
</table>
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.

**Disagree**
- **Christine T. Porter**
- **1**

**Abstain**
- **Ernest J. Gallo**
- **0**

I do not believe this is of emergency nature
The addition of 210.8(F) in the 2020 was a reaction to the tragic death of a child in Chicago. The child was running through the yard and made contact with the shell of the condensing unit while a fault to the frame/shell was taking place.

However, most people are not taking into account a very important point that differentiates the wiring methods used in Chicago and many of the suburbs versus the wiring methods used in the majority of the country.

In the greater Chicagoland area much of the residential built environment was built with EMT rather than NM cable because of local code requirements. And as a result, much of this built environment uses the EMT raceway as the equipment grounding conductor.

I understand that the flexible whip used from the premise wiring system to the condensing unit was broken. As a result, the condensing unit circuit no longer had a working equipment grounding conductor. If the condensing unit circuit had the benefit of a complete working equipment grounding conductor, raceway-type or wire-type, the overcurrent protective device should have opened long before the child wandered into the yard in the first place.

GFCI devices do not last forever. GFCI devices are rarely, if at all, tested as directed by their manufacturers. Yes, 230.67 now requires a listed SPD for each service. The installation of a listed SPD should help the various GFCI devices survive events that typically shorten their life. But since any old POS SPD that meets the listing requirements makes an installation compliant with 230.67, that is a very flimsy hook to hang your hat on. Remember that since 90% of the SPD market is 100% price driven, 90% of the SPD’s available are designed to a price point rather than a performance or endurance point.

Just requiring a wire-type equipment grounding conductor from the condensing unit all the way back to the service equipment and electrically connected to the main bonding jumper would provide a far more robust safety scheme for the hazard experienced by the child in Chicago that 210.8(F) is based upon. Yes, the addition of even the cheapest SPD should help all GFCI devices survive for a longer period of time than without a SPD installed. But even the best SPD will not enable a GFCI device to be more robust than a wire-type equipment grounding conductor.

210.8(F) as written in the 2020 NEC is a feel-good reaction, at best, to the Chicago tragedy.

How many elderly people are you willing to allow to die during extreme heat events to justify this weak attempt to prevent another one-time tragedy?

How many more KwHrs are you willing to waste because customers must now choose non-VRF equipment rather more-energy efficient VRF equipment?

210.8(F) as written, makes no logical sense what-so-ever.
I believe the TIA should be rejected for a number of reasons.

1) I have seen no claims that all brands of mini-splits or VSD-controlled HVAC equipment have this deficiency. If some brands show excessive noise or leakage current, market forces will encourage them to reduce the problem to where they don't cause nuisance tripping.

2) I have seen claims in one or two trade forums that this problem is not experienced with at least one major modern listed brand of GFCI CB. Unless the calibration of that brand violates the specifications in UL 943, this means several things:

   a) the amount of leakage or noise causing these nuisance trips is not that extreme, and thus should be correctable; and

   b) if necessary, until that is done, dwellings utilizing other loadcenter brands should be able to solve the problem with electromechanical feeders serving GFCI disconnects that will not nuisance-trip.

3) Most important, putting off the requirement risks additional electrocutions. Given the first two points, referring to heat-related deaths resulting from failure of equipment does not justify giving manufacturers extra seasons' passes before they product compliant equipment that will prevent both heat deaths and electrocutions, according to design EE's I've consulted. If shunting incoming noise to a drain is the only way a particular piece of equipment can protect its electronics, they can select other options. They might even specify a three-wire circuit and not shunt noise to ground, but instead float the MOV or other protective device and connect it to a multiwire-type GFCI's neutral. This would allow the equipment ground to serve as a path for fault current.

4) Putting off the requirement till 2023 does not force all HVAC manufacturers to operate on the more-level playing field that might be created by the 2024 edition of the UL standard, even if it is published on time and successfully resolves this problem by harmonizing the product standard with the Code—and the NEC cannot make safety contingent on the possibility of that happening.

I am writing for myself, for Robert Welborne, P.E., and for Karl Mirpanah, P.E.

David E. Shapiro
I described these comments I submitted as representing myself, Robert Welborne, and Karl Mirpanah. We stand by them. It turns out that they in fact represent the full Executive Board of the George Washington Chapter, IAEI, including Michael M. Thomas, whose response had not gotten to me yesterday.

To emphasize this: we represent our chapter, not the international organization.

Cordially,

David
It seems as though the manufacturers of the HVAC equipment are producing equipment with leakage current higher than what a GFCI trip settings are. This would indicate that there is leakage current that is unacceptable and dangerous to life safety. The problem is not the GFCI but the equipment. There is no need to delay the requirement. The manufacturer’s need to produce equipment that is safe.
Commenting in support of TIA 1593.

John Eckert  
The CT Group  
900 Montgomery Street  
Laurel, MD 20707
Hello,

I am submitting the attached letter on behalf of the Independent Electrical Contractors in support of TIA 1539.

Thank you,

David Hittinger
Director, Codes and Standards
June 9, 2021

Dawn Bellis, Secretary NFPA Standards Council:

The Independent Electrical Contractors (IEC) support TIA 1593. The proposed TIA intends to correct a circumstance in which the revised standard has resulted in an adverse impact on the electrical installations for some air conditioning equipment with motor drives utilizing pulse width modulation that will not remain operational when supplied with ground fault circuit interrupter (GFCI) type circuit breaker. As written in the 2020 National Electrical Code, the GFCI requirement for all outdoor outlets for dwellings, other than those covered in 210.8(A)(3), exception to (3), that are supplied by single-phase branch circuits rated 150 volts to ground or less, 50 amperes or less, is too broad for all air conditioners.

Adding an effective date for the requirement of January 1, 2023, will allow manufacturers of ductless mini-split-type heating/ventilating/air-conditioning equipment and other units employing power conversion equipment utilizing pulse width modulation as a means to control compressor speed time to refine the equipment to ensure the GFCI technology will work with these systems.

IEC contractors are installing GFCI protection as required by the Code but under normal operating conditions certain units cause operational tripping of ground fault circuit interrupter type circuit breakers that cannot be corrected. Failed or malfunctioning air-conditioning systems can pose a danger to public health and safety. Recently, the Texas Department of Licensing & Regulation voted to amend the rules and delay the effective date of section 210.8(F) of the 2020 NEC until January 1, 2023. The amendment is effective May 20, 2021, and will expire in 120 days, unless renewed by the Commission. Other states are considering similar amendments to the Code.

IEC encourages the Council to adopt the TIA language that will only apply to the associated air-conditioning systems in the modified language.

Sincerely,

David Hittinger
Director of Codes and Standards
Good day,

I am writing in support of the TIA as it would provide relief from the current GFCI requirement in 210.8(F) for circuits supplying outdoor air conditioning, heating and ventilating equipment. As a member of CMP-2 at the time, I voted against this requirement as I felt that sufficient testing had not taken place to assure there would not be unnecessary tripping of the GFCI device. Unnecessary tripping can lead to unsafe conditions. Besides the effects high heat of the summer season can have on individuals in many areas of the country, what if the AC unit is in an area where there is high humidity coupled with hot conditions and the GFCI trips when the owners are not present for extended periods of time? This can result in interior property damage and unhealthy conditions from mold, etc.

Placing an effective date of January 1, 2023 will provide time to do additional testing and, if necessary, a further effective date in the 2023 NEC. Although I believe this TIA should go beyond the specified equipment as I identified in my comment on TIA 1589, I support it if there is a desire to limit the application.

Thank you,

Mark R. Hilbert

Sent from Mail for Windows 10
To:  Secretary, NFPA Standards Council

Please find attached ACCA’s comments supporting Proposed TIA 1593 on NFPA 70 - 2020. Our comments are attached as an Adobe pdf file (signed) and a Word file.

Please contact me if you have any questions.

Thanks!

David C. Bixby

David Bixby
Manager of Codes & Standards
Air Conditioning Contractors of America (ACCA)
www.acca.org
Secretary, Standards Council  
National Fire Protection Association  
(Submitted via e-mail to TIAs_Errata_Fls@nfpa.org)

Subject: Comment on Proposed TIA Log No.: 1593 for NFPA 70 – 2020

The Air Conditioning Contractors of America (ACCA) is a national association of heating, air conditioning, ventilation, and refrigeration (HVACR) contractors, representing more than 60,000 contracting professionals in every state. ACCA is also responsible for creating the nationally recognized and industry-endorsed standards to ensure HVACR systems are properly designed, installed, maintained, and serviced. These standards help ensure our workers, our customers, and the environment are safe.

ACCA’s contractor members are increasingly encountering problems with field nuisance trips on HVACR equipment installed outdoors as a result of complying with 210.8(F) in the 2020 Edition of NFPA 70. Now that the cooling season has peaked, and more states are adopting this requirement, the number of nuisance trips have grown substantially.

With respect to TIA Log No.: 1593, shown below are ACCA’s comments.

ACCA supports the proposed TIA in that the growing adverse impacts of 210.8(F) on outdoor HVACR equipment have not been resolved, and thus the industry needs time to create solutions. As ACCA has pointed out previously on similar proposed TIAs, these nuisance shutdowns are rendering such equipment unusable and create an unjustified lack of confidence in the system by consumers. In addition, contractors and service personal must expend considerable time and resources responding to calls for nuisance trips, when there is no safety reason for doing so.

As if this issue were not already serious enough to merit immediate action, consider that the GFCl reset is located outside at the unit so occupants (or contractors) must travel around shrubbery, retaining walls, and in some areas basement window wells in the dark of night. In winter, add ice and snow to the hazards with outdoor package units.

/Continued...
At the urging of our members, ACCA developed a template for our members to request their state and local jurisdictions to delete this requirement when their state adopts the 2020 NEC as their code. In some states, this local effort has been successful. Efforts to delay the requirement until January 1, 2023 were successful even after the State of Texas had adopted the 2020 NEC. Other states such as Utah and Massachusetts deleted the requirement when they adopted the NEC. This specific proposed TIA 1593 is from the State of Minnesota. Not only has the entire HVACR industry been adversely impacted by this requirement, but many state jurisdictions have recognized this issue and have taken action to delay it, both before and after adoption. The delay of this requirement has become apparent and imperative for all concerned. This fact alone qualifies the proposed TIA as emergency in nature. This requirement is unenforceable and creating a safety hazard for which it was not intended.

In conclusion, the industry needs more time to properly evaluate the above situation and provide solutions before such a requirement can be enforced and followed safely in the field. In addition, ACCA questions whether there was sufficient justification for imposing the new requirement on outdoor A/C disconnects other than those with receptacles. Again, more testing and investigation is needed.

ACCA looks forward to working with the NEC Code-Making Panel 2 in the future to develop a suitable proposal to address our concerns while at the same time uphold the safety aspects that GFCI devices provide.

Thank you,

David C. Bixby
ACCA Manager of Codes & Standards
Air Conditioning Contractors of America
1330 Braddock Place, Suite 350
Alexandria, VA 22314
To Whom It May Concern,

The following comment is offered in regards to the TIA 1593.

I strongly support TIA 1593 submitted by Dean Hunter on delaying the enforcement of NEC 210.8(F) until January 1, 2023, on Outdoor Outlets for mini-split-type heating/ventilating/air-conditioning (HVAC) equipment and other HVAC units employing power conversion equipment as a means to control compressor speed. The City of St. Paul, which is in State of Minnesota, also began enforcing Section 210.8(F) on April 5, 2021. I am aware that some of the documentation presented to support the TIA is from properties in the City of St. Paul. St. Paul is experiencing the same issues with GFCI breakers not working when installed with a mini-split-type air conditioners. The City of St. Paul has also been allowing a temporary allowance of a circuit breaker without GFCI protection so that these air conditioning units can operate. I also agree with Dean Hunter that “Delaying the implementation date allows for the affected stakeholders to reach a solution to the operational tripping occurrences, and provides AHJs with the ability to permit installations of cooling equipment that is essential to the health and safety of residents in warm climates”. Especially this year, in which we are experiencing unusually heat and drought conditions in Minnesota.

If you have questions on my response to this TIA, please contact me by phone or email.

Sincerely,

Dan Moynihan
Sr. Electrical Inspector
Department of Safety and Inspections
375 Jackson Street, Suite 220
Saint Paul, MN 55101
NFPA 72®-2019 Edition
National Fire Alarm and Signaling Code®
TIA Log No.: 1567
Reference: 29.11.3.4 item (6)
Comment Closing Date: April 28, 2021
Submitter: Dave Christian, Gentex Corporation
www.nfpa.org/72

1. Revise 29.11.3.4 item (6) to read as follows:

29.11.3.4 Specific Location Requirements. The installation of smoke alarms and smoke detectors shall comply with the following requirements:

   (1) …

   (6) Effective January 1, 2022, January 1, 2023, smoke alarms and smoke detectors installed between 6 ft (1.8 m) and 20 ft (6.1 m) along a horizontal flow path from a stationary or fixed cooking appliance shall be listed for resistance to common nuisance sources from cooking.

   (7) …

Substantiation: Underwriters Laboratories has moved the UL217 and UL268 effective dates to June 30, 2022. This creates a conflict in the 2022 Draft edition of NFPA 72 Chapter 29 installation requirements. The current installation date is May 1, 2022. This date must now be adjusted to reflect the change in the effective date of the listing standard to allow manufacturers to meet the new listing requirements and provide product to the marketplace.

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

The UL effective dates are now changed and the changes are reflected in NFPA 72 Chapter 29 2022 Edition and this creates a conflict with the 2019 Edition of this standard.
MEMORANDUM

TO: Technical Committee on Single and Multiple Station Alarms and Household Fire Alarm Systems

FROM: Jenny Depew, Committee Administrator

DATE: May 10, 2021

SUBJECT: NFPA 72® Proposed TIA No. 1567 FINAL TC BALLOT RESULTS

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

<table>
<thead>
<tr>
<th>21</th>
<th>Eligible to Vote</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Not Returned</td>
</tr>
<tr>
<td>(Aaron, Rader)</td>
<td></td>
</tr>
</tbody>
</table>

**Technical Merit:**
- 0 Abstentions
- 19 Agree *(w/comment: Olenick)*
- 0 Disagree

**Emergency Nature:**
- 0 Abstentions
- 19 Agree
- 0 Disagree

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

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

   \[21 \text{ eligible} \div 2 = 10.5 = 11\]

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

   \[21 \text{ eligible to vote} - 2 \text{ not returned} - 0 \text{ abstentions} = 19 \times 0.75 = 14.25 = 15\]

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 **May 15, 2021**.
## QUESTION NO. 1: I AGREE with the TECHNICAL MERITS of the Proposed TIA Log No. 1567 to revise section 29.11.3.4 item (6) of the 2019 edition of NFPA 72.

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<thead>
<tr>
<th>Vote Selection</th>
<th>Votes</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
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<td>19</td>
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</tr>
<tr>
<td></td>
<td></td>
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</tr>
<tr>
<td>Wendy B. Gifford</td>
<td>Agree</td>
<td>I agree with this though I will note UL is saying they are only changing the 217 date, not the 268 date. See <a href="https://www.ul.com/news/news-brief-ul-extends-effective-date-smoke-alarm-and-smoke-detector-manufacturers%E2%80%92s%202019%20effective%2C%20tech%20or%20new%20COVID%2019%20pandemic">https://www.ul.com/news/news-brief-ul-extends-effective-date-smoke-alarm-and-smoke-detector-manufacturers%E2%80%92s%202019%20effective%2C%20tech%20or%20new%20COVID%2019%20pandemic</a>.</td>
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<td>Stephen M. Cienick</td>
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<tr>
<td>Cory Ogilie</td>
<td>Agree</td>
<td></td>
</tr>
<tr>
<td>Jeffery P. McBride</td>
<td>Agree</td>
<td></td>
</tr>
<tr>
<td>Larry Ratcliff</td>
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<td></td>
</tr>
<tr>
<td>John L. Perssman</td>
<td>Agree</td>
<td></td>
</tr>
<tr>
<td>Greg L. Hanson</td>
<td>Agree</td>
<td></td>
</tr>
<tr>
<td>Richard M. Simpson</td>
<td>agree</td>
<td></td>
</tr>
<tr>
<td>Kim R. Mazurkiewicz</td>
<td>Agree</td>
<td></td>
</tr>
<tr>
<td>David E. Ovstvitz</td>
<td>Agree</td>
<td></td>
</tr>
<tr>
<td>Timothy K. Dedier</td>
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</tr>
<tr>
<td>Thomas G. Cleary</td>
<td>Agree</td>
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<td>Jeffrey L. Ojun</td>
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<tr>
<td>George Ish</td>
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<tr>
<td>John D. Sorrell</td>
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<tr>
<td>Robert A. Schmidt</td>
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</tr>
<tr>
<td>Eric Saxo</td>
<td>Agree</td>
<td></td>
</tr>
<tr>
<td>Paul Murphy</td>
<td>Agree</td>
<td></td>
</tr>
</tbody>
</table>

| Disagree | 0 |
| Abstain  | 0 |

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

Eligible to Vote: 21
Not Returned : 2

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<th>Vote Selection</th>
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<th>Comments</th>
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<tr>
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<td>A</td>
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<tr>
<td>Stephen M. Cienick</td>
<td>B</td>
<td></td>
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<tr>
<td>David T. Gottiuk</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>Cory Ogilie</td>
<td>C</td>
<td>The proposed TIA intends to correct a previously unknown existing hazard.</td>
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<tr>
<td>Jeffery P. McBride</td>
<td>A</td>
<td></td>
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<tr>
<td>Larry Ratcliff</td>
<td>Agree</td>
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<tr>
<td>John L. Perssman</td>
<td>B</td>
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<tr>
<td>Greg L. Hanson</td>
<td>A</td>
<td>The standard contains an error or an omission that was overlooked during the regular revision process.</td>
</tr>
<tr>
<td>Richard M. Simpson</td>
<td>agree</td>
<td></td>
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<tr>
<td>Kim R. Mazurkiewicz</td>
<td>B</td>
<td></td>
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<tr>
<td>David E. Ovstvitz</td>
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<tr>
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<td>B</td>
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<tr>
<td>Thomas G. Cleary</td>
<td>B</td>
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<tr>
<td>Jeffrey L. Ojun</td>
<td>AGRE</td>
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<td>George Ish</td>
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<td></td>
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<tr>
<td>John D. Sorrell</td>
<td>A</td>
<td></td>
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<tr>
<td>Robert A. Schmidt</td>
<td>B</td>
<td></td>
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<tr>
<td>Eric Saxo</td>
<td>B</td>
<td>The NFPA Standard contains a conflict within the NFPA Standard or with another NFPA Standard.</td>
</tr>
<tr>
<td>Paul Murphy</td>
<td>Agree</td>
<td></td>
</tr>
</tbody>
</table>

| Disagree | 0 |
| Abstain  | 0 |
MEMORANDUM

TO: Correlating Committee on Signaling Systems for the Protection of Life and Property

FROM: Jenny Depew, Committee Administrator

DATE: May 10, 2021

SUBJECT: NFPA 72® Proposed TIA No. 1567 FINAL CC BALLOT RESULTS

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

19 Eligible to Vote
3 Not Returned (Leber, LeBlanc, Ludden)

<table>
<thead>
<tr>
<th>Correlation Issues:</th>
<th>Emergency Nature:</th>
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<tr>
<td>0 Abstentions</td>
<td>0 Abstentions</td>
</tr>
<tr>
<td>15 Agree</td>
<td>15 Agree (w/ comment: Black)</td>
</tr>
<tr>
<td>1 Disagree (Heffernan)</td>
<td>1 Disagree (Parrish)</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.

\[19 \text{ eligible} \div 2 = 9.5 \cong 10\]

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

\[(19 \text{ eligible to vote} - 3 \text{ not returned} - 0 \text{ abstentions} = 16 \times 0.75 = 12)\]

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 **May 15, 2021**.
**Correlating Committee on Signaling Systems for the Protection of Life and Property**

**NFPA 72 Proposed TIA No. 1567**

**FINAL BALLOT RESULTS**

<table>
<thead>
<tr>
<th>QUESTION NO. 1: I AGREE there are no CORRELATION ISSUES in accordance with 3.4.2 and 3.4.3 of the NFPA Regs.</th>
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<tr>
<td><strong>Not Returned:</strong> 3</td>
</tr>
<tr>
<td><strong>Leber, LeBlanc, Ludden</strong></td>
</tr>
<tr>
<td><strong>Vote Selection</strong></td>
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<tr>
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<td>Louis Chavez</td>
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<tr>
<td>Thomas J. Parrish</td>
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<tr>
<td>Morris L. Stoops</td>
</tr>
<tr>
<td><strong>Disagree</strong></td>
</tr>
<tr>
<td><strong>Abstain</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>QUESTION NO. 2: I AGREE that the subject is of an EMERGENCY NATURE for one or more of the reasons noted in the Instructions box.</th>
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<tr>
<td><strong>Eligible to Vote:</strong> 19</td>
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<tr>
<td><strong>Not Returned:</strong> 3</td>
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<tr>
<td><strong>Leber, LeBlanc, Ludden</strong></td>
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<td>Louis Chavez</td>
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<tr>
<td>Morris L. Stoops</td>
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<tr>
<td><strong>Disagree</strong></td>
</tr>
<tr>
<td>Thomas J. Parrish</td>
</tr>
<tr>
<td><strong>Abstain</strong></td>
</tr>
</tbody>
</table>
NFPA 72®-Proposed 2022 Edition

National Fire Alarm and Signaling Code®

TIA Log No.: 1568

Reference: 29.11.3.4 items (4)(a), (4)(b), (5)(a), and (5)(b)

Comment Closing Date: April 28, 2021

Submitter: Dave Christian, Gentex Corporation

www.nfpa.org/72next

1. Revise 29.11.3.4 items (4)(a), (4)(b), (5)(a) and (5)(b) to read as follows:

29.11.3.4 Specific Location Requirements. The installation of smoke alarms and smoke detectors shall comply with the following requirements:

(1) …

(4) Smoke alarms and smoke detectors shall not be installed between 10 ft (3.0 m) and 20 ft (6.1 m) along a horizontal flow path from a stationary or fixed cooking appliance unless the devices comply with the following:

(a) Prior to May 1, 2022, January 1, 2023, smoke alarms and smoke detectors shall be equipped with an alarm silencing means, use photoelectric detection, or be listed for resistance to common nuisance sources from cooking in accordance with the 8th edition of UL 217, Smoke Alarms, the 7th edition of UL 268, Smoke Detectors for Fire Alarm Systems, or subsequent editions.

(b) Effective May 1, 2022, January 1, 2023, smoke alarms and smoke detectors shall be listed for resistance to common nuisance sources from cooking in accordance with the 8th edition of UL 217, the 7th edition of UL 268, or subsequent editions.

(5) Smoke alarms and smoke detectors shall not be installed within an area of exclusion determined by a 10 ft (3.0 m) radial distance along a horizontal flow path from a stationary or fixed cooking appliance. When the 10 ft (3.0 m) area of exclusion would prohibit the placement of a smoke alarm or smoke detector required by other sections of this Code, and when the kitchen or cooking area and adjacent spaces have no clear interior partitions or headers, smoke alarms or smoke detectors shall be permitted for installation at a radial distance between 6 ft (1.8 m) and 10 ft (3.0 m) from any stationary or fixed cooking appliance unless the devices comply with the following:

(a) Prior to May 1, 2022, January 1, 2023, the devices shall use photoelectric detection or be listed for resistance to common nuisance sources from cooking in accordance with the 8th edition of UL 217, the 7th edition of UL 268, or subsequent editions.

(b) Effective May 1, 2022, January 1, 2023, the devices shall be listed for resistance to common nuisance sources from cooking nuisance alarms in accordance with the 8th edition of UL 217, the 7th edition of UL 268, or subsequent editions.

(6) …

Substantiation: Underwriters Laboratories has moved the UL217 and UL268 effective dates to June 30, 2022. This creates a conflict in the 2022 Draft edition of NFPA 72 Chapter 29 installation requirements. The current installation date is May 1, 2022. This date must now be adjusted to reflect the change in the effective date of the listing standard to allow manufacturers to meet the new listing requirements and provide product to the marketplace.
**Emergency Nature:** The NFPA Standard contains a conflict within the NFPA Standard or within another NFPA Standard. 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 current situation presented by the COVID pandemic is causing significant delays in getting products through the UL listing process. If the date remains as currently drafted, it will conflict with the new UL compliance date. Due to this fact there will not be sufficient product in the marketplace to support the current date.
MEMORANDUM

TO: Technical Committee on Single and Multiple Station Alarms and Household Fire Alarm Systems

FROM: Jenny Depew, Committee Administrator

DATE: May 10, 2021

SUBJECT: NFPA 72® Proposed TIA No. 1568 FINAL TC BALLOT RESULTS

No public comments were received on this TIA, therefore, according to 5.6(a) in the NFPA Regs, the final results show this TIA HAS achieved the ¼ majority vote needed on both Ballot Item No. 1 (Technical Merit) and Ballot Item No. 2 (Emergency Nature).

21 Eligible to Vote
5 Not Returned (Aron, Dedear, McBride, Mniszewski, Rader)

<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>16 Agree (w/comment: Olenick)</td>
<td>16 Agree</td>
</tr>
<tr>
<td>0 Disagree</td>
<td>0 Disagree</td>
</tr>
</tbody>
</table>

There are two criteria necessary to pass ballot [(1) simple majority (2) affirmative ¼ vote]. Both questions must pass ballot in order to recommend that the Standards Council issue this TIA.

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

\[
21 \text{ eligible} \div 2 = 10.5 = (11) 
\]

(2) The number of affirmative votes needed to satisfy the ¼ requirement is 12.

\[
21 \text{ eligible to vote} - 5 \text{ not returned} - 0 \text{ abstentions} = 16 \times 0.75 = 12 
\]

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 **May 15, 2021**.
**QUESTION NO. 1: I AGREE with the TECHNICAL MERITS of the Proposed TIA Log No. 1568 to revise section 29.11.3.4 Items (4)(a), (4)(b), (5)(a) and (5)(b) of the Proposed 2022 edition of NFPA 72.**

Eligible to Vote: 21
Not Returned: 5
Aron, Dekker, McBride, Miniszewski, Rader

<table>
<thead>
<tr>
<th>Vote Selection</th>
<th>Votes</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agree</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>Wendy B. Gifford</td>
<td>Agree</td>
<td></td>
</tr>
<tr>
<td>Stephen M. Olsenbeck</td>
<td>Agree</td>
<td></td>
</tr>
<tr>
<td>Agree with this though I will note UL is saying they are only changing the 217 date, not the 268 date. See <a href="https://www.ul.com/news/news-brief-ul-extends-effect-date-smoke-alarm-and-smoke-detector-manufacturer%3A%2F%2F2020%25F%2Fannouncing%20the%20effective%2C%20268%20date%26date%202022">https://www.ul.com/news/news-brief-ul-extends-effect-date-smoke-alarm-and-smoke-detector-manufacturer%3A%2F%2F2020%F%2Fannouncing%20the%20effective%2C%20268%20date%26date%202022</a>. &amp;text=The%20decision%20to%20extend%20the%202022%20date%20may%20impact%20pandemic.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>David T. Gotski</td>
<td>Agree</td>
<td></td>
</tr>
<tr>
<td>Cory Oclega</td>
<td>Agree</td>
<td></td>
</tr>
<tr>
<td>Larry Rattiaff</td>
<td>Agree</td>
<td></td>
</tr>
<tr>
<td>Agree</td>
<td></td>
<td></td>
</tr>
<tr>
<td>George Bish</td>
<td>Agree</td>
<td></td>
</tr>
<tr>
<td>John L. Patsch</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>John D. Sorrel</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td>David E. Christian</td>
<td>Agree</td>
<td></td>
</tr>
<tr>
<td>Robert A. Schmidt</td>
<td>Agree</td>
<td></td>
</tr>
<tr>
<td>Richard M. Simpson</td>
<td>Agree with the recommended change</td>
<td></td>
</tr>
<tr>
<td>Agree</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eric Savoie</td>
<td>Agree</td>
<td></td>
</tr>
<tr>
<td>Thomas G. Cleary</td>
<td>Agree</td>
<td></td>
</tr>
<tr>
<td>Jeffrey L. Olson</td>
<td>AGRÉE</td>
<td></td>
</tr>
<tr>
<td>Paul Murphy</td>
<td>Agree</td>
<td></td>
</tr>
<tr>
<td>Greg L. Jensen</td>
<td>Agree</td>
<td></td>
</tr>
</tbody>
</table>

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

Eligible to Vote: 21
Not Returned: 5
Aron, Dekker, McBride, Miniszewski, Rader

<table>
<thead>
<tr>
<th>Vote Selection</th>
<th>Votes</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agree</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>Wendy B. Gifford</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td>Stephen M. Olsenbeck</td>
<td>E</td>
<td></td>
</tr>
<tr>
<td>David T. Gotski</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>Cory Oclega</td>
<td>Agree</td>
<td></td>
</tr>
<tr>
<td>Larry Rattiaff</td>
<td>Agree</td>
<td></td>
</tr>
<tr>
<td>George Bish</td>
<td>Agree</td>
<td></td>
</tr>
<tr>
<td>John L. Patsch</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>John D. Sorrel</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td>David E. Christian</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>Robert A. Schmidt</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>Richard M. Simpson</td>
<td>Agree with the recommended change</td>
<td></td>
</tr>
<tr>
<td>Agree</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eric Savoie</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>The NFPA Standard contains a conflict with the NFPA Standard or with another NFPA Standard.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thomas G. Cleary</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>Jeffrey L. Olson</td>
<td>AGREED</td>
<td></td>
</tr>
<tr>
<td>Paul Murphy</td>
<td>Agree</td>
<td></td>
</tr>
<tr>
<td>Greg L. Jensen</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td>The standard contains an error or omission that was overlooked during the regular revision process.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Abstain**
MEMORANDUM

TO: Correlating Committee on Signaling Systems for the Protection of Life and Property

FROM: Jenny Depew, Committee Administrator

DATE: May 10, 2021

SUBJECT: NFPA 72® Proposed TIA No. 1568 FINAL CC BALLOT RESULTS

No Public Comments were received on this TIA, therefore, according to 5.6(b) in the NFPA Regs, the final results show this TIA HAS achieved the ¼ majority vote needed on both Ballot Item No. 1 (Correlation Issues) and Ballot Item No. 2 (Emergency Nature).

19 Eligible to Vote
3 Not Returned (Leber, LeBlanc, Ludden)

Correlation Issues:  
0 Abstentions
15 Agree
1 Disagree (Heffernan)

Emergency Nature:  
0 Abstentions
15 Agree (w/ comment: Black)
1 Disagree (Parrish)

There are two criteria necessary to pass ballot [(1) simple majority (2) affirmative vote of ¼ of ballots received]. Both questions must pass ballot in order to recommend that the Standards Council issue this TIA.

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

\[
\text{[19 eligible ÷ 2 = 9.5 = (10)]}
\]

(2) The number of affirmative votes needed to satisfy the ¼ requirement is \textbf{12}.

\[
(19 \text{ eligible to vote} - 3 \text{ not returned} - 0 \text{ abstentions} = 16 \times 0.75 = 12)
\]

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.

\textbf{Appeal Closing Date} for this TIA is \textbf{May 15, 2021}. 
## QUESTION NO. 1: I AGREE there are no CORRELATION ISSUES in accordance with 3.4.2 and 3.4.3 of the NFPA Regs.

**Eligible to Vote:** 19  
**Not Returned:** 3  
Leber, LeBlanc, Ludden

<table>
<thead>
<tr>
<th>Vote Selection</th>
<th>Votes</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agree</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Frank L. Van Overmeiren</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rodger Reiswig</td>
<td></td>
<td>Agree</td>
</tr>
<tr>
<td>Thomas F. Norton</td>
<td></td>
<td>agree</td>
</tr>
<tr>
<td>Lynn Nielson</td>
<td></td>
<td>agree</td>
</tr>
<tr>
<td>Art Black</td>
<td></td>
<td>I don't see any correlation issues.</td>
</tr>
<tr>
<td>Shane M. Clary</td>
<td></td>
<td>Agree</td>
</tr>
<tr>
<td>Merton W. Bunker, Jr.</td>
<td></td>
<td>B</td>
</tr>
<tr>
<td>Kyle Krueger</td>
<td></td>
<td>Agree</td>
</tr>
<tr>
<td>Robert P. Schifiliti</td>
<td></td>
<td>I AGREE there are no CORRELATION ISSUES in accordance with 3.4.2 and 3.4.3 of the NFPA Regs</td>
</tr>
<tr>
<td>Peter A. Larrimer</td>
<td></td>
<td>Agree</td>
</tr>
<tr>
<td>Andrew G. Berezowski</td>
<td></td>
<td>Agree</td>
</tr>
<tr>
<td>Louis Chavez</td>
<td></td>
<td>Agree</td>
</tr>
<tr>
<td>Jeffery G. Van Keuren</td>
<td></td>
<td>Agree</td>
</tr>
<tr>
<td>Thomas J. Parrish</td>
<td></td>
<td>agree</td>
</tr>
<tr>
<td>Douglas M. Aiken</td>
<td></td>
<td>Agree</td>
</tr>
</tbody>
</table>

| Disagree             | 1     | Conflict in the 2022 Draft edition of NFPA 72 Chapter 29 installation requirements. |

| Abstain              | 0     |                                                                          |

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

**Eligible to Vote:** 19  
**Not Returned:** 3  
Leber, LeBlanc, Ludden

<table>
<thead>
<tr>
<th>Vote Selection</th>
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<tbody>
<tr>
<td>Agree</td>
<td>15</td>
<td></td>
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<tr>
<td>Frank L. Van Overmeiren</td>
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</tr>
<tr>
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<td>A. The standard contains an error or an omission that was overlooked during the regular revision process.</td>
</tr>
<tr>
<td>Thomas F. Norton</td>
<td></td>
<td>A.</td>
</tr>
<tr>
<td>Lynn Nielson</td>
<td></td>
<td>Agree</td>
</tr>
<tr>
<td>Art Black</td>
<td></td>
<td>I agree that this is of an emergency nature due to the importance of aligning NFPA standards with UL standards.</td>
</tr>
<tr>
<td>Shane M. Clary</td>
<td></td>
<td>The proposed TIA intends to correct a circumstance in which the revised NFPA Standard has resulted in an adverse impact on a product or method that was inadvertently overlooked in the total revision process or was without adequate technical (safety) justification for the action.</td>
</tr>
<tr>
<td>Rick Hefferman</td>
<td></td>
<td>B</td>
</tr>
<tr>
<td>Merton W. Bunker, Jr.</td>
<td></td>
<td>B</td>
</tr>
<tr>
<td>Kyle Krueger</td>
<td></td>
<td>B</td>
</tr>
<tr>
<td>Robert P. Schifiliti</td>
<td></td>
<td>I AGREE that the subject is of an EMERGENCY NATURE for one or more of the reasons noted in the Instructions box</td>
</tr>
<tr>
<td>Peter A. Larrimer</td>
<td></td>
<td>A.</td>
</tr>
<tr>
<td>Andrew G. Berezowski</td>
<td></td>
<td>Reason D</td>
</tr>
<tr>
<td>Louis Chavez</td>
<td></td>
<td>Agree for one or more reasons noted.</td>
</tr>
<tr>
<td>Jeffery G. Van Keuren</td>
<td></td>
<td>D</td>
</tr>
<tr>
<td>Douglas M. Aiken</td>
<td></td>
<td>A.</td>
</tr>
</tbody>
</table>

| Disagree             | 1     | I do not feel this constitutes an emergency nature.                        |

| Abstain              | 0     |                                                                          |