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<th>17-12-1</th>
<th>Act on the issuance of proposed Tentative Interim Amendment (TIA) to revise various sections of the 2017 edition of NFPA 25, <em>Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems</em> (TIA No. 1287).</th>
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<tr>
<td>17-12-1-a</td>
<td>Text of proposed TIA No. 1287. See Attachment 17-12-1-a</td>
</tr>
<tr>
<td>17-12-1-b</td>
<td>Ballot results of TIA No. 1287. <em>(PASSED TC</em> ballot on both technical merit and emergency nature -34 voting members/26 agree on technical merit/6 disagree/1 abstained/25 agree on emergency nature/7 disagree/1 abstained/1 ballot not returned  See Attachment 17-12-1-b</td>
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<tr>
<td>17-12-1-c</td>
<td>One comment was received. See Attachment 17-12-1-c</td>
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<tr>
<td>17-12-2-a</td>
<td>Text of proposed TIA No. 1295. See Attachment 17-12-2-a</td>
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<tr>
<td>17-12-2-b</td>
<td>Ballot results of TIA No. 1295. <em>(FAILED TC</em> ballot on both technical merit and emergency nature -27 voting members/11 agree on technical merit/10 disagree/3 abstained/10 agree on emergency nature/9 disagree/5 abstained/3 ballots not returned  See Attachment 17-12-2-b</td>
</tr>
<tr>
<td>17-12-2-c</td>
<td>Two comments were received. 17-12-2-c</td>
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<tr>
<td>17-12-3-a</td>
<td>Text of proposed TIA No. 1342. See Attachment 17-12-3-a</td>
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<tr>
<td>17-12-3-b</td>
<td>Final Ballot results of TIA No. 1342. <em>(PASSED TC</em> ballot on both technical merit and emergency nature -26 voting members/26 agree on technical merit/0 disagree/0 abstained/25 agree on emergency nature/1 disagree/0 abstained/0 ballots not returned.  See Attachment 17-12-3-b</td>
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<td>17-12-3-c</td>
<td>No comments were received. No Attachment</td>
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<tr>
<td>17-12-4</td>
<td>Act on the issuance of proposed Tentative Interim Amendment (TIA) to revise Article 700.10(D)(1)(3) of the 2017 edition of NFPA 70, <em>National Electrical Code®</em> (TIA No. 1282).</td>
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<td>17-12-4-a</td>
<td>Text of proposed TIA No.1282. See Attachment 17-12-4-a</td>
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<tr>
<td>17-12-4-b</td>
<td>Ballot results of TIA No. 1282. <em>(PASSED Panel</em> ballot on both technical merit and emergency nature – 21 voting members/19 agree on technical merit/0 disagree/0 abstained/18 agree on emergency nature/1 disagree/0 abstained/2 ballots not returned and <strong>PASSED CC</strong> ballot on both correlation and emergency nature – 12 voting members/10 agree on correlation/0 disagree/0 abstained/10 agree on emergency nature/0 disagree/0 abstained/2 ballots not returned).  See Attachment 17-12-4-b</td>
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<td>17-12-4-c</td>
<td>No comments were received. No Attachment</td>
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<tr>
<td>17-12-5</td>
<td>Act on the issuance of proposed Tentative Interim Amendment (TIA) to revise Article 700.10(D) of the 2017 edition of NFPA 70, National Electrical Code® (TIA No. 1293).</td>
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<td>17-12-5-a</td>
<td>Text of proposed TIA No. 1293. See Attachment 17-12-5-a</td>
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<tr>
<td>17-12-5-b</td>
<td>Ballot results of TIA No. 1293. (PASSED Panel) ballot on both technical merit and emergency nature – 21 voting members/16 agree on technical merit/2 disagree/0 abstained/16 agree on emergency nature/2 disagree/0 abstained/3 ballots not returned and PASSED CC ballot on both correlation and emergency nature – 12 voting members/10 agree on correlation/0 disagree/0 abstained/10 agree on emergency nature/0 disagree/0 abstained/2 ballots not returned). See Attachment 17-12-5-b</td>
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<tr>
<td>17-12-5-c</td>
<td>Four comments were received. See Attachment 17-12-5-c</td>
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<td>17-12-6</td>
<td>Act on the issuance of proposed Tentative Interim Amendment (TIA) to revise Article 625.17(B) 2017 edition of NFPA 70, National Electrical Code® (TIA No. 1296).</td>
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<td>17-12-6-a</td>
<td>Text of proposed TIA No. 1296. See Attachment 17-12-6-a</td>
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<td>17-12-6-b</td>
<td>Ballot results of TIA No. 1296. (PASSED Panel) ballot on both technical merit and emergency nature – 12 voting members/11 agree on technical merit/0 disagree/0 abstained/11 agree on emergency nature/0 disagree/0 abstained/1 ballot not returned and PASSED CC ballot on both correlation and emergency nature – 12 voting members/11 agree on correlation/1 disagree/0 abstained/11 agree on emergency nature/1 disagree/0 abstained/0 ballots not returned). See Attachment 17-12-6-b</td>
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<td>17-12-6-c</td>
<td>One comment was received. See Attachment 17-12-6-c</td>
</tr>
<tr>
<td>17-12-7</td>
<td>Act on the issuance of proposed Tentative Interim Amendment (TIA) to add a new definition to 725.2, revise 725.121(C) and revise 725.144(A) of the 2017 edition of NFPA 70, National Electrical Code® (TIA No. 1299).</td>
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<tr>
<td>17-12-7-a</td>
<td>Text of proposed TIA No. 1299. See Attachment 17-12-7-a</td>
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<tr>
<td>17-12-7-b</td>
<td>Ballot results of TIA No. 1299. (PASSED Panel) ballot on both technical merit and emergency nature – 16 voting members/13 agree on technical merit/1 disagree/0 abstained/11 agree on emergency nature/2 disagree/1 abstained/2 ballots not returned and PASSED CC ballot on both correlation and emergency nature – 12 voting members/11 agree on correlation/0 disagree/0 abstained/10 agree on emergency nature/1 disagree/0 abstained/1 ballot not returned). See Attachment 17-12-7-b</td>
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<tr>
<td>17-12-7-c</td>
<td>Three comments were received. See Attachment 17-12-7-c</td>
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<tr>
<td>17-12-8</td>
<td>Act on the issuance of proposed Tentative Interim Amendment (TIA) to revise Article 725.144(B) of the 2017 edition of NFPA 70, National Electrical Code® (TIA No. 1300).</td>
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<td>17-12-8-a</td>
<td>Text of proposed TIA No. 1300. See Attachment 17-12-8-a</td>
</tr>
<tr>
<td>17-12-8-b</td>
<td>Ballot results of TIA No.1300. (PASSED Panel) ballot on both technical merit and emergency nature – 16 voting members/14 agree on technical merit/0 disagree/0 abstained/12 agree on emergency nature/1 disagree/1 abstained/2 ballots not returned and PASSED CC ballot on both correlation and emergency nature – 12 voting members/9 agree on correlation/2 disagree/0 abstained/10 agree on emergency nature/1 disagree/0 abstained/1 ballot not returned). See Attachment 17-12-8-b</td>
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<td>17-12-8-c</td>
<td>No comments were received. No Attachment</td>
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<tr>
<td>17-12-9</td>
<td>Act on the issuance of proposed Tentative Interim Amendment (TIA) to add a new definition to 840.2 and to revise 840.160 of the 2017 edition of NFPA 70, National Electrical Code® (TIA No. 1301).</td>
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<tr>
<td>17-12-9-a</td>
<td>Text of proposed TIA No. 1301. See Attachment 17-12-9-a</td>
</tr>
<tr>
<td>17-12-9-b</td>
<td>Ballot results of TIA No.1301. (<strong>PASSED</strong> Panel ballot on technical merit but <strong>FAILED</strong> Panel ballot on emergency nature – 17 voting members/13 agree on technical merit/3 disagree/0 abstained/10 agree on emergency nature/5 disagree/1 abstained/1 ballot not returned and <strong>PASSED</strong> CC ballot on correlation but <strong>FAILED</strong> CC ballot on emergency nature – 12 voting members/1 agree on correlation/0 disagree/0 abstained/7 agree on emergency nature/4 disagree/0 abstained/1 ballot not returned). See Attachment 17-12-9-b</td>
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<tr>
<td>17-12-9-c</td>
<td>Three comments were received. See Attachment 17-12-9-c</td>
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<tr>
<td>17-12-9-d</td>
<td><strong>APPEAL</strong> Consider the appeal of Joel Goergen of Cisco Corporation requesting the Council issue proposed TIA No. 1301, NFPA 70, <em>National Electrical Code®</em>. The TIA failed Panel ballot and CC ballot on emergency nature.</td>
</tr>
<tr>
<td>17-12-9-e</td>
<td>Comment received by T. Moore, Chair, Code Making Panel 16 on the appeal of J. Goergen. See Attachment 17-12-9-e</td>
</tr>
<tr>
<td>17-12-9-f</td>
<td>Two comments received on Appeal. See Attachment SA17-12-9-f ADDITION</td>
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<tr>
<td>17-12-10</td>
<td>Act on the issuance of proposed Tentative Interim Amendment (TIA) to revise 336.10(9) of the 2017 edition of NFPA 70, <em>National Electrical Code®</em> (TIA No. 1310).</td>
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<tr>
<td>17-12-10-a</td>
<td>Text of proposed TIA No. 1310. See Attachment 17-12-10-a</td>
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<tr>
<td>17-12-10-b</td>
<td>Ballot results of TIA No. 1310. (<strong>PASSED</strong> Panel ballot on both technical merit and emergency nature – 12 voting members/11 agree on technical merit/0 disagree/0 abstained/11 agree on emergency nature/1 disagree/0 abstained/0 ballots not returned and <strong>PASSED</strong> CC ballot on both correlation and emergency nature – 12 voting members/10 agree on correlation/0 disagree/0 abstained/0 agree on emergency nature/0 disagree/0 abstained/2 ballots not returned). See Attachment 17-12-10-b</td>
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<td>17-12-10-c</td>
<td>No comments were received. No Attachment</td>
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<tr>
<td>17-12-11</td>
<td>Act on the issuance of proposed Tentative Interim Amendment (TIA) to revise Section 505.9(E)(2) of the 2017 edition of NFPA 70, <em>National Electrical Code®</em> (TIA No. 1338).</td>
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<tr>
<td>17-12-11-a</td>
<td>Text of proposed TIA No. 1338. See Attachment 17-12-11-a</td>
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<tr>
<td>17-12-11-b</td>
<td>Final Ballot results of TIA No. 1338. (<strong>PASSED</strong> Panel ballot on both technical merit and emergency nature – 17 voting members/15 agree on technical merit/0 disagree/0 abstained/14 agree on emergency nature/1 disagree/0 abstained/2 ballots not returned and <strong>PASSED</strong> CC ballot on both correlation and emergency nature – 12 voting members/10 agree on correlation/0 disagree/0 abstained/10 agree on emergency nature/0 disagree/0 abstained/2 ballots not returned). See Attachment 17-12-11-b SA17-12-11-b</td>
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<td>17-12-11-c</td>
<td>One comment was received. SA17-12-11-c</td>
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<tr>
<td>17-12-12-a</td>
<td>Text of proposed TIA No. 1318. See Attachment 17-12-12-a</td>
</tr>
<tr>
<td>17-12-12-b</td>
<td>Ballot results of TIA No. 1318. (<strong>PASSED TC</strong> ballot on both technical merit and emergency nature – 28 voting members/21 agree on technical merit/2 disagree/0 abstained/20 agree on emergency nature/3 disagree/0 abstained/5 ballots not returned and <strong>PASSED</strong> CC ballot on both correlation and emergency nature – 12 voting members/10 agree on correlation/0 disagree/0 abstained/10 agree on emergency nature/0 disagree/0 abstained/2 ballots not returned). See Attachment 17-12-12-b</td>
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<tr>
<td>17-12-12-c</td>
<td>No comments were received. No Attachment</td>
</tr>
<tr>
<td>17-12-13</td>
<td>Act on the issuance of proposed Tentative Interim Amendment (TIA) and add new sections 9.3.5 (new) and 9.11.4 to the 2018 edition of NFPA 101, <em>Life Safety Code®</em> (TIA No. 1322).</td>
</tr>
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</table>
### 17-12-13

**Text of proposed TIA No. 1322. See Attachment 17-12-13-a**

**Ballot results of TIA No.1322. (PASSED TC ballot on both technical merit and emergency nature – 28 voting members/21 agree on technical merit/1 disagree/0 abstained/22 agree on emergency nature/1 disagree/0 abstained/6 ballots not returned and PASSED CC ballot on both correlation and emergency nature – 12 voting members/10 agree on correlation/0 disagree/0 abstained/10 agree on emergency nature/0 disagree/0 abstained/2 ballots not returned). See Attachment 17-12-13-b**

**17-12-13-c**

No comments were received. No Attachment

### 17-12-14

**Text of proposed TIA No. 1326. See Attachment 17-12-14-a**

**Ballot results of TIA No.1326. (PASSED TC ballot on both technical merit and emergency nature – 23 voting members/18 agree on technical merit/2 disagree/0 abstained/19 agree on emergency nature/2 disagree/1 abstained/3 ballots not returned and PASSED CC ballot on both correlation and emergency nature – 12 voting members/10 agree on correlation/0 disagree/0 abstained/10 agree on emergency nature/0 disagree/0 abstained/2 ballots not returned). See Attachment 17-12-14-b**

**17-12-14-c**

No comments were received. No Attachment

### 17-12-15

**Text of proposed TIA No. 1328. See Attachment 17-12-15-a**

**Ballot results of TIA No.1328. (PASSED TC ballot on both technical merit and emergency nature – 24 voting members/20 agree on technical merit/1 disagree/0 abstained/24 agree on emergency nature/2 disagree/0 abstained/2 ballots not returned and PASSED CC ballot on both correlation and emergency nature – 12 voting members/10 agree on correlation/0 disagree/0 abstained/10 agree on emergency nature/0 disagree/0 abstained/2 ballots not returned). See Attachment 17-12-15-b**

**17-12-15-c**

No comments were received. No Attachment

### 17-12-16

**Text of proposed TIA No. 1330. See Attachment 17-12-16-a**

**Ballot results of TIA No.1330. (PASSED TC ballot on both technical merit and emergency nature – 30 voting members/29 agree on technical merit/1 disagree/0 abstained/29 agree on emergency nature/1 disagree/0 abstained/0 ballots not returned and PASSED CC ballot on both correlation and emergency nature – 12 voting members/10 agree on correlation/0 disagree/0 abstained/10 agree on emergency nature/0 disagree/0 abstained/2 ballots not returned). See Attachment 17-12-16-b**

**17-12-16-c**

No comments were received. No Attachment

### 17-12-17

**Text of proposed TIA No. 1332. See Attachment 17-12-17-a**

**Ballot results of TIA No.1332. (PASSED TC ballot on both technical merit and emergency nature – 30 voting members/24 agree on technical merit/2 disagree/0 abstained/24 agree on emergency nature/2 disagree/0 abstained/4 ballots not returned and PASSED CC ballot on both correlation and emergency nature – 12 voting members/10 agree on correlation/0 disagree/0 abstained/10 agree on emergency nature/0 disagree/0 abstained/2 ballots not returned). See Attachment 17-12-17-b**

**17-12-17-c**

No comments were received. No Attachment
correlation and emergency nature – 12 voting members/10 agree on correlation/0 disagree/0 abstained/10 agree on emergency nature/0 disagree/0 abstained/2 ballots not returned). See Attachment 17-12-17-b

17-12-18
Act on the issuance of proposed Tentative Interim Amendment (TIA) to revise section 36.7.8, 37.7.8, 38.7(new), 39.7.8 and 39.4.2.4 of the 2018 edition of NFPA 101, Life Safety Code® (TIA No. 1334).

17-12-18-a
Text of proposed TIA No. 1334. See Attachment 17-12-18-a

17-12-18-b
Ballot results of TIA No.1334. (PASSED TC ballot on both technical merit and emergency nature – 26 voting members/23 agree on technical merit/1 disagree/0 abstained/21 agree on emergency nature/3 disagree/0 abstained/2 ballots not returned and PASSED CC ballot on both correlation and emergency nature – 12 voting members/10 agree on correlation/0 disagree/0 abstained/10 agree on emergency nature/0 disagree/0 abstained/2 ballots not returned). See Attachment 17-12-18-b

17-12-18-c
No comments were received. No Attachment

17-12-19
Act on the issuance of proposed Tentative Interim Amendment (TIA) and add new section 26.7.2(new), 28.7.8(new), 30.7.4 and 31.7.4(new) to the 2018 edition of NFPA 101, Life Safety Code® (TIA No. 1336).

17-12-19-a
Text of proposed TIA No. 1336. See Attachment 17-12-19-a

17-12-19-b
Ballot results of TIA No.1336. (PASSED TC ballot on both technical merit and emergency nature – 30 voting members/24 agree on technical merit/2 disagree/0 abstained/23 agree on emergency nature/3 disagree/0 abstained/4 ballots not returned and PASSED CC ballot on both correlation and emergency nature – 12 voting members/10 agree on correlation/0 disagree/0 abstained/10 agree on emergency nature/0 disagree/0 abstained/2 ballots not returned). See Attachment 17-12-19-b

17-12-19-c
No Comments were received. No Attachment

17-12-20
Act on the issuance of proposed Tentative Interim Amendment (TIA) to revise section 5.1.10 of the 2017 edition of NFPA 407, Standard for Aircraft Fuel Servicing (TIA No. 1339).

17-12-20-a
Text of proposed TIA No. 1339. See Attachment 17-12-20-a

17-12-20-b
Ballot results of TIA No. 1339. (PASSED TC ballot on both technical merit and emergency nature -28 voting members/17 agree on technical merit/1 disagree/0 abstained/17 agree on emergency nature/1 disagree/0 abstained/10 ballots not returned  See Attachment 17-12-20-b

17-12-20-c
One comment was received. See Attachment 17-12-20-c

17-12-21
Act on the issuance of proposed Tentative Interim Amendment (TIA) to revise section 8.2 of the 2017 edition of NFPA 1006, Standard for Technical Rescue Personnel Professional Qualifications (TIA No. 1305).

17-12-21-a
Text of proposed TIA No. 1305. See Attachment 17-12-21-a

17-12-21-b
Ballot results of TIA No.1305. (PASSED TC ballot on both technical merit and emergency nature –30 voting members/22 agree on technical merit/0 disagree/0 abstained/22 agree on emergency nature/0 disagree/0 abstained/8 ballots not returned and PASSED CC ballot on both correlation and emergency nature –20 voting members/18 agree on correlation/0 disagree/0 abstained/18 agree on emergency nature/0 disagree/0 abstained/2 ballots not returned). See Attachment 17-12-21-b

17-12-21-c
One comment was received. See Attachment 17-12-21-c
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<th>Date</th>
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| 17-12-22 | Act on the issuance of proposed Tentative Interim Amendment (TIA) to revise sections 3.3.40 and add new section 3.3.41 of the 2016 edition of NFPA1126, *Standard for the Use of Pyrotechnics Before a Proximate Audience* (TIA No.1317). | Text of proposed TIA No.1317. See Attachment 17-12-22-a  
Ballot results of TIA No.1317. **PASSED** TC ballot on both technical merit and emergency nature -29 voting members/25 agree on technical merit/1 disagree/0 abstained/24 agree on emergency nature/1 disagree/1 abstained/3 ballots not returned  See Attachment 17-12-22-b  
One comment was received. See Attachment 17-12-22-c |
| 17-12-23 | Act on the issuance of proposed Tentative Interim Amendment (TIA) to revise sections 9.6.2.1.1.1 and 9.6.2.1.4 of the 2016 edition of NFPA 1221, *Standard for the Installation, Maintenance, and Use of Emergency Services Communications* (TIA No.1302). | Text of proposed TIA No.1302. See Attachment 17-12-23-a  
Ballot results of TIA No.1302. **PASSED** TC ballot on both technical merit and emergency nature -30 voting members/26 agree on technical merit/1 disagree/0 abstained/26 agree on emergency nature/0 disagree/1 abstained/3 ballots not returned  See Attachment 17-12-23-b  
No comments were received. No Attachment |
| 17-12-24 | Act on the issuance of proposed Tentative Interim Amendment (TIA) to add new sections 4.3.23.1 and 4.3.23.1.1 to the 2018 edition of NFPA 1981, *Standard on Open-Circuit Self-Contained Breathing Apparatus (SCBA) for Emergency Services* (TIA No.1341). | Text of proposed TIA No.1341. See Attachment 17-12-24-a  
Ballot results of TIA No.1341. **FAILED** TC ballot on both technical merit and emergency nature –34 voting members/15 agree on technical merit/10 disagree/3 abstained/15 agree on emergency nature/9 disagree/4 abstained/6 ballots not returned and **FAILED** CC ballot on both correlation and emergency nature –32 voting members/15 agree on correlation/11 disagree/3 abstained/16 agree on emergency nature/9 disagree/4 abstained/3 ballots not returned. See Attachment 17-12-24-b  
Twenty-three comments were received. See Attachment 17-12-24-c |
Ballot results of TIA No.1340. **PASSED** TC ballot on both technical merit and emergency nature –36 voting members/25 agree on technical merit/5 disagree/1 abstained/23 agree on emergency nature/5 disagree/3 abstained/5 ballots not returned and **FAILED** CC ballot on both correlation and emergency nature –32 voting members/13 agree on correlation/11 disagree/3 abstained/14 agree on emergency nature/9 disagree/4 abstained/5 ballots not returned. See Attachment 17-12-25-b  
Five comments were received. See Attachment 17-12-25-c |
| 17-12-26 | Act on the issuance of proposed Tentative Interim Amendment (TIA) to revise Section 16.3.7 of the 2018 edition of NFPA 5000, *Building Construction and Safety Code®* (TIA No.1319). | Text of proposed TIA No.1319. See Attachment 17-12-26-a  
Ballot results of TIA No.1319. **PASSED** TC ballot on both technical merit and emergency nature –28 voting members/19 agree on technical merit/1 disagree/0 abstained/18 agree on emergency nature. See Attachment 17-12-26-b  
One comment was received. See Attachment 17-12-26-c |
<table>
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<th>Ballot Results</th>
<th>Additional Information</th>
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<td>17-12-26-c</td>
<td>No comments were received. No Attachment</td>
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<td>17-12-27</td>
<td>Act on the issuance of proposed Tentative Interim Amendment (TIA) to add new section 26.3.6 to the 2018 edition of NFPA 5000,  <em>Building Construction and Safety Code®</em>  (TIA No.1321).</td>
<td>PASSED CC ballot on both correlation and emergency nature – 18 voting members/13 agree on correlation/1 disagree/0 abstained/13 agree on emergency nature/1 disagree/0 abstained/4 ballots not returned.</td>
<td>See Attachment 17-12-26-b</td>
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<td>17-12-27-a</td>
<td>Text of proposed TIA No.1321. See Attachment 17-12-27-a</td>
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<tr>
<td>17-12-27-b</td>
<td>Ballot results of TIA No.1321. (PASSED TC ballot on both technical merit and emergency nature – 22 voting members/16 agree on technical merit/0 disagree/0 abstained/16 agree on emergency nature/0 disagree/0 abstained/6 ballots not returned and PASSED CC ballot on both correlation and emergency nature – 18 voting members/13 agree on correlation/1 disagree/0 abstained/13 agree on emergency nature/1 disagree/0 abstained/4 ballots not returned.</td>
<td>See Attachment 17-12-27-b</td>
<td></td>
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<tr>
<td>17-12-27-c</td>
<td>No comments were received. No Attachment</td>
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<td>17-12-28</td>
<td>Act on the issuance of proposed Tentative Interim Amendment (TIA) to replace 55.1.4.2 and associated Annex A material with new 55.1.4.2 and new associated Annex A material of the 2018 edition of NFPA 5000,  <em>Building Construction and Safety Code®</em>  (TIA No.1323).</td>
<td>PASSED TC ballot on both technical merit and emergency nature – 28 voting members/20 agree on technical merit/1 disagree/0 abstained/20 agree on emergency nature/1 disagree/0 abstained/7 ballots not returned and PASSED CC ballot on both correlation and emergency nature – 18 voting members/14 agree on correlation/1 disagree/0 abstained/14 agree on emergency nature/1 disagree/0 abstained/3 ballots not returned.</td>
<td>See Attachment 17-12-28-b</td>
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<tr>
<td>17-12-28-a</td>
<td>Text of proposed TIA No.1323. See Attachment 17-12-28-a</td>
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<tr>
<td>17-12-28-b</td>
<td>Ballot results of TIA No.1323. (PASSED TC ballot on both technical merit and emergency nature – 28 voting members/20 agree on technical merit/1 disagree/0 abstained/20 agree on emergency nature/1 disagree/0 abstained/7 ballots not returned and PASSED CC ballot on both correlation and emergency nature – 18 voting members/14 agree on correlation/1 disagree/0 abstained/14 agree on emergency nature/1 disagree/0 abstained/3 ballots not returned.</td>
<td>See Attachment 17-12-28-b</td>
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<td>17-12-28-c</td>
<td>No comments were received. No Attachment</td>
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<tr>
<td>17-12-29</td>
<td>Act on the issuance of proposed Tentative Interim Amendment (TIA) to revise section 21.3.9 of the 2018 edition of NFPA 5000,  <em>Building Construction and Safety Code®</em>  (TIA No.1325).</td>
<td>PASSED TC ballot on both technical merit and emergency nature – 16 voting members/10 agree on technical merit/0 disagree/0 abstained/10 agree on emergency nature/0 disagree/0 abstained/6 ballots not returned and PASSED CC ballot on both correlation and emergency nature – 18 voting members/13 agree on correlation/1 disagree/0 abstained/13 agree on emergency nature/1 disagree/0 abstained/4 ballots not returned.</td>
<td>See Attachment 17-12-29-b</td>
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<tr>
<td>17-12-29-a</td>
<td>Text of proposed TIA No.1325. See Attachment 17-12-29-a</td>
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<td>17-12-29-b</td>
<td>Ballot results of TIA No.1325. (PASSED TC ballot on both technical merit and emergency nature – 16 voting members/10 agree on technical merit/0 disagree/0 abstained/10 agree on emergency nature/0 disagree/0 abstained/6 ballots not returned and PASSED CC ballot on both correlation and emergency nature – 18 voting members/13 agree on correlation/1 disagree/0 abstained/13 agree on emergency nature/1 disagree/0 abstained/4 ballots not returned.</td>
<td>See Attachment 17-12-29-b</td>
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<tr>
<td>17-12-29-c</td>
<td>No comments were received. No Attachment</td>
<td></td>
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<tr>
<td>17-12-30</td>
<td>Act on the issuance of proposed Tentative Interim Amendment (TIA) to revise sections 17.3.8 and 18.3.8 of the 2018 edition of NFPA 5000,  <em>Building Construction and Safety Code®</em>  (TIA No.1327).</td>
<td>PASSED TC ballot on both technical merit and emergency nature – 23 voting members/18 agree on technical merit/2 disagree/0 abstained/17 agree on emergency nature/2 disagree/1 abstained/3 ballots not returned and PASSED CC ballot on both correlation and emergency nature – 18 voting members/13 agree on correlation/1 disagree/0 abstained/13 agree on emergency nature/1 disagree/0 abstained/4 ballots not returned.</td>
<td>See Attachment 17-12-30-b</td>
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<tr>
<td>17-12-30-a</td>
<td>Text of proposed TIA No. 1327. See Attachment 17-12-30-a</td>
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<tr>
<td>17-12-30-b</td>
<td>Ballot results of TIA No.1327. (PASSED TC ballot on both technical merit and emergency nature – 23 voting members/18 agree on technical merit/2 disagree/0 abstained/17 agree on emergency nature/2 disagree/1 abstained/3 ballots not returned and PASSED CC ballot on both correlation and emergency nature – 18 voting members/13 agree on correlation/1 disagree/0 abstained/13 agree on emergency nature/1 disagree/0 abstained/4 ballots not returned.</td>
<td>See Attachment 17-12-30-b</td>
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<td>Date</td>
<td>Description</td>
<td>Text of proposed TIA</td>
<td>Ballot results of TIA</td>
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<td>17-12-30-c</td>
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<td>17-12-31</td>
<td>Act on the issuance of proposed Tentative Interim Amendment (TIA) to add new Section 33.3.9 to the 2018 edition of NFPA 5000, <em>Building Construction and Safety Code</em>® (TIA No.1329).</td>
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<td>17-12-31-a</td>
<td>Text of proposed TIA No. 1329. See Attachment 17-12-31-a</td>
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<td>17-12-31-b</td>
<td>Ballot results of TIA No.1329. <em>(PASSED TC)</em> ballot on both technical merit and emergency nature –24 voting members/17 agree on technical merit/1 disagree/0 abstained/16 agree on emergency nature/2 disagree/0 abstained/6 ballots not returned and <em>(PASSED CC)</em> ballot on both correlation and emergency nature –18 voting members/13 agree on correlation/1 disagree/0 abstained/13 agree on emergency nature/1 disagree/0 abstained/4 ballots not returned). See Attachment 17-12-31-b</td>
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<td>17-12-31-c</td>
<td>No comments were received. No Attachment</td>
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<td>17-12-32</td>
<td>Act on the issuance of proposed Tentative Interim Amendment (TIA) to revise Section 19.3.4.6 and 20.3.4.5 of the 2018 edition of NFPA 5000, <em>Building Construction and Safety Code</em>® (TIA No.1331).</td>
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<td>17-12-32-a</td>
<td>Text of proposed TIA No. 1331. See Attachment 17-12-32-a</td>
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<td>17-12-32-b</td>
<td>Ballot results of TIA No. 1331. <em>(PASSED TC)</em> ballot on both technical merit and emergency nature –30 voting members/29 agree on technical merit/1 disagree/0 abstained/29 agree on emergency nature/1 disagree/0 abstained/0 ballots not returned and <em>(PASSED CC)</em> ballot on both correlation and emergency nature –18 voting members/13 agree on correlation/1 disagree/0 abstained/13 agree on emergency nature/1 disagree/0 abstained/4 ballots not returned). See Attachment 17-12-32-b</td>
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<td>17-12-32-c</td>
<td>No comments were received. No Attachment</td>
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<td>17-12-33</td>
<td>Act on the issuance of proposed Tentative Interim Amendment (TIA) to revise Section 29.3.7, 30.3.7 and 34.2.7(new) of the 2018 edition of NFPA 5000, <em>Building Construction and Safety Code</em>® (TIA No.1333).</td>
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<td>17-12-33-a</td>
<td>Text of proposed TIA No. 1333. See Attachment 17-12-33-a</td>
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<td>17-12-33-b</td>
<td>Ballot results of TIA No. 1333. <em>(PASSED TC)</em> ballot on both technical merit and emergency nature –30 voting members/21 agree on technical merit/2 disagree/0 abstained/21 agree on emergency nature/2 disagree/0 abstained/7 ballots not returned and <em>(PASSED CC)</em> ballot on both correlation and emergency nature –18 voting members/13 agree on correlation/1 disagree/0 abstained/13 agree on emergency nature/1 disagree/0 abstained/4 ballots not returned). See Attachment 17-12-33-b</td>
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<td>17-12-33-c</td>
<td>No comments were received. No Attachment</td>
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<td>17-12-34</td>
<td>Act on the issuance of proposed Tentative Interim Amendment (TIA) to revise Section 27.3.8 and 28.3.8 of the 2018 edition of NFPA 5000, <em>Building Construction and Safety Code</em>® (TIA No.1335).</td>
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<td>17-12-34-a</td>
<td>Text of proposed TIA No. 1335. See Attachment 17-12-34-a</td>
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<td>17-12-34-b</td>
<td>Ballot results of TIA No. 1335. <em>(PASSED TC)</em> ballot on both technical merit and emergency nature –26 voting members/20 agree on technical merit/1 disagree/0 abstained/19 agree on emergency nature/2 disagree/0 abstained/5 ballots not returned and <em>(PASSED CC)</em> ballot on both correlation and emergency nature –18 voting members/13 agree on correlation/1 disagree/0 abstained/13 agree on emergency nature/1 disagree/0 abstained/4 ballots not returned). See Attachment 17-12-34-b</td>
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<tr>
<td>17-12-34-c</td>
<td>No comments were received. No Attachment</td>
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17-12-35  Act on the issuance of proposed Tentative Interim Amendment (TIA) to add new Section 23.6(new), 24.5.5 and 25.5.5 to the 2018 edition of NFPA 5000, *Building Construction and Safety Code®* (TIA No.1337).

17-12-35-a  Text of proposed TIA No. 1337. See Attachment 17-12-35-a

17-12-35-b  Ballot results of TIA No. 1337. *(PASSED TC* ballot on both technical merit and emergency nature –30 voting members/24 agree on technical merit/1 disagree/0 abstained/23 agree on emergency nature/2 disagree/0 abstained/5 ballots not returned and *PASSED CC* ballot on both correlation and emergency nature –18 voting members/13 agree on correlation/1 disagree/0 correlation/13 agree on emergency nature/1 disagree/0 abstained/4 ballots not returned). See Attachment 17-12-35-b

17-12-35-c  No comments were received. No Attachment

17-12-36  **APPEAL**  

17-12-36-a  Appeal of Benjamin Mauti of Mine Safety Appliances Company, requesting the Standards Council delay the issuance of the proposed 2018 Edition of NFPA 1982, *Standard on Personal Alert Safety Systems (PASS)* to coincide with the issuance of NFPA 1981, *Standard on Open-Circuit Self-Contained Breathing Apparatus (SCBA) for Emergency Services* which received a Certified Amending Motion and will be on the agenda for the 2018 Tech Session. See Attachment 17-12-36

17-12-36-b  Comment received by R. Athanas, Chair of the Technical Committee on Electronic Safety Equipment (NFPA 1982), on the appeal of B. Mauti. See Attachment 17-12-36-a

17-12-36-c  Comment received by S. Hogg, Drager UK, in support of the appeal of B. Mauti. See Attachment 17-12-36-b

17-12-37  Consider requests from NFPA Committees to change revision cycles for the following documents:

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>17</td>
<td>2017</td>
<td>F2021</td>
<td>F2021 to A2020</td>
<td>Permanent Move from 5 to 3</td>
<td>5 to 3 ½ rev cycle</td>
</tr>
<tr>
<td>17A</td>
<td>2017</td>
<td>F2021</td>
<td>F2021 to A2020</td>
<td>Permanent Move from 5 to 3</td>
<td>5 to 3 ½ rev cycle</td>
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<tr>
<td>96</td>
<td>2017</td>
<td>F2019</td>
<td>F2019 to A2020</td>
<td>One Time Move</td>
<td>3 to 3 ½ rev cycle</td>
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<tr>
<td>1961</td>
<td>2013</td>
<td>A18 SDR</td>
<td>A2018SDR to A2019SDR</td>
<td>One Time Move</td>
<td>5 to 7 yr rev cycle</td>
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</table>

See Attachment 17-12-37

17-12-38  Consider the request of Dr. Craig Beyer, Jensen Hughes, to develop a project addressing organization and operation of fire investigation units (FIUs). Fifty-one comments were received. Twenty-seven comments supported development of the project, twenty-four comments did not support the development of the project. Twenty of the commenters indicated an interest in participating if a Committee was developed. See Attachment 17-12-38

17-12-39  Consider the request of Dave Finger, National Volunteer Fire Council, to develop a project addressing professional qualifications for fire service support personnel. Ten comments were received. Seven comments supported development of the project, three comments did not support the development of the project. Four of the commenters indicated an interest in participating if a Committee was developed. See Attachment 17-12-39

17-12-40  Consider the request of Richard Davis and Dr. Dong Zeng, FM Global, to develop a project to addressing test methods for determining the flammability of interior/exterior wall panels. Four comments were received. Three comments supported development of the project, one comment did not support the development of the project. One of the commenters indicated an interest in participating if a Committee was developed. See Attachment 17-12-40
| 17-12-41 | Consider the request of the Technical Committee on Hybrid (Water and Inert Gas) Fire Extinguishing Systems to enter new document NFPA 770, *Standard on Hybrid (Water and Inert Gas) Fire-Extinguishing Systems*, into the Annual 2020 revision cycle. The Council approved the establishment of this proposed document at the October 2014 Council Meeting. See Attachment 17-12-41 |
| 17-12-42 | Consider the request of the Technical Committee on Electrical Inspection Practices to enter new documents, NFPA 78, *Guide on Electrical Inspections*, and NFPA 1078, *Standard for Electrical Inspector Profession Qualifications*, into a custom revision cycle with a public input closing date of February 14, 2018. The Council approved the establishment of these proposed documents at the April 2017 Council Meeting. See Attachment 17-12-4 |
| 17-12-43 | At the August 2017 Standards Council meeting, the Council considered the request of Kenneth Linder, Chair, Automatic Sprinkler Systems Correlating Committee and NFPA Staff to merge NFPA 16, *Standard for the Installation of Foam-Water Sprinkler and Foam-Water Spray Systems* into NFPA 11, *Standard for Low-Medium-, and High-Expansion Foam* at the start of the next revision cycle for NFPA 11. After a review of all information provided, the Council voted to take no action at that time. The Council requested NFPA Staff report back to the Council with additional information detailing which installations would be extracted from NFPA 13, *Standard for the Installation of Sprinkler Systems* and determine if the scope of NFPA 11 needs revisions to include the requested material. The Council also requested that a notice be published to seek comments from the public and the Committees affected by the merger of NFPA 16 into NFPA 11. One comment was received in opposition of the merger. See Attachment 17-12-43 |
| 17-12-44 | Consider the request of the Technical Committee on Road Tunnel and Highway Fire Protection to revise the Committee scope as follows:  

**CURRENT SCOPE:** This Committee shall have primary responsibility for documents on fire prevention and fire protection measures to reduce loss of life and property damage for road tunnels, air-right structures, bridges, and limited access highways. Excluded from this scope is the protection for facilities for the storage, repair, and parking of motor vehicles.  

**PROPOSED SCOPE:** This Committee shall have primary responsibility for documents on fire prevention and fire protection measures to reduce loss of life and property damage for limited access highways, road tunnels, air-right structures, bridges, and limited access highways, elevated highways, depressed highways, and roadways that are located beneath air-right structures. Excluded from this scope is the protection for facilities for the storage, repair, and parking of motor vehicles. See Attachment 17-12-44 |
| 17-12-45 | At the August 2017 Council meeting, the Council voted to approve a request from NFPA Staff to absorb the membership of the Technical Committee on Wildland Fire Fighting Professional Qualifications (PQU-WSP) into the membership of the Technical Committee on Wildland Fire Management (WFM-AAA) and to revise the scope of WFM-AAA to accommodate the merger. At this meeting, the members from the PQU-WSP will be moved to the WFM-AAA committee and the Council can officially disband the PQU-WSP Committee. See Attachment 17-12-45 |
| 17-12-46 | Approve the revision cycle schedules for Fall 2020, Annual 2021, Fall 2021 and Annual 2022. See Attachment 17-12 |
| 17-12-47 | Report of the Committee Membership Task Group (M. Snyder, Chair). |
| 17-12-47-a | Act on pending applications for Committee Members. SA17-12-47-a |
| 17-12-47-b | Annual reappointment of Committee Members. SA17-12-47-b |
| 17-12-48 | Report of the Policy and Procedures Task Group (D. O’Connor, Chair). No Attachment |
| 17-12-49 | Hear a report of the Recording Secretary on the August 2017 Minutes. No Attachment |
| 17-12-50 | The Council will review the dates and locations of upcoming Council meetings, as follows: |
| | April 10-11, 2018 |
| | TBD |
| | August 13-15, 2018 |
| | Quincy, MA |
| | December xxx 2018 |
| | TBD |
| | No Attachment |
| 17-12-51 | Consider the request of the Technical Committee on Emergency Medical Services to enter new document NFPA 451, *Guide for Community Healthcare Programs*, into a custom revision cycle (public input closing date was November 16, 2017). The Council approved the establishment of this proposed document at the April 2015 Council Meeting. SA17-12-51 ADDITION |
New Project Initiation Form

Proposed Standard for the Organization and Operation of Fire Investigation Units

a. Explain the Scope of the new project/document:
The proposed standard will provide requirements for fire and explosion investigation units. Fire Investigation Units (FIU) should be defined as public and private sector organizations performing fire and explosion investigations. The standard will not be applicable to task forces, but will be applicable to the individual FIUs that makeup the task force. It will be applicable to both public and private sector units (including public agencies i.e. fire departments, law enforcement agencies involved in fire investigation, fire marshal offices, and private agencies i.e. consultancy firms, insurance investigation units). It will link naturally to the existing NFPA 921 and 1033, which provide guidance and requirements for fire and explosion investigation and for fire and explosion investigators. The proposed standard will include requirements for organization, for facilities and equipment, for compliance with safety procedures, for training, certification and education, for origin and cause report content, for document retention, for review and approvals of investigation reports, and for processes and management systems. The document will be suitable to support and provide a path to accreditation of fire and explosion investigation units; however, the document will not require FIUs to become accredited. It is anticipated that this proposed standard will require individual fire investigators to meet minimum certification requirements.

b. Provide an explanation and any evidence of the need for the new project/document:
In 2009, the National Academy of Sciences issued its report titled Strengthening Forensic Science in the United States-A Path Forward. The NAS report called for all forensic practitioners to be certified, to work in accredited organizations, and to follow standard methodology. This report resulted in a new interest in improving the quality of all the forensic science disciplines, including the investigation of fires and explosions. The formation of the Organization of Scientific Area Committees (OSAC) at NIST was a concrete step that responded to this demand to develop and identify standards and guides that will support professional quality investigations. Accreditation of forensic science units is a high priority issue. The National Commission on Forensic Science in April 2015 called for universal accreditation of forensic science service providers, including fire investigation units. This requires standards that set requirements for forensic science units. While NFPA has been a pioneer in developing guides and standards for fire and explosion investigation and for qualifications of fire and explosion investigators, there are currently no published standards (NFPA or elsewhere) that adequately addresses the methods for units that conduct these investigations.

Accreditation organizations are anxious to accredit forensic science units and in particular fire and explosion investigation units. Because no consensus standard exists for these units, the accreditation organizations have begun accrediting units based upon the accreditation body’s in-house developed requirements. This will lead to requirements that vary from accreditation organization to accreditation organization and requirements that have no consensus basis in the community. NFPA is uniquely qualified to address this deficiency in the fire and explosion investigation community. One chapter of the existing NFPA 1730 briefly addresses only public fire investigation organizations. This is not adequate in scope or depth. The scope and purpose is limited to policies and explicitly excludes methods. The current NFPA 1033 committee members would be appropriate for the development of this document. As this committee currently operates under the auspices of the Professional Qualifications Correlating Committee, the issue of this reporting relationship would need to be addressed. Additionally, this proposed standard would need to be written in non-JPR format so that would also need to be addressed along with the Committee’s scope and purpose.

c. Identify intended users of the new project/document:
The proposed standard will be used by fire and explosion investigation units, (including public agencies i.e. fire departments, law enforcement agencies involved in fire investigation, fire marshal offices, and private agencies i.e. consultancy firms, insurance investigation units), accreditation agencies, certification bodies, potential clients, and the courts. Clients and the courts will use the standard and associated accreditation as means of assuring the quality of fire and explosion investigation work.
d. Identify individuals, groups and organizations that should review and provide input on the need for the proposed new project/document; and provide contact information for these groups:

- Chairs of NFPA 921, 1033, 1730 Committees
- International Association of Fire Chiefs (IAFC)
- International Association of Arson Investigators (IAAI)
- National Association of Fire Investigators (NAFI)
- International Fire Marshals Association (IFMA)
- National Association of State Fire Marshals (NASFM)
- International Association of Fire-Fighters (IAFF)
- International Association of Chiefs of Police (IACP)
- National Association of Police Organizations (NAPO)
- Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF)
- United States Department of Justice (DOJ)
- National Institute of Justice (NIJ)
- National Institute of Standards and Technology (NIST): Organization of Scientific Area Committees (OSAC)
- Insurance Committee for Arson Control (ICAC)
- Federal Bureau of Investigation (FBI)
- Association of Prosecuting Attorneys (APA)
- Center for Public Safety Excellence (CPSE)


e. Identify individuals, groups and organizations that will be or could be affected, either directly or indirectly, by the proposed new project/document, and what benefit they will receive by having this new document available:

- Public- Public safety will benefit from the improvements in the fire investigation profession that this standard will bring.
- Courts- A consensus standard for fire and explosion investigation units will assist the courts judge the suitability of reports from investigation units for use in court and improve the administration of justice.
- Insurance Companies- Insurance companies regularly hire investigation firms, and often rely on public sector investigation units as well. Accreditations and certifications based on the proposed standard would assist insurance companies in selecting qualified firms.
- Investigators- Fire and explosion investigation work occurs in the context of the firm or agency for which the investigator works. The standard will assist in the creation of work environments that support quality investigation work in both the public and the private sectors.
- Private and Public Sector Fire Investigation Agencies- The commitment to quality assurance proposed by this standard will ensure on-going compliance to industry standards and continual improvement of fire investigation operations. Additionally, this standard would improve compliance with industry best practices, promote standardization, and improve quality of services provided by FIUs nationally.
- Attorneys- Law firms regularly hire investigation firms and often rely on public sector investigation units as well. Accreditations and certifications based on the proposed standard would assist attorneys in selecting professional fire investigation firms.
- District Attorneys (DA)- Prosecutors rely upon investigation units to provide the technical basis for prosecutions. The standard and accreditation under the standard will assist DA’s in their work.
- Accreditation and Certification Bodies- These organizations will benefit from the development of consensus standards for their use in certification and accreditation.

f. Identify other related documents and projects on the subject both within NFPA and external to NFPA: NFPA 921, NFPA 1033, NFPA 1730, and ASTM standards included in NFPA 921 by reference.

The proposed standard will complement NFPA 921, 1033, and 1730 because it would address aspects of the organization and operation of fire investigation units that are not currently detailed in these documents. Below are three options, in order of preference, that propose a means for moving the Standard forward.

- **Option 1**: To establish a new technical committee on the Organization and Operation of Fire Investigation Units, which will write the standard. Attached is an outline for this document.
- **Option 2**: Assign the current NFPA 1033 technical committee the task of creating a new standard. This requires amending the committee scope. It also would require the 1033 committee to operate outside the purview of the Professional Qualifications Correlating Committee. The possibility of an addition to the current NFPA 1033 Standard was considered but was deemed unacceptable. The current 1033 is a foundational document for the professional qualifications for the individual investigator, which requires JPRs to be met. The proposed new Standard would support the organization as a whole and as such JPRs would not be appropriate. NFPA 1033 is currently used to qualify fire investigators as experts and adding organizational requirements would create confusion among stakeholders.
- **Option 3**: Modify the scope and purpose of the NFPA 1730 Standard. Change section 1.1.4 as it currently prohibits the inclusion of methods for carrying out fire investigation services. Also, expand the purpose to specifically include fire investigation units associated with organizations other than fire departments. Proposals for changes to NFPA 1730 are attached. Consultation with the NFPA 1730 committee indicates that they are not interested in changing the scope and purpose.
g. Identify the technical expertise and interest necessary to develop the project/document, and if the committee membership currently contains this expertise and interest:

It would be most appropriate to form a new committee with a significant membership of individuals involved in the management of fire investigation units. While a new committee is preferable, the NFPA 1033 committee could assume responsibility for the proposed standard, provided that the changes enumerated in B above are implemented. The NFPA 921 committee would not be appropriate because they already face a large workload and 921 is on a 3-year cycle. The 1033 committee has a more manageable workload. The proposed standard could be scheduled off-cycle with respect to 1033 to spread the workload.

h. Provide an estimate on the amount of time needed to develop the new project/document:

The proposed standard could be developed within the normal three to five year document cycle. The size of the document would likely be closer to the size of 1033 than 921 (1033 is 16 pages, 921 is 400 pages).

i. Comment on the availability of data and other information that exists or would be needed to substantiate the technical requirements and other provisions of the proposed new project/document:

All technical information required for the standard is available. There are ample model standards available for other types of investigation units to support standard development.

-ISO17025 General Requirements for the Competence of Testing and Calibration Laboratories
-ISO17020 Conformity Assessment-Requirements for the Operation of Various Types of Bodies Performing Inspections
-ASTM E2833-12 Standard Practice for Certification Bodies
-ASCLD/LAB Supplemental Requirements for the Accreditation of Forensic Science Testing Laboratories
-A2LA R318 Specific Requirements: Forensic Examination Accreditation Program-Inspection
-ANAB Guidance on ISO/IEC 17020 Accreditation for Forensic Inspection Agencies
-NLME Standard B4-Forensic Autopsy Performance
-CALEA Standard 42-Criminal Investigations
-Forensic Standards Accreditation Board Standards for Accrediting Specialty Certification Boards
-Australian Standards 5338.1, 5338.2, 5338.3, 5338.4-Standards for Forensic Analysis

Please send your request to:
NFPA
Codes and Standards Administration
1 Batterymarch Park
Quincy, MA 02169
Stds_admin@nfpa.org
Rev. 6/16

Signature: ____________________________

Name: Craig Beyler
Email: cbeyler@jensenhughes.com
Affiliation: NIST OSAC Fire and Explosion Subcommittee
OSAC
Improving Fire Investigations through Accreditation

Craig Beyler

[Image of OSAC logo and circular diagram]
“By contrast, much more research is needed on the natural variability of burn patterns and damage characteristics and how they are affected by the presence of various accelerants. Despite the paucity of research, some arson investigators continue to make determinations about whether or not a particular fire was set. However, according to testimony presented to the committee, many of the rules of thumb that are typically assumed to indicate that an accelerant was used (e.g., “alligatoring” of wood, specific char patterns) have been shown not to be true. Experiments should be designed to put arson investigations on a more solid scientific footing” (p. 5-34).
Goals of Organization of Scientific Area Committees (OSAC) in Forensic Science

• OSAC is a result of the 2009 NAS Report
• “The aim of the OSAC is to identify and promote technically sound, consensus-based, fit-for-purpose documentary standards that are based on sound scientific principles.”
• Joint project of DOJ and NIST to encourage consensus standards in forensic science
• Registry of Forensic Science Standards
• Identify research needs
Fire Investigations is a Forensic Science

• Fire and Explosion Investigation is one of 25 subcommittees
Small part of a large forensic science enterprise

• Categories of Members
  o Federal Law Enforcement
  o State Fire Marshals
  o Private Fire Investigation Firms
  o Academics
  o Laboratories
  o Insurance
  o Engineering
One OSAC Goal is a Research Agenda

• “Experiments should be designed to put arson investigations on a more solid scientific footing” (NAS, 2009, p. 5-34).

• Research needs identified by OSAC committees may result in NIJ requesting proposals for funding.

• The following research needs have been identified and proposed by the committee thus far:

1. Potential for reducing bias in fire and explosion investigations
2. Validation of origin and cause determination protocols
Fire and Explosion Investigation Accomplishments

• NFPA 921 was the second consensus document added to the registry
• NFPA 1033 was the fourth standard added to the registry
• Both documents are well accepted in the field and by the courts
Ongoing Problems

• Management Problems Identified
  o While all investigators claim to use 921, many are not conducting investigations according to 921 methods.
  o Ongoing defective investigations are not being recognized and remediated
  o Non-scientifically based fire investigation opinions are still being offered in court
  o Insufficient resources for training

• By design 921 and 1033 do not address the issues related to the organization and management of fire investigation units
The Quality Triangle in Forensic Science

Certification

Accreditation

Standardization
2009 NAS Report Recommendations on Certification and Accreditation

• “Laboratory accreditation and individual certification of forensic science professionals should be mandatory, and all forensic science professionals should have access to a certification process”

• “All laboratories and facilities (public or private) should be accredited, and all forensic science professionals should be certified, when eligible”

• The American Bar Association has recommended that, “Crime laboratories and medical examiner officers should be accredited, examiners should be certified, and procedures should be standardized and published to ensure the validity, reliability, and timely analysis of forensic evidence.”
2009 NAS Report Recommendations on Certification and Accreditation

• “Accreditation serves as a mechanism to strengthen professional community ties, transmit best practices, and expose laboratory employees directly to the perspectives and expectations of other leaders in the profession.”
National Commission on Forensic Science (NCFS) Recommendation

• “It is recommended that all forensic science service providers (FSSPs) become accredited” (2015, p.1).
National Commission on Forensic Science (NCFS) Recommendations

• Helps to ensure both ongoing compliance to industry standards and continual improvement of a forensic science service providers (FSSPs) operations.

• Assesses a FSSP’s capacity to generate and interpret results.

• Accreditation criteria are based on accepted industry standards and applicable international standards.
NCFS on Accreditation

• Assess the quality of the FSSP’s management system by examining, among other things:
  o staff competence, training, and continuing education;
  o method validation;
  o appropriateness of test methods;
  o traceability of measurements and calibrations to national standards;
  o suitability, calibration, and maintenance of test equipment;
  o testing environment; documentation, sampling, and handling of test items; and
  o quality assurance of data, including reporting results and proficiency tests.
Accreditation

• Accreditation means that the organization (public or private) adheres to an established standards of quality and relies on acceptable practices within these requirements.

• Fire and Explosion investigation has no standard for investigation unit organization and operation, suitable for accreditation.

• OSAC is soliciting your input and support to develop such standards for the fire investigation profession.
Proposal for a Voluntary Standard for Organization and Operation of Fire Investigation Units

• OSAC subcommittee has proposed that NFPA develop a *Standard for Organization and Operation of Fire Investigation Units*.

• To be suitable for accreditation of FIU’s.

• Will aid investigation unit managers provide an environment that supports high quality investigations.
NFPA 1730

• Does not address the forensic science or quality issues related to fire investigations

• 1730 Committee was consulted and has chosen not to expand the scope of the document to address the forensic science issues identified by OSAC
NFPA 1033 Committee

- Committee chair is open to adding a FIU standard to the committee’s work
- Would be off-cycle from 1033
- As a Professional Qualifications committee, there may be issues with doing a non-qualifications standard.
- Could simply form a new committee, but not decision with regard to the potential home for the FIU standard has been selected
Standard for Organization and Operation of Fire Investigation Units (FIU)

The proposed standard will include requirements related to:

• Organization
• Facilities and equipment
• Safety procedures
• Training
• Certification and education
• Origin and cause report content
• Document and evidence retention
• Review and approvals of investigation reports (QA)
• Processes and management systems
Standard for Organization and Operation of Fire Investigation Units (FIU)

• Will provide best practices for effective management of FIU
• Will provide more support for unit budget requests
• Will be suitable to support and provide a path to accreditation of fire and explosion investigation units
• Will help manage risk associated with lawsuits, bad public relations, and wrongful convictions
• Will improve the credibility of the work product
• Will enhance the organization’s reputation
A tale of two tales

• Ernest Ray Willis
• Cameron Todd Willingham
ERNEST RAY WILLIS

Other Arson Cases

In the early hours of June 11, 1986, a house fire in Iraan, Texas, killed 24-year-old Elizabeth Belue and 25-year-old Gail Allison. The house was owned by Cheryl and Michael Robinson, and the night before, Belue and Allison had been up late drinking with the Robinsons and two men who were staying with them at the time, cousins Ernest Ray Willis and Bill Willis. At some point, the Robinsons had a violent quarrel outside the house and were arrested, but the guests remained and eventually went to sleep. When the house began to burn, only the Willisises made it outside alive.

The sheriff investigating the fire suspected that it had been set intentionally, and arson experts seemed to confirm this suspicion, claiming to find “pour patterns” on the floor – charred marks said to have been left by a flammable liquid that had been poured inside the house. Ernest Ray Willis, who was the first out of the house and the least injured, became the leading suspect. There was no physical evidence that he had set the house on fire, and no apparent motive – Willis suffered from chronic back pain that made it difficult to work, and the Robinsons had offered him a place to stay in exchange for fixing their car. He claimed that the fire woke him at about 4:00 a.m., and that he ran through the house trying to wake the others before the flames forced him outside, where he began to break windows to...
Consequences of Poor Fire Investigations

- Cameron Todd Willingham – Executed
  - Investigators used pseudo-science and all of the old myths
  - Executed based on many of these myths in the State of Texas

- 20/20, Major newspaper coverage, Frontline

http://abcnews.go.com/2020/video/arson-lab-tests-flashpoint-occurs-10590272?&clipId=10590272&cid=embedded
The after story:

- Texas Forensic Science Commission (recommendations for fire investigation)
- Texas Scientific Advisory Workgroup (training and case review)
- Move towards accreditation
Texas Forensic Science Commission Recommendations

1. Adoption of national standards
2. Retroactive investigation review
3. Enhanced Certification
4. Collaborative training on incendiary indicators
5. Tools for analyzing ignition sources
6. Periodic curriculum review
7. Involvement of SFMO in local investigations
8. Establishment of peer review group/multidisciplinary team
9. Standards for testimony in arson cases
10. Enhanced admissibility hearings in arson cases
11. Evaluating courtroom testimony
12. Minimum report standards
13. Preservation of documentation
14. Dissemination of information regarding scientific advancements
15. Code of conduct/ethics
16. Training for Lawyers and Judges
17. Funding
The Quality Triangle in Forensic Science

Certification

Accreditation

Standardization
Other Initiatives of OSAC

• Research Needs
• Standards and Guides Development
• Education and Training
• Certification
• Report Writing and Review
• Judicial Gatekeeping
• Strategic Plan for Fire and Explosion Investigation
Scientific research underlying investigation methods

Problems

• Initial progress in 921 was based upon fire science research NOT specifically conducted for investigation purposes

• Ongoing support for investigation method research has been modest with low level and intermittent NIJ support

• ATF Fire Laboratory has not yielded much published research work, dominated by case work

• OSAC committee developing a research agenda to guide research and stimulate funding
Standards and Guides Development

• Written as a guide, 921 is now the standard of care
• NFPA 1033, Standard for Professional Qualifications for Fire Investigator, was slow in incorporating 921-based requirements, but now fully reflects the 921 methodology
• Further work is needed reflect more specific “job performance requirements” in 1033
• OSAC committee is reviewing 921 and 1033 to identify opportunities for improvement based on existing knowledge as well as to drive the research agenda
Education and Training

• Existing level of formal education required by NFPA 1033 is completion of high school
• No shortage of books or training opportunities based upon 921 methodology
• Job performance of some investigators does not reflect effective training
• Prosecutors and Defense Attorneys would benefit from training concerning what should be expected of fire investigations.
• OSAC subcommittee is reviewing education and training requirements and effectiveness with the goal of contributing to standards and practices
Certification

• Two certification programs available, IAAI, NAFI
• Job performance of some certified investigators does not reflect effective certification
• OSAC subcommittee is reviewing education and training requirements and effectiveness with the goal of contributing to standards and practices
• Requirements for report preparation and review in NFPA 921 and 1033 are both limited and general, e.g. from 1033:

  Prepare a written report, given investigative findings, documentation, and a specific audience, so that the report accurately reflects the investigative findings, is concise, expresses the investigator’s opinion, contains facts and data that the investigator relies on in rendering an opinion, contains the reasoning of the investigator by which each opinion was reached, and meets the needs or requirements of the intended audience(s).

• Fire investigation reports in the public sector are most often inadequate, i.e. does not fulfill above requirement.

• OSAC subcommittee is studying these requirements with the intent of preparing more detailed requirements that may be suitable for inclusion in 921 and 1033. Sample reports, templates, and checklists are being considered.
Judicial Gatekeeping

• Judges are generally ill-prepared for this role and are very hesitant to exercise their gatekeeping function.

• Beyond development of NFPA 921 and 1033, the fire and explosion investigation community has done little to assist judges in their gatekeeper role.

• There is no directory of individuals qualified to serve as special masters and there are no training programs or documents designed for judicial use.

• OSAC subcommittee is considering if there are actions and developments required by the fire/explosion investigation community.
Criminal vs Civil Cases

• NFPA 921 and *Daubert* have revolutionized expert witness report writing and testimony in civil litigation

• This effect has not occurred in criminal cases

• Vast difference in reports in civil vs criminal cases

• Judges are not holding public sector investigators accountable as they do in civil cases.
Strategic Plan for Fire and Explosion Investigation

• Roadmap for moving fire investigation forward
• Takes a holistic approach to improvement
• Expected to be completed by early 2018
Conclusions

• There is a complex system of elements that contribute to high quality fire and explosion investigations
• This goes well beyond the development of guides and standards, though these documents are foundational
• A holistic approach seems to be indicated
• Strategic plan will provide a roadmap
• New standard for FIU’s will provide guidance on effective FIU organization and operation

We need your input and support
2. Please state your reason(s) for supporting or opposing such standards development.

3. Are you or your organization interested in applying for membership on the Technical Committee if standards development is approved by the Standards Council? If yes, please submit an application, in addition to your comments in support of the project, online at: Submit online application

*Note: Applications being accepted for purposes of documenting applicant interest in committee participation. Acceptance of applications by NFPA does not guaranty or imply the Standards Council will ultimately approve standards development activity on this proposed subject matter.

Please submit all comments, in support or opposition, for effective contamination control of personal protective equipment, accessories, and equipment by December 15, 2017 at: stds_admin@nfpa.org.

Remote Inspections

On the heels of a white paper written and presented by the Building Code Development Committee and a recent article in the NFPA Journal, the National Fire Protection Association (NFPA) Standards Council is in receipt of a New Project Initiation Request for the development of an ANSI Accredited Standard to establish protocols and practices for the use of remote inspections of existing buildings, buildings under construction, and building systems for code compliance. Technologies for remote inspections include video, photographs, data submission, and other technologies as they become available. The standards are envisioned to be utilized/adopted by jurisdictions seeking to increase efficiencies, cost, time and resources required for inspections while improving safety for inspectors performing inspection duties. If standards development is approved by the Standards Council, the standard may additionally call for effective contamination control of other foreign matter residue.

NFPA is currently soliciting comments to gauge whether support exists for standards development addressing remote inspections of existing buildings, buildings under construction, and building systems. NFPA specifically seeks input on the following:

1. Are you, or your organization, in favor of the development of a new standard establishing protocol and practices for remote inspections of existing buildings, buildings under construction, and building systems?

2. Please state your reason(s) for supporting or opposing such standards development.

3. Are you or your organization interested in applying for membership on the Technical Committee if standards development is approved by the Standards Council? If yes, please submit an application, in addition to your comments in support of the project, online at: Submit online application*

*Note: Applications being accepted for purposes of documenting applicant interest in committee participation. Acceptance of applications by NFPA does not guaranty or imply the Standards Council will ultimately approve standards development activity on this proposed subject matter.

Please submit all comments, in support or opposition, to standards development for remote inspections as described, by December 15, 2017 at: stds_admin@nfpa.org.

** Fire Investigation Units (FIUs)**

The National Fire Protection Association (NFPA) Standards Council is in receipt of a New Project Initiation Request for the development of an ANSI Accredited Standard addressing Fire Investigation Units (FIUs) from the National Institute of Standards and Technology (NIST), specifically the Organization of Scientific Area Committees (OSAC) Fire and Explosion Investigation Subcommittee.

The request defines an FIU as any public or private sector organizations performing fire and explosion investigations. This applies to any public agencies i.e. fire departments, law enforcement agencies involved in fire investigation, fire marshal offices, and private agencies such as consulting firms and insurance investigation units. The project as proposed will include individuals operating as part of a task force for specialized incidents, although the requester identifies that the proposed project is not intended to prescribe any requirements relating to the formation of a task force.

If the New Project Initiation is ultimately approved by the Standards Council, a new Technical Committee may be established and charged with the development of appropriate requirements related to Fire Investigation Units (FIUs). Activities within the scope of the Technical Committee are anticipated to focus minimum requirements for fire and explosion investigation relating to:

**Organization:**
- Facilities and equipment;
- Compliance with safety procedures;
- Training;
- Certification and education;
- Document retention;
- Review and approvals of investigation reports; and
- Processes/management systems

NFPA is currently soliciting comments from interested organizations and individuals to gauge whether support exists for standards development addressing Fire Investigation Units (FIUs). The request comes in response to the NIST/OSAC initiative to develop and identify standards and guides that will support professional quality investigations within the forensic community, in this instance specifically on the topic of fire and explosion investigation. The requester proposes that such a project will link naturally to the existing NFPA 921 and 1033, which provide guidance on how to complete a fire or explosion investigation and the qualifications (job performance requirements) of the individual.

NFPA specifically seeks input on the following:

1. Are you, or your organization, in favor of the development of an NFPA Standard pertaining to Fire Investigation Units (FIUs)?

2. Please state your reason(s) for supporting or opposing such standards development.

3. Are you or your organization interested in applying for membership on the Technical Committee if established by the Standards Council? If yes, please submit an application, in addition to your comments in support of the project, online at: Submit online application

Note: Applications being accepted for purposes of documenting applicant interest in committee participation. Acceptance of applications by NFPA does not guaranty or imply the Standards Council will ultimately approve standards development activity on this subject matter.

Please submit all comments, in support or opposition by October 13, 2017 to Fire Investigation Units (FIUs) standards development at: stds_admin@nfpa.org.
This is to support the development of standard for Fire Investigation Units at NFPA. The document will become a part of the 921, 1033 suite of NFPA documents central to the practice of fire investigation. This proposal originates in the OSAC Fire and Explosion Subcommittee that I chair and has the support of NIST OSAC. We in OSAC strongly feel that NFPA is the best home for the planned standard. While the standard could be developed at another SDO, the existence of 921 and 1033 at NFPA make NFPA the obvious choice for SDO. We hope you agree. Thank you, Craig

Craig Beyler, PhD | Technical Director Emeritus

JENSEN HUGHES
Advancing the Science of Safety
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cbeyler@jensenhughes.com | www.jensenhughes.com
Hello,
I have been in the Fire Investigation business for 30 years. Even though there has been many great changes in our industry I do think NFPA needs to have a standard developed to make the field less political and help those who are good investigators be recognized. I have interviewed hundreds of investigators who have IAAI- CFI and or NAFI- CFEI. It is now implied that one is better than the other, but isn't true. A college kid graduating from Eastern KY University who can not obtain a (IAAI CFI) seems more rounded than a CFI that has been around for years (some don't have many fire investigation experience). I require my associates to have both because of all the Private sides marketing saying one is better then the other. So I applaud a New NFPA standard.

If you have any questions please feel free to call me.

--

Thank you,

Mark J. Casalinova
President / CEO

(330) 865-5757 Office
(888) 850-FIRE Toll Free
(330) 807-7830 cell
(330) 319-8572 eFax
www.firecauses.com

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From: Ciesla, Richard <rciesla@uis-usa.com>
Sent: Tuesday, October 10, 2017 1:25 PM
To: stds_admin
Subject: Fire Investigation Units (FIUs)

NFPA
I have been in the Fire investigation profession for over 25 years as a career fire firefighter and a fire investigator for my department retiring as Chief of Department and since retiring from the fire service (33 years), I now manage a territory Arizona & New Mexico for a private investigation company which conducts fire investigations for Insurance companies and attorneys. I feel I have a good handle of what is required for a professional fire investigation unit.

I feel there is a strong need for the development of an NFPA standard and strongly support the idea. Some of the topics I feel need to be addressed in writing the standard would be:

- Suggested guidelines on continuing education for each investigator and also the supervisors
- Guidelines on Report reviews, technical reviews a supervisor must sign off on a report.
- Minimum certification requirements for each investigator

It has been my experience that there is a lack of accountability in this area on both the public and private sectors and would like to be considered to be a member of this committee if one becomes available. I feel I have a strong working knowledge of what it takes and could offer valuable input and have an advantage of working on both the public and private sides in fire investigations.

Please tell me where I could find the application to fill out in order to be considered for a member on this committee.

Thank you for your consideration, If you should have any questions feel free to contact me (508) 864-3824

Richard Ciesla IAAI-CFI / District Manager
Unified Investigations & Sciences, Inc.
a sedgwick company
407 South 107th Avenue #A22 | Tolleson, AZ 85353
OFFICE 602-281-9687 | CELL 480-220-8763 | EMAIL rciesla@uis-usa.com
www.uis-usa.com The leader in forensic engineering and origin & cause services
Submit an Assignment

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Dear NFPA,

I am a strong supporter of developing this proposed new standard. The challenges of fire investigation units facilitating too many fire investigators that do not follow the best practices of NFPA 1033 and NFPA 921 is well documented. A standard for fire investigation units will define a standard of performance for leaders of these organizations that is lacking at this point.

I serve on the OSAC Fire Investigation Committee and we have recommended that this standard be developed. Thank you for considering this standard. The Texas State Fire Marshal's Office went through a very difficult period after a report was issued by the Texas Forensic Science Commission in 2009 that documented two poor fire investigations. All of this was preventable had the organization been following national best practices. What happened in Texas is happening all over the U.S and beyond to this day.

Leadership is critical in correcting organizational shortcomings. A standard for fire investigation units will lay out a blueprint to guide these leaders on what must be done to further improve the quality of fire investigations. The Texas State Fire Marshal's Office has implemented numerous changes such as forming a Science Advisory Workgroup (SAW) comprised of a multi-disciplinary panel that provides training to fire investigators in Texas and review of convictions and other cases. As a result, the quality of our fire investigations and reports have improved tremendously. We also assist the Innocence Project of Texas on cases that they want reviewed. We have an excellent working relationship. Transparency is important to gain public trust. The IAAI has also recognized our case review model as an international best practice.

In closing, thank you for seeking feedback on this proposed standard and I am interested in serving to help with its development.

All the best,

Chris Connealy
State Fire Marshal
State Fire Marshal's Office
Texas Department of Insurance
O: 512-676-6781
C: 512-961-2999
F: 512-490-1063
I am a member of the NFPA 921 Technical Committee and Vice Chair of the OSAC Fire and Explosion Investigation Subcommittee. I also manage a private sector fire investigation organization. I am in favor of developing a Standard on Fire Investigation Units.

In the near future the forensic community in general will be moving to accredit forensic investigation organizations similar to how forensic laboratories are now accredited. There is currently no detailed best practices document on how fire forensic organizations should be organized and managed. While NFPA 1730 address fire investigation operations it does so minimally and is written toward the public sector. There are many private sector fire investigation organizations that would benefit from this new document. The Standard would form a base from which accreditation bodies could evaluate fire investigation operations. The Standard would help to provide consistency in the evaluation process that different accreditation bodies may employ.

I would be willing to serve on the Technical Committee for this new standard.

Phil

Philip E. Crombie, Jr. | 2nd Vice President | Forensic Laboratory
Travelers
90 Lamberton Road
Windsor, CT 06095
W: 860.687.7449 C: 860.573.5042
Greetings,

In response to the request for input related to the new project related to Fire Investigation Units please see the following:

1) Our organization would be in favor of an NFPA Standard pertaining to Fire Investigation Units (FIUs) for reasons including but not limited to:
   a. Such standard would define a Fire Investigation Unit and identify the minimum personnel, facilities and equipment necessary to complete fire and explosion investigations
   b. It would standardize compliance with safety procedures at all incidents including those involving asbestos and other hazardous materials
   c. It would standardize training requirements across both the public and private sectors
   d. It would provide an avenue for unit certification and define minimum education requirements
   e. It would standardize the issue related to technical report reviews and full peer reviews
   f. It would allow for better public/private team interaction and cooperation

2) I personally, supported by my company representatives at Envista Forensics would be interested in applying for membership on the Technical Committee of established by the Standards Council. Please Note: I have attempted to submit an online application to no avail as no FIU tab is present. Please advise.

3) I have included a copy of my current CV attached above.

I look forward to hearing back from the Standards Council.

Respectfully,

Mike Driscoll

---

**Mike Driscoll, CFI**  
**Senior Vice President**  
**Fire & Explosion**  
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[www.envistaforensics.com](http://www.envistaforensics.com)

We’ve rebranded! PT&C|LWG Forensic Consulting Services is now Envista Forensics! Please update your address books accordingly!
1. NFPA Standards Council:

2. 

3. 1. Are you, or your organization, in favor of the development of an NFPA Standard pertaining to Fire Investigation Units (FIUs)?

   Yes, I am in favor of the development of an NFPA Standard pertaining to Fire Investigation Units (FIUs).

4. 2. Please state your reason(s) for supporting or opposing such standards development.

   There are more FIUs forming now to improve working partnerships with multiple agencies that have a stake in the fire investigations. An FIU allows for the use of resources from a variety of organizations/agencies to be pulled together to improve fire investigations. These FIUs contain members from the fire department, police department, private companies, volunteer fire investigators, etc. These FIUs vary from city to city to county to state to federal and there’s no one way to operate or manage an FIU currently. We have a standard (NFPA 1033) for Fire Investigators, we should have standards developed for FIUs. The goal is to have uniform standards across the board for FIUs. FIUs are essentially mini crime scene units for fire scenes and should be held to a high standard for the work they do as they play an important role especially for criminal investigations.

Thank you,

Elizabeth Goddard
Special Agent/Tactical Medic
Certified Fire Investigator
National Response Team
ATF New York Group I
Cell: (347)361-0252
Desk: (718)552-1651
Fax: (718)552-1611
Email: Elizabeth.Goddard@atf.gov

To the extent that this electronic communication contains case-related information, it is only a summary or excerpt and is not intended to be a complete statement of facts or a formal report. Prior to sending any case-related electronic mail, please contact me via telephone at 347-361-0252.
Maynard, Mary

From: Hendrix, Eric <ehendrix@gcps.org>
Sent: Tuesday, September 19, 2017 11:41 AM
To: stds_admin
Subject: FIU Committee

To Whom It May Concern,
I received an email with information regarding a proposed new Technical Committee to address the development of an ANSI standard regarding the establishment of a Fire Investigations Unit and after reading the proposed purpose and area of interest I feel like these are already covered collectively through NFPA 921 & 1033. However, if a technical committee is deemed necessary I would enjoy the opportunity to participate. Thanks.

Eric Hendrix, Fire Marshal
Gaston County Fire Marshal’s Office
615 N. Highland Street
Gastonia, NC 28052
(704) 866-3231 (Office)
(704) 718-5660 (Cell)
(704) 868-4150 (Fax)
To Whom it may Concern,

I believe that standards for Fire Investigation Units could have potential to be a benefit to the fire investigation community as a whole, but there are several factors that need to be considered. I am not talking about Public or Private, but one example being a Public Entity that does not store evidence. In Kentucky there are several fire investigators who work for individual fire departments that do not store evidence. They will collect/assist in the collection of evidence, but have a local/state police handle the storage of evidence.

I would like to be included in any future talk on this topic and would volunteer in any way that I can in the formation of this document.

Bryant Hunger  
Kentucky State Police - Post 6  
Arson Investigator
Maynard, Mary

From: Jeff.Hussey@com.state.oh.us
Sent: Monday, September 18, 2017 1:51 PM
To: stds_admin
Subject: FIU Standards Feedback from Ohio State Fire Marshal

1. Are you, or your organization, in favor of the development of an NFPA Standard pertaining to Fire Investigation Units (FIUs)?
   Yes, the Ohio State Fire Marshal’s Office supports the development of an FIU standard.

2. Please state your reason(s) for supporting or opposing such standards development.
   We see a number of substandard investigations and questionable agencies and investigative practices across our state, especially in smaller communities. We support development of standards to create a higher level of professionalism, with more scientific investigative practices and more effective prosecution of arson cases.

3. Are you or your organization interested in applying for membership on the Technical Committee if established by the Standards Council? If yes, please submit an application, in addition to your comments in support of the project, online at: Submit online application
   Yes, the Ohio State Fire Marshal is willing to assign a senior fire investigator to the Technical Committee if asked by NFPA.

Jeff A. Hussey, Ohio State Fire Marshal
(614) 752-7161
Jeff.Hussey@com.state.oh.us

******************************************************************************************
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******************************************************************************************
*
Good Afternoon,

I am the Commander of the Stanislaus County, California Regional Fire Investigation Unit. I am a 32-year law enforcement LT. at the District Attorney’s Office who is also a NAFI Certified Fire Investigator (CFEI and an IAAI certified Fire Investigation Technician (FIT). I also have several years of experience on the fire suppression side.

Approximately 2 years ago we stood up our FIU after examining many different FIU models across the country to include those staffed and supervised solely by fire agency personnel, those staffed and supervised solely by law enforcement personnel, and hybrid units or “task forces”. We chose our model after examining the strengths and weaknesses of the various models while also examining the problems associated with the Phoenix Fire Department Arson Squad and the subsequent recommendation for criminal charges of some of their investigators. We are also the jurisdiction that prosecuted the George Souliotes arson/murder case that is well known in our profession after it was overturned on a federal appeal before he ultimately pled to lesser and included charges.

Approaching the issues from the perspective of the prosecutor’s office without viewing it though the biased lens of either the fire department or law enforcement disciplines allowed us to make a more objective determination. We were surprised to see that fire agency personnel were being placed in law enforcement roles after just a few weeks of training where a law enforcement officer would have had several years on the job before being considered for a Detective assignment that involved crimes as serious as arson or murders involving arsons.

The typical law enforcement officer would have attended a 6 month police academy, several months of field training with multiple training officers and under the scrutiny of a training Sergeant. They would be on probation for 12-18 months and would be receiving weekly if not daily legal updates from supervisors and legal advisors, while also writing literally hundreds if not thousands of reports, attending and testifying in court on multiple cases of all types, and contacting, interviewing and interrogating many people on their path of becoming journey level law enforcement officers.

Fire agency investigators on the other hand are typically hired and trained to perform firefighting, rescue and pre-hospital EMS functions. Their advanced training generally involves advanced techniques of delivering those same core functions or more technical training involving hazardous materials, high/low angle rescues, etc. If they desire to transition to a fire investigator role in many states including California, they are literally required to attend a few weeks of training on fire investigation origin and cause, a week of laws of arrest training, and a week of firearms and defensive tactics training before they are turned loose to perform in a role it takes a law enforcement officer years of training and experience before they would be considered for that role. We discovered that in many cases the instructors teaching fire investigation were other fire agency personnel who had no law enforcement experience, had never testified in court, and may not have ever even served in the role of a fire investigator.

We had cases where the very first time our fire investigator had ever testified in court were on arson/murder cases as a lead investigator! We would never allow this to happen in law enforcement for obvious reasons.

We solved this problem by having our mixed discipline Investigators working to their core strengths, separating the forensic exam of the origin and cause of the fire from the criminal investigation side to avoid the impact of cognitive
bias. All investigators are required to meet the NFPA 1033 standard, the Commander of the Unit meets NFPA 1037, and all investigations are done in accordance with NFPA 921.

In answer to your posed questions:

1. My organization (Stanislaus County District Attorney’s Office) absolutely supports an NFPA standard pertaining to FIU’s. It is troubling to think that there is an NFPA standard detailing how many square inches of reflective material should be on a turnout coat, but none exists pertaining to a unit that can literally take away a person’s freedom or even their life.

2. My reasons for supporting the development of such standards are stated above.

3. I am absolutely interested in applying for membership on any technical committee established for this purpose.

I have also attached a paper I authored dealing with this subject and a link to a news article on our new FIU.


Thank you for your consideration,

Dave Hutchinson, CFEI
Lieutenant
Fire Investigation Unit Commander

Stanislaus County District Attorney
Bureau of Investigation
209-525-6916 office
209-652-9116 cell

“A new scientific truth does not triumph by convincing its opponents and making them see the light but rather because its opponents eventually die and a new generation grows up that is familiar with it.”
- Max Planck

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Fire Investigation, a Law Enforcement Function?

LT. Dave Hutchinson, CFEI

Stanislaus County District Attorney’s Office

Bureau of Investigation

October 23, 2014
Abstract

The judicial system in the United States relies on experts to advise us in areas related to the forensic sciences. These experts are allowed to give their opinions in legal proceedings and often times the conviction or acquittal of the accused will hinge on the expert’s testimony. These experts under the supervision of the judge acting as a gate keeper of the reliability of the evidence, are questioned by the attorneys representing both the prosecution and the defense to determine their credibility and level of expertise. Each side may bring their own expert and once accepted as experts by the court the trial often times comes down to which expert is more credible. But what if the very science used by these experts is faulty and once they believe their own fire origin conclusions they do not have the law enforcement training and experience to recognize they are wrong? What if the experts in this trade were taught by their predecessors who were taught by their predecessors and the whole time what they accepted as fact was not fact at all but merely speculation and conjecture? This paper explores the methodology used by fire investigation units to determine if fires are accidental or intentionally set. Additionally, the underlying question of what discipline should provide fire investigation services is explored. A look back at the history of this field and the potential for error while moving forward with Meta-Leadership and new ideas to avoid such mistakes in the future will be evaluated.
Are People Being Wrongfully Accused of Arson, or are They Getting Away with Murder?

On December 23, 1991 a fire in Corsicana, Texas resulted in the deaths of three sisters all under the age of three. Their father, Cameron Todd Willingham was tried and convicted in 1992 for the arson and murder of his children. On February 17, 2004 Willingham was executed despite questions surrounding the validity of the science used to convict him.

On January 15, 1997 a fire in a rental home in Modesto, California resulted in the deaths of the tenant and her two children ages three and six. The landlord, George Souliotes was arrested, tried and convicted in 2000 for the arson and murders. A significant portion of the prosecution’s case was based on the fire investigator’s interpretation of the fire patterns.

These two highly publicized cases are frequently discussed but by no means the only prosecutions where it can be argued that questionable or junk science was used to convict someone of a crime. Additionally, poorly trained fire investigators with no or limited law enforcement training and experience are less likely to recognize actual indicators of arson and may be calling fires accidental when in fact they were intentionally set.

As either scenario is unacceptable one must first question what level of training is sufficient for fire investigators and who determines what that level is? Additionally, what discipline should fire investigators come from, law enforcement or fire suppression?

How Are Fire Investigators Trained?

As Lentini (2006) points out, “it was the perception of a profession plagued by misconceptions that caused the Standards Council of the National Fire Protection Association (NFPA) to form a technical committee on fire investigations in 1985” (p. 12).
Most, if not all fire investigation training at the time was provided via on the job training by other investigators employed by the fire department and very few investigators in the field had actual scientific training, formal education in the sciences, or only limited (if any) law enforcement training. Despite scientific advances in the field, Lentini (2006) emphasized “because many fire investigators are trained by mentors, who were trained by mentors, the belief structure of investigators who learned their craft 30 or 40 years ago still influences many current practitioners” (p.11). Historically, law enforcement agencies shied away from fire investigation and thus left the fire service to fend for itself in an area they were not trained for.

Professional Organizations Adopt Standards

Based on court decisions and the recognition that there needed to be guidance in the field, the NFPA published guide # 921, Guide for Fire and Explosion Investigations in 1992 and it is updated every three years to reflect changes in the field. NFPA 921 requires that investigators regardless of discipline, utilize a scientific method to determine the origin and cause of fires and explosions.

NFPA released Standard # 1033 in 1987, Standard for Professional Qualifications for Fire Investigators, also on a three year revision cycle. This standard requires investigators to maintain at a minimum an up to date basic knowledge of the following topics beyond the high school level: fire science; fire chemistry; thermodynamics; thermometry; fire dynamics; explosion dynamics; computer fire modeling; fire investigation; fire analysis; fire investigation methodology; fire investigation technology; hazardous materials; failure analysis and analytical tools; fire protection systems; evidence documentation, collection, and preservation; electricity and electrical systems.
Notice that other than the generic “Fire Investigation” topic, nowhere does it say a fire investigator must have any knowledge of criminal investigation techniques or any police procedure knowledge at all.

**Modern Fire Investigation Units**

Whether units should be staffed with personnel drawn from law enforcement, fire departments, or a combination of both is a topic frequently debated. That question can only be answered informatively if a decision is first made as to what level of service the unit is to provide. If the unit is to provide only an investigation into where the fire started and what the cause was, frequently referred to as “origin and cause”, then personnel drawn from the fire service may be adequate. But if the fire investigation unit is also tasked with the criminal investigation of the incident once the origin and cause is determined, then a career law enforcement officer is clearly best given the unique skill set and experience required for that aspect of the investigation. Working together is ideal but as pointed out in 2005 by Marcus, Dorn and Henderson, the “Silo Effect” often keeps individual disciplines and agencies focused on only their own needs and issues and not inclined to create partnerships.

Consider that a law enforcement officer will typically have several years of training and experience before being placed in an investigative assignment. During those formative years he will have made hundreds or thousands of citizen contacts and arrests, conducted interviews and interrogations, and learned to recognize deception and common indicators of criminal activity, learned to write accurate reports, testified in court numerous times, and become adept at avoiding the criminal defense attorney traps by being exposed to them already.
Investigators drawn from the fire service however likely received the vast majority of their training and experience on fire suppression and emergency medical services.

Once chosen for a fire investigation assignment they are sent to just a few weeks of school, usually taught by other fire personnel, and then turned loose and expected to perform at a level it takes a law enforcement officer years to reach. Not a good scenario.

In any case there is a strong argument to be made that whoever provides the origin and cause determination should not also conduct the criminal investigation.

The Impact of Cognitive Bias

As described in the 2009 National Academy of Science report, *Strengthening Forensic Science in the United States: A Path Forward* (NAS Report) it is well understood in the forensic sciences that cognitive bias is a factor in all forensic disciplines (p. 122).

Bieber (2012) points out this bias can take several forms but the most common related to fire investigation are: **expectation bias**- the tendency for investigators to believe, certify, and express data that agree with their expectations for the outcome of an experiment; **confirmation bias**- the tendency to search for or interpret information in a way that confirms the observer’s preconceptions; **role bias and conformity effect**- when a forensic examiner embraces the role of a criminal investigator and the bias created from that change in perspective can shape the results of his/her analysis and conclusions.

In no other forensic discipline is the provider of the forensic services also the criminal investigator. For example, in no other setting is the fingerprint examiner, DNA criminalist, or tool mark examiner also interviewing victims, witnesses and/or suspects, then arresting those suspects and presenting cases for prosecution.
As reasoned by Bieber (2012):

It is crucial to an objective forensic analysis that the two roles be separate. A forensic examiner conducting a fire scene examination for the purpose of determining the area of origin and causation of a fire simply may not participate in any parallel or subsequent criminal investigation based directly or indirectly on his cause and origin conclusions. (p. 12)

In fact these investigative participants acting in their forensic roles, are best isolated from any and all “domain irrelevant” information so as to avoid the potential for cognitive bias.

**Conclusions**

The determination of a fire’s origin and cause is a forensic investigation related to fire behavior. This task is likely best performed by an investigator with knowledge of fire behavior and fire dynamics. The criminal investigation however is a task best performed by those with the knowledge, training and experience to perform that function, specifically law enforcement officers. To eliminate cognitive bias in fire investigation it is best to define investigative roles to avoid influencing, even if inadvertently, the analysis offered by any of the participants, (law or fire). In Stanislaus County using the meta-leadership model, we are instituting a new model fire investigation unit where fire department investigators will be assigned with law enforcement detectives to investigate fires with each discipline working to their core strength, but together. This unit will be supervised by a law enforcement Lieutenant from the District Attorney’s Office, Bureau of Investigation who is also a Certified Fire and Explosion Investigator, (CFEI)

These steps with the oversight of the courts should hopefully avoid the wrongful prosecutions of innocent people while bringing to justice those that are truly guilty.
References

Bieber, P. July (2012), Measuring the Impact of Cognitive Bias in Fire Investigation, Arson Research Project, Monterey College of Law


To Whom It May Concern;

Please accept this email as my personal formal endorsement, and that of Forensic Investigations Group, LLC, in support of an NFPA Standard pertaining to Fire Investigation Units (FIU’s).

1. As the owner of the first U.S.-based organization to attain accreditation to ISO/IEC 17020, I believe that this standard would serve as a natural progression in the advancement and development of fire investigations, fire investigators, and FIU’s in compliance with recognized standards of care.
2. Accreditation raises the bar for institutions by providing for the objective, third party assessment of policies and procedures, facilities, training, and processes, etc. to comply with recognized standards.
3. Comparable to other forensic disciplines, The standard would support and direct the development of an organization’s goals of quality investigations.

Finally, I would like to formally apply for membership on any Technical Committee established by the Standards Council in this endeavor. My efforts to find and submit the appropriate application online have not been successful, and there is not a link on the newsletter that I downloaded. If you could please provide some guidance in submitting the appropriate application, it would be greatly appreciated.

I am committed to contributing to this endeavor in any way I can on a committee of this nature.

Sincerely;
Richard Jones, IAAI-CFI
Chief Fire Investigator
Forensic Investigations Group
82001 Highway 1129
Covington, LA 70435
(985) 871-1459 office
(985) 373-0253 cell
(985) 892-4243 fax
Maynard, Mary

From: Kelly Kistner, CFE, IAAI-CFI <kkistner@figfire.net>
Sent: Tuesday, September 19, 2017 7:17 PM
To: stds_admin
Subject: RE: FIU Feedback and Application

I apologize. Due to the formatting of the previous e-mail I sent, my signature block was deleted or eliminated from the e-mail.

Regards,
Kelly W. Kistner, IAAI-CFI, CFPS, CFE
(210) 860-2109 Mobile
kkistner@figfire.net

-----Original Message-----
From: "Kelly Kistner, CFE, IAAI-CFI"
Sent: Tuesday, September 19, 2017 6:15pm
To: stds_admin@nfpa.org
Subject: FIU Feedback and Application

1. Are you, or your organization, in favor of the development of an NFPA Standard pertaining to Fire Investigation Units (FIUs)?
   I am personally in favor of the development of an NFPA standard pertaining to fire investigation units. Although, many
   public sector units may be opposed, due to budgetary constraints, I am confident an NFPA standard could minimize the
   cost burden; yet, also provide a sound standard that is applicable across all domains of the fire investigation profession.

2. Please state your reason(s) for supporting or opposing such standards development.
   Below is a portion of excerpt from some research I did for Graduate School. I have added some current comments as
   related to FIU:
   Quality performance is necessary for reliable results and reducing error. [1] Quality performance, best achieved
   through quality assurance (QA), “provides an infrastructure to promote high performance, address errors that
   arise, and improve processes.” [2] QA also includes validated and documented protocols. [3] Education and
   training are an important component in maintaining a high quality operation and are integral to QA. The
   education and training requirements are covered in NFPA 1033. [4] However, the fire investigation unit (FIU)
   and the requirements of an AHJ are not thoroughly established in 1033. The best method for achieving
   acceptable QA is through agency/entity accreditation. [5] Fire investigators, their public agencies, and/or private
   firms should strive to achieve accredited credentials as individuals and organizations. A FIU standard would
   provide a national standard for accreditation and protocols to improve QA, set forth expectations of each AHJ,
   reduce bias, and ultimately reduce potential error; therefore, improving the fire investigation profession.


3. Are you or your organization interested in applying for membership on the Technical Committee if established
   by the Standards Council? If yes, please submit an application, in addition to your comments in support of the
   project, online at: Submit online application
   Yes. I am interested in applying for membership on the FIU committee.
To: NFPA Standards Council

From: John Lentini

Re: Support for Proposal for Standard for Fire Investigation Units

I am a member of the NFPA 921 Technical Committee, where I serve as the representative from ASTM committee E 30 on Forensic Sciences. I am also a member of the NFPA 1033 Technical Committee, as well as a member of the Organization of Scientific Area Committees Subcommittee on Fire and Explosion Investigations, which initiated the request for a new standard for fire investigation units (FIUs).

I am writing to express my strong support for such a standard. In addition to the salutary effect such a standard would have on improving work product, accreditation is coming to fire investigation, and there are currently insufficient published standards for independent accrediting bodies to use against which to measure fire investigation units. NFPA 1730 contains only the vaguest standards for FIUs, and these need to be improved. I do not believe that improvement in NFPA 1730 is the correct approach, however, and the 1730 Technical Committee seems to agree. I believe this needs to be a freestanding standard to cover all those areas of fire investigation that are so important to getting the correct answers.

I would be willing to serve on a technical committee, but I have not provided an application with this communication because I believe that the FIU standard should be developed in the already-existing NFPA 1033 Technical Committee. It is my understanding that the chairman of NFPA 1033 has agreed to participate in development of the new standard.

Just as NFPA 921 and NFPA 1033 have improved the training and professionalism of fire investigators, they have also provided the impetus for increased spending on training by the fire service. An FIU standard would have a similar effect, providing fire chiefs and agency heads with another reason to devote the resources necessary for FIUs to do a better job.

I hope that the Standards Council steps up and endorses NFPA's continued leadership in the field of fire investigation by initiating this new project.

Sincerely,

John Lentini, CFI, D-ABC
You only live once, but if you do it right, once is enough.
To Whom It May Concern,

#1 - I personally am in favor of a standard regulating Fire Investigation Units.

#1 - The Mesquite Fire Department is in favor of a standard regulating Fire Investigation Units.

#2 - Fire Investigation has become a very technical field. I have been performing investigation for over 13 years. The duties of an investigator has drastically changed over these past 13 years, especially over the past 4-5 years. There needs to be more oversight and checks & balances placed over investigations.

I personally have submitted input to the NFPA 1033 committee requesting levels of Fire Investigators. I suggested a level 1, 2, and 3. A level 3 investigator would have to meet the standards of a Fire Investigation Unit Supervisor. I believe that my recommendation goes hand-in-hand with the purpose of this new standard.

#3 - Yes I am interested in participating with the Technical Committee of this new standard.

Thanks,
George B. Malone, IAAI-CFI, MVF, CI
Captain, Arson Investigator
Mesquite Fire Department
1515 N. Galloway Avenue
Mesquite, TX 75149
972-216-6267 office
214-364-1699 cell
972-216-6436 fax
gmalone@mesquitefire.org
It is my understanding that the NFPA is considering a new standard to address fire investigation units. The first think I thank that needs to be considered in the public investigation units. If the document is a standard or becomes a standard of care recognized by the courts like NFPA 921 it will be impossible for these units to conduct investigations. Please remember that majority of the country is services by volunteer fire departments. Those with these departments are struggling now to comply with NFPA 1033. Then there are the state agencies that are having the budgets cut because of the shortfall in revenue. Two things will happen if NFPA continues to develop documents that put more and more stress on these agencies. The first is they will no longer use NFPA documents. The second is you will force them out of the business of investigating fires. Is this NFPA’s goal?

Any standard or guide that will require or suggest the activities, facilities, equipment, safety, training, certification, education, document retention, report review and approval, and management systems could actual be a determent to these units. How will the document address these issues of funding to meet these requirements? Unless the NFPA is willing to address the funding issue to meet the requirements the document will only hurt these unit and may cause for fire investigation in some communities to stop.

This is a much bigger issue for comment to be requested in the NFPA newsletter. May I suggest that before this decision is made the contact be made with the fire departments around the country contacted. This can be done through several different fire and police associations. These are the International Association of Fire Chiefs, the International Association of Police Chiefs, etc. Only through these organization can a true assessment be made on this issue.
I have reviewed and discussed this issue with a number of persons in the industry, both private and public. The important fact to be considered is where we want to see the fire investigation profession is going in the future. Accreditation is the new level of competence that will ensure the quality of the investigation process. Meeting a level necessary to obtain accreditation is the next step. For this guidance is needed. The NFPA could provide that guidance with this standard. This document will give a specific level for the different areas of fire investigation to meet. Where there is no question some will fall below what is called for, it is a goal to be obtained. With this, a quality job specific accreditation requirements can be offered to these units.

James Mazerat

Forensic Consultant
I am in support of a standard for all Fire Investigation Units. This field needs consistency. Change and growth has been slow in this field. Depending on where the fire occurs, the manner and quality of the investigation can be very different.
I returned to school last year at EKU after 18 years in this field. I was searching for consistency and a better forensic and overall base education in fire science. My degree is in Fire Arson & Explosion Investigation, I graduate this December. The new level of education I have obtained has already had a huge impact on my career.
I would be interested in serving on a committee for the FIU’s.
Please see below my current CV.

Regards, Mary Clarke McKinley
859-421-7842
FORENSIC FIRE MECHANICS
TO: Fire Investigation Units (FIUs) Standards Development  
FROM: David N. O’Connell, President  
RE: New Standard Request for Fire Investigation Units  
DATE: October 4, 2017  

While we as a Chapter are not inclined to take a position on this proposal until such time as we are provided with sufficient information from your office to make an informed decision. The Maine Chapter, IAAI, recognizes that such a standard could have a significant effect on all of our chapter members who perform investigations as part of a unit, team, or task force.

Additionally, we would like clarification on the reasoning behind this standard request and its intent. Considering that we are being asked to weigh in on a potential standard that could have tremendous impact on our chapter’s members, it would only seem prudent to have a complete understanding of this request and how it could potentially impact our members before we move forward.

Sincerely,

David O’Connell
President, Maine Chapter IAAI
Dear Sir/Madam:

My name is John Ortega, Jr. I am the Chief over the Fire/Arson & Explosives Investigation Unit for the Bexar County Fire Marshal’s Office in San Antonio Texas. We are a public sector law enforcement agency specializing in the investigation of fires/explosion incidents and related criminal activity. I am in favor of standardized criteria for Fire Investigation Units, in order to ensure that these types of investigations are being carried out by qualified groups of men and women, and further that formalized standards are met in order to deliver quality and comprehensive fire investigative services. I would further like to be considered for membership in this technical committee if it is established. Please contact me for further details. My email is jortega@bexar.org Mobile # 210-487-9532.

John David Ortega, Jr.|Chief Investigator
Bexar County Fire Marshal’s Office
622 Dolorosa | San Antonio, TX 78207
Main 210-335-0300| Fax 210-335-0330 |www.bexar.org/fm
I am in support of having FIU standards for the following reasons:

* They would provide uniformity and consistency for current units and the development of new ones
* They would provide support to current units that may be operating at lower levels than they should be
* As a strong proponent of fire investigator safety, these standards would be another step in moving fire investigator safety practices forward

Jeff Pauley IAAL-CFI, CFEI
Battalion Chief/Fire Marshal
Bedford County Dept. of Fire & Rescue
1185 Turning Point Road
Bedford, VA 24523
Office: 540-587-0700 ext. 1325
Cell: 540-875-9124
I would like to comment on the proposed standard as it would relate to the fire investigation units, potentially worldwide. A brief background for myself, I am a current deputy fire marshal for a municipality which borders the City of Phoenix, AZ. I am the program manager for our fire investigations unit since its inception 15 years ago. I am certified through both the NAFI (CFEI) and the IAAI (CFI), as well as numerous inspector certifications. I was a firefighter first, then went through a local law enforcement academy to become a specialty peace officer, as it relates to arson crimes. In addition, I have a business in which I perform investigations for different clients, such as insurance companies, attorneys, product manufacturers and municipal attorneys on arson cases. I am also an instructor for fire investigations.

To be brief, while I believe it is important to have a standard for many things, the implications of that standard tend to create what may be an unattainable level for many FIUs. As a DFM, the use of standards is critical to life safety and I see the benefit of the standards utilized. However, the creation of a standard for an FIU could very well be a double-edged sword. While creating a consistent and measurable standard to be held to, it also impacts the ability to "to do the best you can with what you've been given". Smaller departments and even large municipalities fail to properly fund prevention programs and even less investigations units. The creation of a standard would likely cause the complete shut down of FIUs across the nation. Thus creating a lack of verifiable data derived from competent investigations from investigators who truly love their job but know their department does not fully support the programs. The likelihood of many investigators to "walk away" I think would be exacerbated by a standard that their department is not willing to properly fund.

Conversely, the creation of such a standard does ultimately force the hand of FIUs and their respective departments to fund them to the standard created, whatever that may be. This can work both for and against the municipality and the FIUs. As an instructor throughout the State of Arizona, one of the largest agencies consistently struggles with their unit in numerous ways such as funding, training, turnover, case management, etc. Smaller agencies in outlying areas struggle to just have a "trained" investigator, much less the ability to comply with a possible standard that is not feasible for several reasons.

Should a committee be formed to explore the possible creation of a standard or explore options, I would like to be considered for such. With the knowledge I have garnered over the years of working with small and large agencies alike, my inclusion on fire investigation task forces, and the desire for units to be successful, I would make an ideal candidate for consideration.

There are two main certifying agencies currently offering several ways for an investigator to be certified, and arguably there is no mandate for the sponsoring agency which gives them the directive. Again, this standard has far-reaching implications which need to be addressed.

Please feel free to reach with any questions or comments.

Respectfully,

Keith Paffrath
602-625-9034
October 3, 2017

To: National Fire Protection Association, Fire Investigation Units (FIUs) standards development

Re: Fire Investigation Units (FIU’s) standards

The State of Ohio currently has no certification for a fire investigator, as such with a Firefighter, Fire inspector, or EMT, the only certification for fire investigators is that offered by IAAIL, CFI certification and NAFI, CFEI. The State of Ohio would be in favor of any such standards for FIU’s that would enhance the credibility of such organizations.

In the 1980’s the State of Ohio Fire Marshal’s Office developed a program on the concept of Arson Task Force and provided training to fire departments, law enforcement agencies across the State of Ohio in investigating fires for origin and cause. If determined the fire was incendiary the task force was to secure the scene until the arrival of the State Fire Marshal Investigator. This concept was to be a team concept in fighting the crime of arson, however through the years the Task Force concept had turned into a turf battle of local agencies not working with state agencies in the investigation, conducting investigations and not contacting local law enforcement when it was determined to be a crime, and not having current up to date training in the investigation of fire and arson.

Any national standard for Fire Investigation Units (FIUs) would be a positive movement for many reasons such as establishing minimum standards for operation and training. An FIU standard or guide would provide the necessary frame work for those FIU units who currently work under no standard and lack the training that is required to be effective and will only enhance the abilities of those FIU units that strive to maintain certifications for their members and operate in a professional and effective manner.

This standard would have a positive impact on The State Fire Marshal’s Office in having a standard for all Fire Investigation Units to work under and enhance the TEAM concept of fire investigations.

As an Investigator with over 30 years’ experience I would be more then interested in being part of a committee in developing such a standard.

Sincerely,

Brian S. Peterman
To Whom It May Concern,

I wish to express my personal support for the development of a new standard on Fire Investigation Units (FIUs). I cannot speak for my organization however, as this is not allowed.

As a Team Supervisor and Certified Fire Investigator with the Bureau of Alcohol, Tobacco, Firearms, and Explosives’ (ATF) National Response Team, my responsibilities include managing large, multi-jurisdictional, and complex fire and explosion investigations. ATF utilize SOP’s and in-house standards to manage its fire investigation functions and investigations. It could not function well otherwise. Many agencies we work with do not have these and therefore investigations become that much more complicated. It becomes an issue when we have to try to get all the agencies on the same page, and then commit them to doing something they don’t typically do. The use of a universal standard would eradicate these “up front” issues on multi-jurisdictional investigations. Every agency would be jumping off from the same starting point and have the same expectations in terms of fire investigation product.

The new standard will be critical for making sure Fire Departments are committed to their Fire Investigation Units. Typically, this commitment slackens when it comes to issues of training and PPE. The frequent justification is that the budget will not allow for it. However, a new standard would compel Fire Departments to stand up and maintain proper PPE programs, commit them to consistent training and certification plans for investigators, and ensure that they are complying with legal issues such as document retention and freedom of information requests. These requirements are essential if you are to be engaged in the business of fire investigation.

The new standard will also address quality issues. As it stands now, NFPA has issued a document on the qualifications for fire investigators, and a guide for best practices of a fire investigation. What is lacking, and should be addressed by this new standard, is a process for assessing the quality of an investigation and fixing it should it prove deficient. This document would be useful for managers and supervisors, especially since, in the public sector, many times these officers come from non-fire investigation backgrounds.

The new standard will address gaps in NFPA 921 and 1033 as these documents have different scopes. The document will be used as a first step towards accreditation, something which has not occurred with any public sector fire investigation agency with the exception of ATF. Accreditation is sorely needed and will address work quality issues that lead to erroneously denied insurance claims or wrongful convictions.

By way of full disclosure, I currently serve on the NIST OSAC subcommittee which forwarded the proposal of a new standard to NFPA. I would enjoy serving on the technical committee for this new standard should it become a reality.

Thank you,

Regards,
M. Dixon Robin
Maynard, Mary

From: Row, David <DAVID.ROW@LibertyMutual.com>
Sent: Thursday, September 21, 2017 8:53 AM
To: stds_admin
Subject: Fire Investigation Units (FIU) Standards Development Technical Committee

Sirs;

As a member of one of the few insurance carrier Fire Investigation Units, I strongly support this initiative as proposed by NIST/OSAC. I have been involved in the development and implementation of our unit since its inception. I am a former Law Enforcement officer who belonged to an FIU at a public agency.

I see a need for this type of standard in the industry today. Many agencies and entities have FIUs, but there appears to be a lack of consistency in requirements for membership, quality of training opportunities, compliance with Federal and State safety regulations, and peer-review procedures for reporting. I have worked diligently to encourage my own company in providing appropriate training and requiring appropriate compliance with OSHA and NESHAP requirements in our involvement with fire investigations. We are continuing to develop better means of communicating needs, hazards, and outcomes to our stakeholders. If there was a standard to follow, the possibility of better organizational compliance by upper management might streamline these needs.

I am interested in applying for a position within the Technical Committee. I would represent Liberty Mutual, the 5th largest insurer in the United States. However, I have searched the website extensively, and cannot locate an area where I might submit an online application. Please forward me the link for the online application at your earliest convenience.

Thank you for the opportunity to provide my input.

David A. Row, IAAI-CFI, CFEI, M-IFireE
Senior Fire Investigator
U.S. Consumer Markets – Fire Investigation Unit
34405 W. 12 Mile Rd., Suite 130
Farmington Hills, MI 48331
Direct Dial: 248-568-7910
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To Whom It May Concern;

Please accept this email as my personal formal endorsement, and that of my organization, in support of an NFPA Standard pertaining to Fire Investigation Units (FIU’s).

1. This standard would be a natural progression in the evolution and growth of fire investigations, fire investigators, and FIU’s in compliance with recognized standards of care.

2. Accreditation would allow for the objective, third party assessment of policies and procedures, facilities, training, and processes, etc. to comply with recognized standards and raise the bar, making NFPA the bar, that all FIU’s would be measured against.

3. The standard would support and direct the development of organization’s goals of quality investigations comparable to other forensic disciplines.

Finally, please advise me on how to formally apply for membership on any Technical Committee established by the Standards Council in this endeavor. My efforts to find and submit the appropriate application online have not been successful, and there is not a link on the newsletter that I downloaded.

I am eager to apply and contribute in any way I can on a committee of this nature.

Best Regards;

Robert K. Toth, IAAI-CFI®

*** Link to New Fee Schedule – 10/2017***
To whom it may concern:

I am writing in support of the NFPA's initiation request to develop a Standard addressing Fire Investigations Units in the public and private sector. I believe this type of Standard or guideline is long overdue and the natural progression of NFPA 921 & 1033.

Serving presently as President of the Illinois Chapter of the International Association of Arson Investigators and an active fire service professional that also works in the private sector doing fire investigation I have been on the ground floor of developing fire investigation teams across the State of Illinois.

The Illinois Fire Service has been proactively establishing fire investigation units, Fire Investigations Taskforce's, and MABAS Fire Investigation Teams for the last 20 years. Many of the Departments in Illinois participate in the Mutual Aid Box Alarm Associations (MABAS). During the formation of many of our teams many things were learned by trial and error because there were no set guidelines or standards. During this time we worked on intergovernmental agreements between communities, developed operational SOP's, Implemented the Incident Management system, created an Illinois recertification program for fire investigators in Illinois to maintain training in compliance with NFPA 921 & 1033.

As far as I know of Illinois is the only states that requires there Certified Fire and Arson Investigators to maintain recertification. This was adopted across our state due to the fire investigators only relying on there original training in fire investigation and not seeking outside continuing education on many of the recent changes in NFPA 921 /1033 and the studies conducted by ATF, NIST and UL lab which has disproved of many of the past material taught during there class.

Illinois Fire Investigation teams have a strong working relationship with local law enforcement, Illinois State Fire Marshals CFI'S as well as ATF CFI's.

In the private sector owning my own fire investigation firm I have had the opportunity of working directly with Insurance Company Fire Investigation Units including Travelers, Hartford, Liberty Mutual, and State Farm Insurance.

As President of the Illinois IAAI and an Active Member of the IAAI I would like to be considered to serve on the Technical Committee to develop the Ansi Accredited Standard addressing Fire Investigations Units. I am presently member of the NFPA and serve on the NFPA First Responder Forum representing the International Association of Arson Investigators.

I looked on the NFPA website, but was unable to find an application for the FIU Technical Committee.

Please find attached by current resume which details my background, education, and work related experience in fire investigation.
I will be in Boston in the end of October attending the NFPA First Responder Forum.

Thank you for your time and consideration,

Christopher J. Ward
President
Illinois IAAI

Christopher J. Ward CFI, CFEI, CVFI
Ward & Associates
Forensic Fire Investigations
P.O. Box 201
Manhattan, IL 60442
Cell (815) 405-5491
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Website: www.wardfire.net

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Good afternoon,

I wanted to email and lend my full support for the proposed new standard on Fire Investigation Units.

While I am not an investigator myself, being so close to the Fire Investigation community by working in a lab, exposes us to a variety of Fire investigators and the agencies that they works for. Every day we see Agencies that can’t provide basic equipment and supplies to their investigators, management that doesn’t fully support their Investigators, and a wide variety of skills and abilities of investigators within the same agency.

Notwithstanding the above, Fire investigations and the individual Fire Investigators have made tremendous strides at improving their field. There is still, however, further to go. I believe that by having a standard for the last piece of the puzzle will solve many of the remaining issues that Fire Investigators face today. Most of which can be solved by having an organization that fully supports their investigators and that hold them accountable through the use of good management practices.

If this standard is used as a basis as an accreditation program for those Fire Investigation Units that wish to achieve accreditation, I believe I would be a valuable asset to the standards committee given my background with Accreditation of forensic sciences. I’d be more than happy to serve on a committee if NFPA desired.

Thanks,
Chad

Chad Wissinger, BS, MBA, CPM
Forensic Laboratory Chief
Ohio Department of Commerce
Division of State Fire Marshal
8895 East Main Street
Reynoldsburg, Ohio 43068
P: 614.752.7135 F: 614.752.7214
C: 614.403.8861

www.com.ohio.gov

This message and any response to it may constitute a public record and thus may be publicly available to anyone who requests it.
Subject: Standards

It is my opinion that anyone charged with fire explosion investigations should be trained not only in NFPA 921 and 1033. Having the power to determine origin and cause is a tremendous responsibility and many so called investigators lack the needed training to meet those responsibilities. It is further my opinion that fire investigators should hold at the least an associates degree in fire science, and be certified as either a CFI or CFEI. Public investigators should also be trained law enforcement agents, as they have the authority to take someone’s freedom from them. Fire Investigators also should be required to complete 16 hours of certified professional training (CPT) to maintain certification annually. I further believe this is personal responsibility and not that of the agency. Agency responsibility will just add a greater burden on the tax payer. Our colleagues in the private sector should also be held to the same training standards. The overall goal is to make this investigative field as professional as possible.
Good evening, I wanted to make a few simple comments on the discussion of NFPA additional requirements for fire investigators.

1. Some smaller FD’s in particular volunteer organizations in more rural areas will not have the luxury of a dedicated investigator and often do not have the budget for additional training or technologies.
2. Record retention is usually dedicated by the fire department or the applicable District Attorney depending on the complexity of the fire i.e.: arson, death, incendiary, etc.…
3. Required technology or management systems are budget centric and depends if the FD can afford.

NFPA can often be an over reach for smaller organizations and there should be concern is beyond following NFPA 921, of adding additional requirements many departments may not be able to afford. We should not be adding technologies that would complicate such organizations.

Thanks, Jeff

Jeff Ashford
Wildland
Fire Investigator, CFEI, CVFI
Evergreen Fire & Rescue
1802 Bergen Parkway
Evergreen, Co 80439
Office 303 674 3145
Dispatch 303 674 2323
Cel/Text 720 6412359
Thanks for your comments and input!

Randy Watson,
IAAI-CFI, CFEI, F-IAFI
SEA, Ltd.
800-743-7672

Sent from a mobile device.
Please excuse any errors/omissions.

On Sep 18, 2017, at 11:20 PM, Vyto Babrauskas Ph.D. <vytob@doctorfire.com> wrote:

I am opposed to a new committee being formed to establish such a standard. The requirements for fire investigations and fire investigators are fully well addressed currently by NFPA 921 and NFPA 1033, respectively. These cover fully well within their scope any needed technical aspects of a fire investigator conducting a fire investigation. It appears that the proponent(s) therefore envision that an additional document could be focused on the bureaucratic (i.e., non-technical) aspects of administering a group of fire investigators. This is an HR issue, not a fire safety issue. NFPA is not in the business of establishing standards for human relations departments, thus, it is inappropriate to pursue such a standard. If there are any technical issues pertinent to fire investigations that are not currently addressed within NFPA 921 or NFPA 1033, then the proper approach would be to propose new work items for one or both of these documents. I certainly know that the Committee for NFPA 921 is receptive to any needed new items and I presume this equally well applies to the Committee for NFPA 1033.

Best regards,

Vyto Babrauskas, Ph.D.
Fire Science and Technology Inc.
926 Hayes Avenue
San Diego, CA 92103
phone: (619) 501-7739
I would like to offer the following comments in response to the New Project Initiation Request being considered by the NFPA. Although I feel that there are steps that should be taken to advance the field of Fire Investigations, I do not believe that the creation of a separate standard is the best method of achieving this goal.

1. Based on the definition offered in the NFPA News (September 2017 edition), the ANSI standard being considered would apply to both public and private sector organization. Since these types of organizations have different functions and requirements, the creation of a standard may conflict with established legal requirements that currently govern the organization.

2. The proposed standard would apply to individuals operating within a Task Force. Although the requester has stated that the standard would not apply to the formation of a task force, the presence of a standard may adversely affect an organization’s ability to recruit personnel from outside departments to participate.

3. The minimum requirements being considered by the Technical Committee include facilities and equipment. Public organizations typically do not have the ability to rapidly modify facilities. The budgetary cycles and requirements of a public organization may result in them being non-compliant with the standard for several years. As with any standard, being non-compliant would open the organization up for adverse scrutiny during legal proceedings. The merit of a criminal case should not fall on the ability of an organization to pay for a certain type of facility.

4. The needed safety procedures for this industry should be included in NFPA 921/1033 (along with other NFPA documents). Best practices for safety procedures can easily be included in these documents and do not require the creation of a new standard.

5. Training, certification and education, and document retention are subjects that are currently regulated by State organizations or laws. A new standard may be contradictory to established law. The default for the organization should be their current legal guidelines.

As I previously stated, there are steps that should be taken to improve the field of Fire Investigations. Please consider the addition of information to existing documents instead of the creation of a new standard.

Respectfully

COBB COUNTY DEPARTMENT OF PUBLIC SAFETY

Brian S. Beaty - IAIA-CFI
Fire Investigator
Fire Investigation Unit
1595 County Services Parkway Marietta, GA 30008
Phone: 770-499-3867 Fax: 770-499-3861
Maynard, Mary

From: Jim <jbliss@indianharbour.org>
Sent: Tuesday, October 17, 2017 8:41 PM
To: stds_admin
Subject: FIU Opposition

As a single member responsible for Fire and Life Safety inspections as well as Fire investigations of a small community, I am not in favor of the proposed creation of a FIU Standard Development. In doing so you will create a duplication of minimum requirements for the Fire Investigation that is already in existence through NFPA 1033, 921, State and Local requirements. Additionally this may create unfunded liabilities to small public agencies.

Jim Bliss
Fire Marshal
City of Indian Harbour Beach
2055 South Patrick Dr
Indian Harbour Beach, FL 32937
Office: 321-773-3181
Cell: 321-863-2405
jbliss@indianharbour.org
Dear Fellow Members,

It is my understanding that yet another Standard is proposed which would focus on minimum requirements for fire and explosion investigators.

NFPA 921 and NFPA 1033 already address the “how to” and “qualifications needed” for an individual to complete either a fire or explosion investigation.

The proposed wording which includes “Private sector, consulting firms and insurance investigation units” should be deleted. Clearly, NFPA 1033 addresses the qualifications necessary in an investigator, no matter where that individual is employed.

The proposed standard is redundant and costly to public sector investigators who must now certify in yet another program to prove they are qualified even if they are IAAI-CFI, simply because they are part of a volunteer Fire Investigation Unit.

This smacks of discrimination practices by a few individuals who have little or no regard for anyone’s qualifications, except their own. Their lack of respect for the Fire Service is evidenced by this proposal.

It is my opinion that anyone who can meet the qualifications in NFPA 1033 and has a clear understanding of NFPA 921 has the necessary credentials to complete a thorough and professional origin and cause investigation.

Genevieve Bures
Bures Consultants, Inc.
343 West Bagley Road
Suite 103
Berea, Ohio 44017
NFPA Committee Members

As an investigator that works both Public and Private, I have concerns that a standard such as proposed will create a hardship or basically an unfunded mandate to the organizations investigating fires.

I have been told that this standard was proposed to aid with accreditation issues for organizations. If the objective stays within that theme, it should not have too much impact. Having been in the Fire Service for 30 years, I know that proposals like this can snowball and everyone will try to add to it. That being said, all of the topics listed could be added into NFPA 921 and added as JPR in NFPA 1033 without creating a new document.

Suggestions made in NFPA921 allow organizations to work within their budgets. This is a perfect venue to put ideas and suggestions as to the best practice for the topics in the posting of the proposed standard. The creation of an Industry Standard will create a hurdle to overcome in litigation. An example would be the topic of Facilities and Equipment. A standard which requires you to have certain equipment or a facility may create a path for a case to become more about why you don’t have a building to house your records verses the facts of the case. This has already been seen in court with NFPA 921 which is just a Guide.

I ask that if the Standards Committee decide to create a Standard verses a Guide concerning FIUs, that they consider the ramifications and financial burdens that could be put on organizations all over the country. Creating a Guide to be used for accreditation purposes, allows for flexibility and time. Flexibility for organization to continue to provide service and time for them to evolve into the level that is suggested by this proposal.

Lt. Robert Cabral OFE, IAACI-CFI, CI, ECT

Union Township Fire Department
860 Clough Pike
Cincinnati, Ohio 45245
513-528-4446
rcabral@union-township.oh.us
To Whom It May Concern,

My name is Jerry Carter and I am a detective first lieutenant with the Michigan State Police (MSP). I serve as the commander of the MSP Fire Investigation Unit (FIU). Our FIU is made up of nine fire investigators who are strategically located throughout the state. Our fire investigators, including myself, have all attended fire investigation schools that meet or exceed the requirements of NFPA 1033. Our fire investigators are able to perform the job performance requirements of NFPA 1033. They also utilize NFPA 921 as a guide to assist them during their fire and explosion investigations. We, as a unit, continually refresh and increase our fire investigation knowledge and skills by attending many hours of continuing education classes and in-service sessions annually.

I have recently read an article in NFPA News dated September 2017. The article was titled “New Project on Fire Investigation Units (FIUs).” The article did not provide sufficient information for me to make a determination if I was for or against the concept of an “ANSI Accredited Standard addressing Fire Investigation Units (FIUs).” However, I do have some thoughts/concerns regarding the focus areas listed in the article.

- Facilities and Equipment
- Compliance with safety procedures
- Training
- Certification and education
- Document Retention
- Review and approvals of investigation reports
- Process management systems

As a law enforcement agency, MSP has its own policies on report writing systems, report writing approvals, and document retention. The MSP Fire Investigation Unit must comply with these internal policies. I would not be in favor of a standard that would attempt to dictate that the MSP Fire Investigation Unit would have to be in compliance with requirements that would violate our Official Orders. With that being said, I would gladly provide any information possible on the organization and policies of the Michigan State Police Fire Investigation Unit to help promote constructive dialogue.

Thanks,

D/F/Lt. Jerry Carter
Greetings,

I would like to write and share my personal opposition to the forming of a new standard as defined in the request. We have two long-term standing committees (921 and 1033) which already accomplish all the task stated in the request from OSAC. The formation of a third committee conducting redundant and possibly even creating conflicting guidance would be counterproductive to the mission statement of the NFPA and would be a disservice to the public. There is simply no value in creating an additional standard for the fire investigation community.

Regards

Jim Caton
M-IAAI, IAAI-CFI, CVFI
Senior Fire Investigator Professional Profile

Office: 800-482-5611, 1145
Mobile: 501-204-1011

Our mission is to consistently provide conclusive, unbiased, and accurate forensic investigation services with the fastest turnaround time and best customer service in our industry
I am writing this opposition e-mail in representation of more than 100 members of the Central Virginia Fire Arson Association (CVFAA).

CVFAA is a professional organization that provides representation and training for fire inspectors and fire investigators in the Metro-Richmond Virginia area. Currently, I serve as the president of this organization.

During today’s monthly meeting there was discussion in regards to opposition or support for the implementation of standards addressing Fire Investigation Units (FIUs). After discussions, an overwhelming majority present were in opposition of creating FIU standards. Members felt that current standards and guidelines, as well as state and local laws provide the guidance necessary for individual fire investigators, as well as “fire investigation units” relating to; facilities, equipment, safety compliance, training, documentation, etc….

Please accept this e-mail as opposition from members of the CVFAA for the development of standards for FIUs.

Keith Chambers, Battalion Chief
Chesterfield Fire and EMS
Fire Marshal’s Office
(804)768-7439

Like us on Facebook:
https://www.facebook.com/ChesterfieldVAFireEMS
Dear Sir/Ms.

The intent of this email is to express my opposition to the Organization of Scientific Area Committees (OSAC) request to create a new standard governing fire investigations. NFPA 921 and NFPA 1033 already govern the field of fire investigations and therefore there is no need for another standard.

Respectfully,

Kevin Dippolito, IAAI-CFI, NAFI-CFEI, CVFI, CFII
Fire Marshal, Township of Bristol, Bristol, PA 19007

Member, NFPA 1033 Technical Committee
October 30, 2017

National Fire Protection Association
Fire Investigation Units (FIUs) Standards Development

Via: Email

To Whom It May Concern:

I was recently made aware that the National Fire Protection Association (NFPA) was considering a request to establish ANSI Accredited Standard addressing Fire Investigation Units (FIUs). I do not support such a request. Currently, the fire investigation community is governed by NFPA 1033 and NFPA 921, although NFPA 921 is a guide, it does serve as a standard of care when conducting fire investigations. In addition, NFPA 1730 covers a wide array of items dealing with fire investigation and as such, I believe any new standard would be redundant and unnecessary.

I have been a full-time fire investigator working for a public agency for the past fifteen years. As such, I am very familiar with both NFPA 1033 and NFPA 921. I incorporate both documents in my training opportunities to new investigators and believe that any initiative to professionalize quality investigations within the forensic community should be addressed in NFPA 921 and/or NFPA 1730. I am also an instructor for the State of Florida and teach at several regional training academies in the areas of fire investigation. It is important that new investigators understand the science behind fire investigations, but a new standard for fire investigation units would complicate matters. A lot of the information that would be contained in the new standard is already addressed in NFPA 921 and 1730.

Therefore, I would oppose any new initiative for a standard and do not feel that it is necessary.

Sincerely,

Thomas C. Fucci

Thomas C. Fucci, IAAI-CFI/CFEI
Board Certified Fire Investigator
I and the Office of the Maryland State Fire Marshal are not in favor of a new standard addressing Fire Investigation Units. We currently have standards and guidelines regarding fire investigations: 1033, 921 & 1730. Based on all of the work that has been done with 921 and the time it has taken to get where we are today with this document would be at a lost if another standard was brought into the mix. It would be starting all over again, confusing and just one more document that we would have to utilize at trial and other hearings. It is hard enough now with states attorney's just getting them to learn 921 and what it can do and how it is applied in a criminal case involving fire and explosives.

All of the items identified for the new standard can be incorporated within one of the three current standards thus not needing a new standard to address those issues. I also question the current motivation behind this standard from the Fire & Explosion Investigation subcommittee of the OSAC. I am also not sure how the private fire investigator community would want another standard providing guidance in their investigations as they are completely different from the investigations by the public sector. Thank you for your time and allowing the community to comment on this proposal.

Brian S Geraci
State Fire Marshal

Office of the Maryland State Fire Marshal
1201 Reisterstown Road | Bldg C
Pikesville, MD 21208-3899
Office: 410-653-8980 | Fax: 410-653-8988
I was very excited last November when I read about OSAC’s approval of NFPA 921 for inclusion on the OSAC Registry and the potential for 1033 to be included. Now I am hearing that OSAC wants more – as if 921 and 1033 are not enough. Why is an OUTSIDE agency requesting more standards to cover task force teams/groups? Tell them to read 921 and 1033 – everything needed for fire investigation is already there. It does not matter how many investigators are involved in the situation. My vote is to tell OSAC this is not their area of expertise and adding more standards is not necessary.

Each department, each task force team, each group, each fire, will dictate how to approach and manage the fire scene. As long as 921 is followed, there is no need for more oversight, regulation or standard by NFPA or OSAC.

Chris Grooms, IAAI-CFI
Fire Marshal, City of Ketchikan
70 Bawden Street
Ketchikan, AK 99901
907-228-2363
I have seen the request by OSAC requesting a new standard on Fire Investigative Units. I don’t know what the proposals are but I would like to make sure that our agency is heard. Any changes that would bring forth minimums such as facilities, tools, teams, ect... Will have an adverse effect on our agency to provide investigative services and the rural areas will be placed in a position where they cannot do it but are responsible by law to do it putting them in a catch 22. If a private scientific laboratory wants standards such as this that fine but the public agencies barley have the resources as it is. The end result would lead to agencies not conducting investigations and labeling all fires as undetermined. Its not right but that is what’s going to happen.

Any changes should be through a quality review and not just considering large urban areas but smaller areas where this would destroy investigation services by very qualified agencies.

Thank you for your time and allowing my input.

Jeffery L Mack
Deputy Fire Marshal – IAAI CFI
Salem Fire Department
370 Trade St SE
Salem, Oregon 97301
503-589-2136
**RESPONSE TO REQUEST**

The National Fire Protection Association (NFPA) Standards Council is in receipt of a New Project Initiation Request for the development of an ANSI Accredited Standard addressing *Fire Investigation Units (FIUs)* from the National Institute of Standards and Technology (NIST), specifically the Organization of Scientific Area Committees (OSAC) Fire and Explosion Investigation Subcommittee.

The request defines an FIU as any public or private sector organizations performing fire and explosion investigations. This applies to any public agencies i.e. fire departments, law enforcement agencies involved in fire investigation, fire marshal offices, and private agencies such as consulting firms and insurance investigation units. The project as proposed will include individuals operating as part of a task force for specialized incidents, although the requester identifies that the proposed project is not intended to prescribe any requirements relating to the formation of a task force.

If the New Project Initiation is ultimately approved by the Standards Council, a new Technical Committee may be established and charged with the development of appropriate requirements related to *Fire Investigation Units (FIUs)*. Activities within the scope of the Technical Committee are anticipated to focus minimum requirements for fire and explosion investigation relating to:

- Organization;
- Facilities and equipment;
- Compliance with safety procedures;
- Training;
- Certification and education;
- Document retention;
- Review and approvals of investigation reports; and
- Processes/management systems

NFPA is currently soliciting comments from interested organizations and individuals to gauge whether support exists for standards development addressing *Fire Investigation Units (FIUs)*.

The request comes in response to the NIST/OSAC initiative to develop and identify standards and guides that will support professional quality investigations within the forensic community, in this instance specifically on the topic of fire and explosion investigation. The requester proposes that such a project will link naturally to the existing NFPA 921 and 1033, which provide...
NFPA specifically seeks input on the following:

1. Are you, or your organization, in favor of the development of an NFPA Standard pertaining to Fire Investigation Units (FIUs)?

   Fire Investigation Units, as defined above, is any public or private sector organizations performing fire and explosion investigations. This applies to any public agencies i.e. fire departments, law enforcement agencies involved in fire investigation, fire marshal offices, and private agencies such as consulting firms and insurance investigation units.

   I am not in favor of the development of an NFPA Standard pertaining to Fire Investigations Units.

   I am specifically opposed to a ‘STANDARD’ that deals with the fire investigation industry.

   NFPA 1033 is virtually non-complied with by most of the investigators I discuss it with or try to teach about because they don’t know about it, haven’t been included in their curriculum, or haven’t taken the time to be educated (most higher-ups are ignorant of the Standard).

   A ‘Standard’, by definition, is mandatory language. To author a ‘standard’, even as it applies to the formation of a Fire Investigation Unit, is an insurmountable task. It cannot be done as there are far too many different scenarios surrounding the field of Fire Investigation. It is unlike a ‘Standard’ that can be written to specify the size of an exit door or how many 12ga wires can be in a specific size conduit.

2. Please state your reason(s) for supporting or opposing such standards development.

   I believe that most Fire Investigation Units are currently in the public sector as most private sector companies use an ‘individual’ approach. This could mean that a sole proprietor is somehow a ‘Fire Investigation Unit’.

   All of the Public sector units that I am aware of work within NFPA 921 and their own department specific SOP’s/SOG’s.

   If all of the persons involved in fire investigation utilize the guidance set forth in NFPA 921, then there is no need of any other document trying to define the same thing. If anything, this proposal would be as an addition to (even as a new chapter of) NFPA 921.

   Specifically as it relates to the above mentions topics:

   Organization; referring to the organization of the units as in leadership and assigned positions?
Facilities and equipment; What facilities and equipment would be different for a ‘Fire Investigation Unit’ than for an individual? How could a regulation be written effectively when each department, area, and community has such differing needs, not to mention the investigator’s training, education, knowledge, and experience differences.

Compliance with safety procedures; Most departments and companies currently have written safety procedures. How would this ‘standard’ coexist with current language? What about the OSHA requirements already in existence?

Training; NFPA 1033 specifies (yes, as a Standard), what training a fire investigator MUST have. Would there be some difference in the training required for a Unit vs an individual?

Certification and education; There is no current requirement anywhere that a fire investigator be ‘certified’ however, I don’t know of a court anywhere that will allow a fire investigator to testify if they are not certified by one of the bodies such as a state, federal government, IAAI, NAFI. All of those organizations already require a specific amount of education to be certified. I don’t know of a client (in the private sector) that will hire an investigator (or company) that uses non-certified investigators.

Document retention; How is this any different than what anyone is currently doing. Again, departments and companies have retention requirements. (BTW the IRS only requires 7 years document retention)

Review and approvals of investigation reports; Any department or company that is issuing reports typically has a review process (and may have an approval process). As an individual investigator, owning and operating my own company as a sole proprietor, who would I need to get to review and approve a report? Would I need to hire an outside firm, that may know nothing about fires, to review my work? Am I to share my report with other peers (read possible adversary or competitor)? Is this peer review, administrative review, or technical review?

and

Processes/management systems Same as all the rest)

All of the above referenced items are currently being applied at the department or company level and through the Standard of 1033 and Guidance of 921.

There is absolutely no need of a grand waste of time for a Standard to be composed to address what is already in the marketplace.

Send a proposal for inclusion to the NFPA 921 committee. This is where something like this belongs (if anywhere).

3. Are you or your organization interested in applying for membership on the Technical Committee if established by the Standards Council? If yes, please submit an application, in addition to your comments in support of the project, online at: Submit online application
Yes, in addition to my work on the NFPA 921 committee, I would be honored to serve on this committee.

Note: Applications being accepted for purposes of documenting applicant interest in committee participation. Acceptance of applications by NFPA does not guaranty or imply the Standards Council will ultimately approve standards development activity on this subject matter.

Should you have any questions or need any further information, please do not hesitate to contact me.

Sincerely,

MorrFire Investigations

Jeffery T Morrill, CFI, CFEI

This investigation purports to the qualifications set forth in NFPA 1033, the Standard for Professional Qualifications for Fire Investigator, 2014 edition, and the methodology as set forth in NFPA 921, The Guide for Fire and Explosion Investigation, 2014 Edition. Any and all evidence handled was done so in accordance with ASTM Standards; ASTM E860, Standard Practice for Examining and Testing Items that are or May Become Involved in Litigation, 1997; ASTM E1188 Standard Practice for Collection and Preservation of Information and Physical Items by a Technical Investigator, 1995; ASTM E1492, Standard Practice for Receiving, Documenting, Storing, and Retrieving Evidence in a Forensic Science Laboratory, 1992; and ASTM E1459, Standard Guide for Physical Evidence Labeling and Related Documentation, 1992. This is a SUMMARY REPORT and does not necessarily state all data considered nor all opinions related to the origin, cause, or responsibility of the fire. The opinions expressed herein are based on the available data. Should additional data become available, the author reserves the right to evaluate said data and determine if the new data has any bearing on the opinions expressed. This report is reserved for the client listed above. This report shall not be used in any other context without the author’s approval. This report is intended to be used in a civil context and shall not be used in any criminal proceeding.
To Whom It May Concern; this letter is in response to the recent notification by the NFPA in regard to a request from the Organization of Scientific Area Committees (OSAC) to implement an Accredited Standard (ANSI) for Fire Investigation Units (FIUs).

On behalf of the Board of Directors and the membership of the Massachusetts Chapter of the International Association of Arson Investigators (MAIAAI). I would like to inform the NFPA that the MAIAAI is opposed to the development of an FIU, ANSI standard.

The chapter recognizes the need for a professional approach to Fire Investigation and accepts the current guide NFPA 921 as a guide to conducting fire investigations. In addition to the NFPA 921, the Standard for Professional Qualifications for Fire Investigator NFPA 1033 is also a recognized standard which already covers the topics which describe the necessary requirements for Fire Investigation Units.

The duplicity and unnecessary restrictions imposed by an additional Standard for FIUs is unwarranted by the membership of the MAIAAI.

Respectfully submitted,

Thomas J. Murray

Chapter President of the MAIAAI
I have reviewed the new project proposal addressing FIU’s. I do not see the need for an ANSI Accredited Standard for fire investigation units. We are a small department, and our investigators all meet the current 1033 standard and adopt the 921 Guide. I feel that this new “Standard” will only be another large cost to smaller Fire Marshal Offices. I personally have no issue with continuing education and adopting new ideas and training, but something like this could end up requiring additional staff just to maintain the paperwork. I’m against this idea.

Capt. Mike Perdue
Interim Fire Marshal
Salem Fire-EMS Department
216 South Broad Street
Salem VA 24153
540-375-3080
Maynard, Mary

From: Rick Roby <rroby@csefire.com>
Sent: Friday, October 13, 2017 3:56 PM
To: stds_admin
Subject: Proposed Technical Committee of FIUs

To whom it may concern,

1) I am writing in opposition to the formation of a new Technical Committee on Fire Investigative Units (FIUs).

2) On behalf of Combustion Science & Engineering, Inc., we are opposed to the formation of a new Technical Committee on Fire Investigative Units (FIUs), because it will substantially, if not entirely, overlap with the existing Technical Committees for NFPA 921 and NFPA 1033. The existence of competing Technical Committees developing inconsistent or contradictory standards and guidelines for fire investigation (which will inevitably occur) will have a profound negative effect on professional and scientifically valid fire investigation. These competing committees would allow people to “shop” requirements and/or guidelines between the different committees for approval and implementation. The situation will likely arise where one committee endorses a guideline or requirement that the other committee has rejected. The presence of contradictory requirements and guidelines in the fire investigation community will reek havoc on proper conduct of fire investigation and will create chaos in criminal or civil litigation.

3) If, despite our opposition, such a committee is formed, we would be interested in applying for membership on the committee.

On behalf of Combustion Science & Engineering, Inc., I thank you for your time and consideration.

Rick Roby

--

Richard J. Roby, P.E., Ph.D.
President & Technical Director
Combustion Science & Engineering, Inc.
8940 Old Annapolis Road, Suite L
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USA
Phone: (410) 884-3266
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Good Afternoon,

Here is our response to your request for input.

NFPA specifically seeks input on the following:

1. Are you, or your organization, in favor of the development of an NFPA Standard pertaining to Fire Investigation Units (FIUs)?

   No – We are NOT in favor of this project/proposal at this time.

2. Please state your reason(s) for supporting or opposing such standards development.

   While standards and certainly accreditation (and certification) seek to improve the overall quality and reliability of the work of Fire Investigation Units, the focus needs to remain with the Fire Investigator and not the administrative or management system that supports these FIUs. It is our opinion, that NFPA 921 and NFPA 1033 are sufficient to ensure industry compliance and continual improvement.

   At its core, this new standard will involve additional time and cost to prepare, administer, and defend in court while adding very little value to the actual work or documentation that was done as part of a complete and thorough fire investigation. If parties on either side of the isle have concerns with the administration, policies, or methodology, those issues will get brought up and will get addressed in court with or without a new standard, and regardless of accreditation.

3. Are you or your organization interested in applying for membership on the Technical Committee if established by the Standards Council? If yes, please submit an application, in addition to your comments in support of the project?

   The New Hampshire State Fire Marshal’s Office remains open to participation in Technical Committee roles and assignments as needed.

Respectfully submitted,

Deputy State Fire Marshal
Keith A. Rodenhiser, CFEI
Bureau Commander
New Hampshire State Fire Marshal’s Office
Bureau of Investigations
33 Hazen Drive | Concord, NH 03305
To whom it may concern

Having been in the fire investigation industry for 21 years, I haven’t heard much about OSAC. I would like to know who they are, and who comprises their board. While I am a strong supporter of NFPA 921 and continuing advances in fire investigation technology, developing a “standard” for fire investigation teams or work units on the surface would appear to have a detrimental effect on small departments and law enforcement agencies with limited resources, large teams with multiple investigators, but budget constraints, private industry with client agreements, and/or multi-party fire scene investigations.

Without knowing the reasons why the OSAC is moving to create a standard, I cannot support their efforts.

Certainly more information is needed!

Best Regards

KIRK W. SCHMITT, IAAI-CFI
Senior Fire Investigator | Wildfire Specialist
Unified Investigations & Sciences, Inc.
a sedgwick company
OFFICE 303.762.8487 | CELL 719. 205-6044 | FAX 303.762.8586
3030 S. Tejon Street | Englewood, CO 80110
EMAIL kschmitt@uis-usa.com
WWW.UIS-USA.COM The leader in forensic engineering and origin & cause services
Submit an Assignment

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Standards Council  
National Fire Protection Association  
Batterymarch Park  
Quincy, Massachusetts

RE: Proposed New Project on Fire Investigation Units (FIU’s)

To the members of the Standards Council,

Please accept my comments in opposition to the creation of a new Technical Committee for a new document regarding the “development of appropriate requirements” for Fire Investigation Units (FIU’s).

I had five years’ experience in my fire department’s Fire Investigation Unit, three years as the ranking officer. Prior to that time, I had spent an additional five years in the Fire Prevention Bureau, which had the same duties and responsibilities as the FIU, but preceded the specific designation of FIU. For almost the past 19 years I have worked as a fire investigator in the private sector in firms devoted specifically to fire and explosion investigations, although not designated FIU’s.

I am a Principle member of the TC on Professional Qualifications for Fire Investigator (NFPA 1033), and had been for the past 26 years (since 1991). I was formerly a principle and alternate committee member of the TC for Fire and Explosion Investigations (NFPA 921) for 23 years (1988 – 2011).

At the outset, it is my opinion it appears that any proposed new NFPA document would be redundant to the existing requirements and procedures already found in NFPA 1033 and NFPA 921. It is further my opinion that developing a separate document with additional “requirements” is unnecessary and not in the best interests of fire investigators or fire investigation organizations.

However, and most importantly, I am be fearful that a new document with the intent to develop “appropriate requirements related to Fire Investigation Units” would create new requirements infringe on the job performance requirements for fire investigator found in NFPA 1033, and/or the procedures and practices recommended in NFPA 921.
In any instance, there should be no “stand-alone” requirements for FIU’s that are not included in either, or both, NFPA 1033 or NFPA 921. Furthermore, it does seem possible to have a separate TC for FIU’s without overlapping and infringing on the scope of either the TC for Fire Investigator Professional Qualifications, or the TC for Fire and Explosion Investigations.

A review of both NFPA 1033 and NFPA 921 finds that the proposed “activities within the scope” of the new Technical Committee on FIU’s, that would “focus minimum requirements for fire and explosion investigation,” are already addressed and included in either, or both, NFPA 1033 or NFPA 921, as follows:

- Facilities and equipment
  - NFPA 921-17, §15.4.1 “Equipment and facilities”
  - NFPA 921-17, §15.4.2 “Personal Safety Equipment”
- Compliance and Safety procedures
  - NFPA 1033-14, §1.3.4
  - NFPA 1033-14, §4.1.3
  - NFPA 921-17, Chapter 13, “Safety”
- Training
  - NFPA 1033-14, §1.3.5
  - NFPA 1033-14, §1.3.7
  - NFPA 1033-14, §4.1.1
- Certification and Education
  - NFPA 1033-14, §1.3.2
  - NFPA 1033-14, §1.3.7
  - NFPA 1033-14, §4.1.1
- Document retention
  - NFPA 1033-14, §4.4
  - NFPA 1033-14, §4.5
- Review and approval of investigation reports
  - NFPA 1033-14, §13.6.
  - NFPA 921-17, §4.6 “Review Procedure”
  - NFPA 921-17, §16.5 “Reports”
- Process/management systems
  - NFPA 1033-14, §4.1.6
  - NFPA 921-17, §1.2 “Purpose”

NFPA 1033 identifies the job performance requirements (JPR’s) for the position of “Fire Investigator” in both the public and private sectors. I am unaware of any separate JPR’s for FIU investigator’s that are not included in NFPA 1033. If there are such requirements, they would, and should, be included in NFPA 1033, not a separate document. The JPR’s of NFPA 1033 are intended to address all aspects of a fire investigators responsibilities, as well as the prerequisite knowledge and skills necessary to conduct a fire or explosion investigation.

NFPA 921 provides the knowledge, methodology and procedures for the application of the JPR’s identified in NFPA 1033. Again, there is no separate methodology, or
procedure for fire investigation, or for fire investigators assigned or working within a FIU that are not included in NFPA 921.

The stated goal of the proposal is to address “any public and private sector organizations performing fire and explosion investigations.” Once again, there are no specific “fire investigation” functions, procedures, techniques which are applied to FIU’s that do not apply to fire investigation procedures and practices already identified in NFPA 1033 or NFPA 921

While the request defines FIU as any “public or private sector organizations,” the examples are mostly “public sector” organizations. The proposal includes addressing a “task force” for specialized incidents. However, the job functions and “team concept “ for fire investigation is already addressed in NFPA 921-17, and can be found in both Chapter 15, “Planning,” specifically §15.1.3, and Chapter 29, Management of Complex Investigations.”

The primary private sector organizations who have designed FIU’s are insurance companies. While private investigation and forensic engineering firms are broadly involved in fire and explosion investigation, rarely do they have designed “FIU’s.”

Organizational structure and management functions are very different for private sector versus public sector, where the structure is usually established by rank and “chain of command.” As a result, those functions do not align well with a “standard” specifically stating “requirements.”

Having a separate “standard” for the “origination” of a FIU would simply establish another layer complexity, in the form of “requirements” for investigators who follow and fully complying with the requirements and procedures found in both NFPA 1033 and NFPA 921, but are not organized according to the separate “requirements” of the FIU’s.

With all the “minimum requirements” for FIU’s already addressed in either or both NFPA 1033 or NFPA 921, it seems the topic of FIU’s would be much more appropriate for a text book or manual, rather than development by a new NFPA Technical Committee and separate “requirements.” There is no good reason that this should be developed into a separate NFPA Standard.

Regards,

Dennis W. Smith
President
My Name is Geoff Spinner. I am an IAAI CFI. I finished out my career working for the Contra Costa County Fire District from NOV 2008 and retired DEC 2015. I was part of the fire investigation unit. The simplest opinion considering my experience is that the development of a standard for such teams/units has the potential to be exclusionary. Not every department has the benefits of an endless budget. The standards in place now for CFIs should be enough. That is my ten cents.
I would like to offer the following comments in response to the New Project Initiation Request being considered by the NFPA. Although I feel that there are steps that should be taken to advance the field of Fire Investigations, I do not believe that the creation of a separate standard is the best method of achieving this goal.

1. Based on the definition offered in the NFPA News (September 2017 edition), the ANSI standard being considered would apply to both public and private sector organization. Since these types of organizations have different functions and requirements, the creation of a standard may conflict with established legal requirements that currently govern the organization.

2. The proposed standard would apply to individuals operating within a Task Force. Although the requester has stated that the standard would not apply to the formation of a task force, the presence of a standard may adversely affect an organization’s ability to recruit personnel from outside departments to participate.

3. The minimum requirements being considered by the Technical Committee include facilities and equipment. Public organizations typically do not have the ability to rapidly modify facilities. The budgetary cycles and requirements of a public organization may result in them being non-compliant with the standard for several years. As with any standard, being non-compliant would open the organization up for adverse scrutiny during legal proceedings. The merit of a criminal case should not fall on the ability of an organization to pay for a certain type of facility.

4. The needed safety procedures for this industry should be included in NFPA 921/1033 (along with other NFPA documents). Best practices for safety procedures can easily be included in these documents and do not require the creation of a new standard.

5. Training, certification and education, and document retention are subjects that are currently regulated by State organizations or laws. A new standard may be contradictory to established law. The default for the organization should be their current legal guidelines.

As I previously stated, there are steps that should be taken to improve the field of Fire Investigations. Please consider the addition of information to existing documents instead of the creation of a new standard.

Respectfully

C. K. Williams, IAAI-CFI, IAAI-ECT
Chief Fire Investigator
Cobb County Fire & Emergency Services
Fire Investigations Unit
1595 County Services Parkway
Marietta, GA 30008
(770) 499-3868
New Project Initiation Form  
(To be completed by proponent of new project/document)  
*Additional pages may be attached if necessary.*

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<td>a.</td>
<td>Explain the Scope of the new project/document:</td>
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<td>This standard will identify the minimum job performance requirements (JPR’s) for personnel engaged in certain roles that support fire service organizations, but who are not engaged in traditional firefighting activities.</td>
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<td>b.</td>
<td>Provide an explanation and any evidence of the need for the new project/document:</td>
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<td>In 2015, the NFPA conducted a needs assessment for fire services in the United States. The results of question 12, relating to the number of personnel involved in support or auxiliary roles for the fire service, were eye opening. The report estimated that there are currently over 122,000 people serving a broad scope of roles that fit in the category of no direct firefighting, support roles. Support staff serve in communities of all sizes, but sparsely populated areas are particularly reliant on them. Over 60 percent of support staff serve in communities with populations of 5,000 or fewer residents, where they make up more than 12 percent of all available personnel. The NFPA set of fire service related professional qualifications currently lacks any document that addresses the skills and knowledge required for personnel that undertake support assignments at a broad scope of incidents that are encountered by the modern fire department. Without a national consensus document for support personnel, both volunteer and career fire departments are left to specify and deliver whatever training is appropriate for those individuals who serve their organizations in support roles. Safety and effectiveness for these individuals may or may not be addressed properly.</td>
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<td>c.</td>
<td>Identify intended users of the new project/document:</td>
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<td>Fire Departments</td>
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<td>d.</td>
<td>Identify individuals, groups and organizations that should review and provide input on the need for the proposed new project/document; and provide contact information for these groups:</td>
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<td>International Association of Fire Chiefs, North American Fire Training Directors, International Association of Fire Fighters, National Volunteer Fire Council, state-level fire service associations</td>
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<td>e.</td>
<td>Identify individuals, groups and organizations that will be or could be affected, either directly or indirectly, by the proposed new project/document, and what benefit they will receive by having this new document available:</td>
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<td>According to the Fourth Needs Assessment of the U.S. Fire Service report there are 26,322 fire departments utilizing support personnel in who have no direct firefighting activities. These departments would be directly impacted by the new standard.</td>
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<td>f.</td>
<td>Identify other related documents and projects on the subject both within NFPA and external to NFPA:</td>
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<td>There are no national documents or projects related to support personnel generally. Several states have developed guidelines or regulations for the deployment of fire department support personnel. Additionally, there are a number of national documents or projects related to specific activities that support personnel</td>
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For instance, NFPA 1091: Standard for Traffic Control Incident Management establishes job performance requirements for personnel directing traffic at emergency scenes. According to the Fourth Needs Assessment of the U.S. Fire Service report, 9,582 fire departments use support personnel to direct traffic. I envision the support personnel standard bundling the basic information, job specific information and other standard references into a single, menu driven document.

The NVFC believes that the NFPA should establish a new technical committee to develop this standard. The technical committee membership would ideally consist of support personnel, fire chiefs, fire service training professionals, state fire training academy representatives, and representatives of national organizations with an interest in this topic.

There was a proposal to add job performance requirements for fire department support personnel to the NFPA 1001 document during the most recent revision cycle. The Fire Fighter Professional Qualifications Committee rejected that proposal but discussed supporting the creation of a separate document specifically addressing support personnel. A copy of this form has been shared with that committee.

The only data that exists regarding the use of fire department support personnel nationally is the Fourth Needs Assessment Report of the U.S. Fire Service. I anticipate that a large percentage of the work of developing the fire department support personnel standard would be collecting state-level guidelines and regulations as well as identifying existing standards or guidance documents that relate to different roles that support personnel perform.

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<td>NFPA</td>
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<tr>
<td>Codes and Standards Admin.</td>
</tr>
<tr>
<td>1 Battery March Park</td>
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<tr>
<td>Quincy, MA 02169</td>
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<td><a href="mailto:stds_admin@nfpa.org">stds_admin@nfpa.org</a></td>
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<th>Comment on the availability of data and other information that exists or would be needed to substantiate the technical requirements and other provisions of the proposed new project/document:</th>
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<td>The only data that exists regarding the use of fire department support personnel nationally is the Fourth Needs Assessment Report of the U.S. Fire Service. I anticipate that a large percentage of the work of developing the fire department support personnel standard would be collecting state-level guidelines and regulations as well as identifying existing standards or guidance documents that relate to different roles that support personnel perform.</td>
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<th>Signature:</th>
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<tr>
<th>Name:</th>
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Service Support Personnel

The National Fire Protection Association (NFPA) Standards Council is in receipt of a New Project Initiation Request for the development of an ANSI Accredited Standard addressing Professional Qualifications for Fire Service Support Personnel. The submittor has indicated the need for a recognized universal standard establishing professional qualifications to operate as a support member for the fire service.

There are currently no known standards that address the role of individuals operating in the role of support member in the fire service.

If standards development is approved, the development of appropriate documents will necessitate the establishment of a new NFPA Technical Committee comprised of technical experts from within the field, including the public and private sectors. Standard development based upon this request, if approved, will focus on:

- Developing a scope for personnel supporting active fire service operations not subject to Immediate Dangerous to Life or Health (IDLH) environments;
- Performing a Job Task Analysis related to the proposed support position; and
- Identifying Job Performance Requirements (JPRs) to establish professional qualifications for the position of support member.

NFPA is currently soliciting comments from interested organizations and individuals to gauge whether support exists for standards development addressing the scope of this project in relation to existing professional qualification documents and assigning this project to the appropriate technical committee.

NFPA specifically seeks input on the following:

1. Are you, or your organization, in favor of the development of an NFPA Standard pertaining to minimum standards for fire service support personnel?
2. Please state your reason(s) for supporting or opposing such standards development.
3. Are you, or your organization, in favor of the development of an NFPA Standard to establish Professional Qualifications for Fire Service Support Personnel?
4. Are you or your organization interested in applying for membership on the Technical Committee if the Standards Council initiates development activities on the proposed project? If yes, please submit an application, in addition to your comments in support of the project, online at: Submit online application*

Please submit all comments, in support or opposition, by October 13, 2017 to address combustibility of exterior and interior wall panels at: stds_admin@nfpa.org

New Change Indicators Appearing

NFPA takes seriously the feedback we receive and value the opinions of those who use and rely on our information. Since the implementation of our new publishing platform, we have been working to improve: focusing heavily on including change indicators in all of our codes and standards. A solution is now being launched in the 2018 editions of our codes and standards. In the past, NFPA incorporated vertical rules and bullets to indicate changes. Where a section had a change to the text, a vertical rule would appear in the left margin of that section. Where there was a deletion, a bullet would appear in the left margin of that line. This manual process left the reader with no specific information of that change (added text, replaced text, modified text). The indicator simply flagged the reader that there was a change, leaving the reader to research the previous edition to determine the nature of that change.

NFPA's new change indicators capture text revisions, text deletions, figure/table revisions, section deletions, and new content. These are auto-generated in the XMS publishing system by simply running a differentiation tool against the previous edition. You will see these new change indicators in 2018 editions of NFPA Standards.

The following explanatory text that will appear in all 2018 editions on the disclaimer page:

Fire Test for Wall Panels

The National Fire Protection Association (NFPA) is considering the development of an ANSI Accredited Standard addressing the combustibility of exterior and interior wall panels. This test method would be based on the existing 16 ft. Parallel Panel Test from the FM Approvals Standard 4880, involving two facing vertical wall panels exposed to a 360 kW propane gas ignition source, representing a direct adjacent exposure. The parallel panel placement creates a re-radiation effect, representing severe exposures. The pass/fail criteria would be based on heat release rates measured under a calorimeter (1.5 MW minimum). This test would provide a cost effective solution to the other larger full-scale tests, such as the 25 to 50 ft high corner tests.

NFPA is seeking comments from all interested organizations and individuals to gauge whether support exists for standards development on a new wall panel fire test. Specifically, please submit your comments to the following:

1. Are you, or your organization, in favor of the development of an NFPA Standard pertaining to a fire test for wall panels?
2. Please state your reason(s) for supporting or opposing such standards development.
3. Are you, or your organization, in favor of development of an NFPA Standard to establish a new fire test for wall panels?
4. Are you or your organization interested in applying for membership on the Technical Committee if the Standards Council initiates development activities on the proposed project? If yes, please submit an application, in addition to your comments in support of the project, online at: Submit online application*

Please submit all comments, in support or opposition, by October 13, 2017 to address combustibility of exterior and interior wall panels at: stds_admin@nfpa.org
Dear NFPA Standards Council Members:

On behalf of the National Volunteer Fire Council (NVFC), I am writing to express support for the new project on Fire Service Support Personnel that was advertised in the September 2017 NFPA News. Regarding the specific questions posed in the newsletter relating to the proposed project:

1. The NVFC is very much in support of the development of a standard pertaining to the minimum requirements for fire service support personnel. We feel that there is a significant need to have standard in place that provides minimum job performance requirements for a range of activities that are performed by personnel supporting fire services, but not engaging in direct firefighting activities. We support the development of this standard in a manner consistent with a number of other NFPA Professional Qualifications Standards that set out job performance requirements for various functions in a menu approach.

2. The NVFC has long recognized that there is wealth of expertise and skills in a given community. The most recent NFPA Needs Assessment of the U.S. Fire Service Report found that there are an estimated 122,000 non-firefighters serving as support personnel in fire departments throughout the United States. Support personnel serve in communities of all sizes, but over 60 percent of them are located in communities with populations of 5,000 or fewer residents, where they make up more than 12 percent of all available personnel.

While many dedicated citizens may not have the desire to actively participate in firefighting, or they may not be able to do so physically, their skill sets may fill other functions that add to the effectiveness and efficiency of a fire department. Defining the requisite skills and knowledge as well as the job performance requirements necessary to do a specific support task safely and effectively is a very worthwhile endeavor for which the NFPA standards system is well suited.

3. As indicated in the response for questions 1, we are very much in support of developing the proposed standard. We also favor its development within the framework of the NFPA Professional Qualifications Project. It will be important to correlate with the other NFPA Professional Qualifications documents to insure that consistency in practice and terminology is maintained. In addition, there are certain areas in the existing NFPA Professional Qualifications Standards where skills, knowledge and job performance language has already been developed for certain functions. Being able to coordinate with the committees that have the responsibility for those documents will allow some extractions and more efficient use of training and certification elements developed to meet the standards.
4. The NVFC will apply for organizational membership on the Technical Committee if established by the Standards Council. Our members have a keen interest in this project and will actively support the development process with committee representation that is appropriate to the subject area and consistent with NFPA rules regarding committee participation and balance.

If you have any questions regarding this comment please follow up directly with Dave Finger, Chief of Legislative and Regulatory Affairs at dfinger@nvfc.org or (202) 887-5700.

Sincerely,

Kevin D. Quinn
Chair
I am writing to express my support of the NFPA establishing a Profession Qualifications for Fire Service Support Personnel committee and document. There exists a great need in the fire service, particularly in the small rural volunteer and combination departments for such a document.

Having been a volunteer Fire Chief, I can readily see the benefit of having a standard Professional Qualification document that can be used to qualify non-fire support department personnel. A large number of these smaller volunteer and combination departments have personnel willing to support their local fire department during emergencies with duties other than firefighting. Our department can readily use and adopt such a document.

Additionally, I serve as a Principal on the NFPA 1001 Technical Committee. Our committee has dealt with this issue for the several revision cycles. At the last meeting in January of this year, a public comment from the NVFC asking that these qualifications be added to the 1001 was addressed and not accepted. The committee felt that these qualifications should not be part of a firefighter document. After much committee discussion there was a general agreement that asking the Standards Council to address this issue was a good idea and would help to resolve the apparent need for this type of qualifications standard.

Finally, I also serve as the NVFC Director from Louisiana and have been very involved in promoting the establishment of some type of qualifications for non-fire fighter support personnel to assist at emergencies. I strongly believe that there exists a need for a national standard that departments can adopt and follow to better serve their communities safely, effectively and efficiently.

Cordially,

Kenn Fontenot
Good Morning,
I am the Coordinator of our Support Team here at Stayton Fire District.
We currently have 16 members on our team.

Ten of those members make up our Rehab Team who provide assistance to our FF on large calls or fire training exercises. The Rehab Team members are required to receive specific training to join and then they train monthly on CPR, taking vital signs, physical assessments, radio communications, rehab trailer - portable shelters - misting equipment – generators – food handling procedures.
I think the standards program would serve them well.

But for our other Support Team members who assist with district events, administrative work, photography, recycling, station cleaning, district history, shopping, etc. They do not require any formal training but only have attendance/participation requirements. If they drive any district vehicle, they are required to take the district driver’s training.

One of the ideas behind our support team is to encourage citizens in the community that are not interested in being a firefighter or not able to, to use their skills and talents to benefit the fire service. So for those that are not on the Rehab Team, I would not suggest NFPA standards.

Rhonda Grant
Administrative Assistant
Stayton Fire District
PH: (503) 769-2601
FX: (503) 769-1487
www.staytonfire.org
October 12, 2017

NFPA Standards Council
Via Email: stds_adm@nfpa.org

RE: Fire Service Support Personnel

Dear Standards Council:

I am writing to support the new project to develop standards for Fire Service Support Personnel as was reported in the NFPA News of September 2017 (Volume 21 Number 9).

The NFPA Needs Assessment of the US Fire Service indicated there are about 122,000 support personnel serving in fire departments across the country. Most of these are serving in small town fire department such as the West Barnstable Fire Department. This department typically has six to eight volunteer members serving in support positions at emergency incidents such as chiefs aide, EMS provider, communications officer and other limited emergency roles based upon their specific skills and training.

It is surprising that with 122,000 support staff in U.S. fire departments that there is virtually no recognition or admission of their existence and value. It is like they are a black market resource. We need to bring them into the open and make them a formal part of the fire service.

While we’ve developed local standards for them, the lack of common terms, minimum training and a national professional qualification standard makes it difficult to fully utilize support staff, especially when dealing with mutual aid and multi-agency incidents. Even within our own agency there sometimes arises confusion over the role and capabilities of our support staff.

For instance, there is no standardized name for support personnel. We call them auxiliary firefighters, but that title has no common meaning across fire departments. Without a common meaning and minimum training standard we are setting up these
responders for failure due to miscommunications and inconsistent or inappropriate expectations.

The NFPA standards process is the best way to develop formal and consistent practices, training and terminology for fire department support staff.

I recommend that NFPA move forward with developing Professional Qualifications for Fire Service Support Personnel.

Respectfully,

Chief Joseph V. Maruca
I write to provide the following comments regarding the proposed new project on fire service support personnel.

1. On behalf of the La Farge (WI) Fire Department, I wish to register our strong support for the proposal. We believe that there is real value in having a standard in place providing minimum job performance requirements for those personnel providing valuable service on the fireground, but not engaged in direct firefighting activities. Furthermore, flexibility in use of this standard dictates that it be created using a menu approach.

2. This proposal does nothing more than recognize the status quo. The most recent NFPA Needs Assessment of the U.S. Fire Service Report found that there are an estimated 122,000 non-firefighters already serving as support personnel in fire departments throughout the United States. These people serve in communities of all sizes, but over 60 percent of them are located in communities with populations of 5,000 or fewer residents, where they make up more than 12 percent of all available personnel. While many dedicated citizens may not have the desire to actively participate in firefighting, or they may not be able to do so physically, their skill sets may fill other functions that add to the effectiveness and efficiency of a fire department. Defining the requisite skills and knowledge as well as the job performance requirements necessary to perform a specific support task safely and effectively is a very worthwhile endeavor for which the NFPA standards system is well suited.

3. Yes.

4. Yes.

Respectfully submitted,
Philip C. Stittleburg
Chief, La Farge Fire Department
I would like to see how this is going to roll out. We are putting more and more requirements on our VOLUNTEERS and then wondering why no one is volunteering. While developing this proposal please keep in mind the volunteers have a different full time job which pays them, a family, and possibly other commitments as well.

Sincerely

Chuck Williams Chief WVFD

Sent from my iPhone
I was forwarded information about the NVFC and NFPA in regards to a Support Personnel Certification for the fire service. I am glad to see that this is being considered as a possible certification. We currently utilize “support personnel” inside our department as a way to supplement our firefighting personnel on scene. I am aware of several departments that have auxiliary groups in our area and this would provide a perfect opportunity for those departments to provide training and a certification to those personnel. Each departments needs are going to be different, but this would allow a basis for training to begin. In our department, our support personnel must have CPR/First Aid, a Vehicle Driving Course, NIMS 100, 200, 700, 800 and a Traffic Management/Safety Course.

Each of the classes serves a purpose for us. The CPR/First Aid, as our support staff will be working Rehab and may have the opportunity to provide or be the first to start CPR or provide minor medical care. Our staff will be driving one of our department apparatus (rehab/utility vehicle) to scenes. The NIMS classes, to have an understanding of the ICS system and keep the department eligible for cost-shares/grants. Finally, the traffic management course, a support staff can provide traffic control at scenes or a community events and this frees a firefighter for other takes.

So, on to the four questions that needed to be answered:

1. Yes I/we are in favor of this standard.
2. I believe the above statements gives my reasoning of support.
3. Yes, I/we are in favor of NFPA developing a standard for support personnel.
4. Yes, I am interested in participating in the development of this standard.

Should you have any questions or need clarification, please feel free to contact me.

Mark Wobus
Fire Chief
Bastrop Fire Department
802 Chestnut (physical)
PO Box 427 (mailing)
Bastrop, Texas 78602
512-332-8670 office
I am writing in opposition of creating a professional standard for support personnel. Support personnel are extremely varied by their physical and mental abilities. Some people fill support roles at the level of serving coffee at fire events or strictly doing public education. Other support personnel are extremely active on the fire grounds and fill a vital operational role.

Creating a generic standard could cause departments to have to break up functioning teams of support people and segregate them into those that meet the standard and those that don’t. Or even worse, department attorneys not allowing them to volunteer any longer due to perceived liability.

Each support program is very tailored to its department. Creating one more set of standards can have a detrimental impact on volunteerism and likely has very limited tangible benefits.

Rich Etheridge
Rich Etheridge | Fire Chief

Capital City Fire Rescue | 820 Glacier Ave; Juneau, Alaska 99801
Standards Council,

I am in opposition to the NFPA creating a Pro-Qual standard for fireground support operations personnel. To me this is a major step backwards to the professionalizing of the fire service and holding everyone who operates on the fire ground to an established standard that already exist – NFPA 1001.

This is also a major safety issue because everyone on a fireground should be held to the same standard (1001) and would compound and confuse the incident commanders ability to manage a fire scene wondering who is trained to interior verses exterior operations. I further see firefighters who would be trained at the lesser standard as being tempted to don an SCBA in a time of urgency and make entry when they are not qualified to do so and thus they become a hazard and safety concern for the IC and others on the fireground.

Adding to this confusion would be the impact this standard would have on the training and certification programs for state agencies tasked with those responsibilities. I know that in my state I would strongly not the use or allow the development of any certification to a standard for firefighters other than what already exist with the NFPA 1001 standard.

I understand there are organizations that are pushing for this lesser standard that allows primarily volunteers to obtain some type of national certification to operate on a fire scene but I think in the big picture that this would cheapen the entire Pro-Qual/certification process and system. We should hold all firefighters who operate on a fireground to the same standard of professionalism as set forth in NFPA 1001. Volunteers want to be recognized as “professional” in what they do and the volunteer firefighters that I’ve worked with and trained for over 32+ years would not want anything less than the same standard that a career firefighter obtains to do their job.

Best regards,

Alan Joos
Training Division – Chief

Nebraska State Fire Marshal Agency
Office | 308-385-6893
Cell | 308-850-7618
alan.joos@nebraska.gov
https://sfm.nebraska.gov/training | Facebook
To whom it may concern,

As a member of a volunteer fire dept in a rural community, I would not be supportive of standardized requirements for support personnel. We have members with varying skills and abilities who help our organization. We are able to have individuals contribute in meaningful ways that work for us. If we had to use set standards and job descriptions it would limit the number of members we could attract and retain. For departments like ours, we need the flexibility to cover our needs with the resources available.

Provide guidelines and training that's easy to access, rather than more requirements and hoops. We will continue to do our best to improve.

Respectfully,

Sherry Rovig  
Clifton Volunteer Fire Department  
Duluth, MN
### New Project Initiation Form
(To be completed by proponent of new project/document)

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>a.</strong> Explain the Scope of the new project/document:</td>
<td></td>
</tr>
<tr>
<td>This standard provides a test method for determining the flammability of interior/exterior wall panels. The test method has been shown to correlate positively with full-scale fire tests but with a substantial cost saving. Therefore it can serve as an alternative to NFPA 285.</td>
<td></td>
</tr>
<tr>
<td><strong>b.</strong> Provide an explanation and any evidence of the need for the new project/document:</td>
<td></td>
</tr>
<tr>
<td>The new standard would be based on the FM Global, 4.9 m (16 ft.) Parallel Panel Test (PPT) for wall panels. That test method is currently a part of FM Approval Standard 4880, which also includes the full-scale 25 and 50 ft. high corner tests. The 4.9 m (16 ft.) parallel panel configuration includes two 1.1 m (3.5 ft.) wide vertically erected panels facing each other so that they continuously feed heat fluxes to each other while burning. The exposure fire is 360 kW from a 1.1 by 0.5 m (42 by 21 in.) propane-sand burner. A calorimeter is required to measure heat release and pass-fail limits are well below 2 MW. Research has proven that this 4.9 m (16 ft.) PPT can determine fire performance equivalent to that of full-scale, more expensive corner tests (25 and 50 ft. high). In general, the 4.9 m (16 ft.) PPT can be conducted for a small fraction of the larger corner test prices. The test method could be considered as an alternative to that in NFPA 285. The test method can provide a simulation of exterior wall with severe heat exposure. What is more, as part of the development of this standard, concerns would be addressed relating to the presence of windows in such an assembly, as is simulated in the wall sample in the NFPA 285. These concerns were raised at a prior Fire Test Committee meeting, and the most recent Building Construction Committee and Structures and Materials Committee meetings.</td>
<td></td>
</tr>
<tr>
<td><strong>c.</strong> Identify intended users of the new project/document:</td>
<td></td>
</tr>
<tr>
<td>Wall assembly manufacturers, architects, engineers, testing laboratories.</td>
<td></td>
</tr>
<tr>
<td><strong>d.</strong> Identify individuals, groups and organizations that should review and provide input on the need for the proposed new project/document; and provide contact information for these groups:</td>
<td></td>
</tr>
<tr>
<td>The existing Fire Test Committee possesses the expertise to review and maintain such a document. The NFPA 5000 TCs on Building Construction and the TC on Structures and Materials would be interested as well.</td>
<td></td>
</tr>
<tr>
<td><strong>e.</strong> Identify individuals, groups and organizations that will be or could be affected, either directly or indirectly, by the proposed new project/document, and what benefit they will receive by having this new document available:</td>
<td></td>
</tr>
<tr>
<td>Wall assembly manufacturers, architects, engineers, testing laboratories, AHJ's, building owners. The new document would provide a more cost effective alternative to larger scale fire tests.</td>
<td></td>
</tr>
<tr>
<td><strong>f.</strong> Identify other related documents and projects on the subject both within NFPA and external to NFPA:</td>
<td></td>
</tr>
<tr>
<td>NFPA 285, FM Approval Standard 4880</td>
<td></td>
</tr>
<tr>
<td><strong>g.</strong> Identify the technical expertise and interest necessary to develop the project/document, and if the committee membership currently contains this expertise and interest:</td>
<td></td>
</tr>
<tr>
<td>The existing Fire Test Committee possesses the expertise to review and maintain such a document.</td>
<td></td>
</tr>
</tbody>
</table>
h. Provide an estimate on the amount of time needed to develop the new project/document:

1-2 years. The majority of the test method is currently part of FM Approval Standard 4880.

i. Comment on the availability of data and other information that exists or would be needed to substantiate the technical requirements and other provisions of the proposed new project/document:

The test methodology of 4.8 m (16 ft.) parallel panel test is documented in the FM Approval Standard 4880. Two peer reviewed articles [1, 2] demonstrated the consistence of the 4.8 m (16 ft.) parallel panel test with the full-scale 25 ft. and 50 ft. corner tests. Another peer-reviewed article [3] compared the full-scale 25 ft. and 50 ft. corner tests with several existing wall panel test methods.


Please send your request to:
NFPA
Codes and Standards Administration
1 Batterymarch Park
Quincy, MA 02169

Stds_admin@nfpa.org
Rev. 10/09

Signature: 

Name: 

Affiliation: 

(please print)
Service Support Personnel

The National Fire Protection Association (NFPA) Standards Council is in receipt of a New Project Initiation Request for the development of an ANSI Accredited Standard addressing Professional Qualifications for Fire Service Support Personnel. The submittor has indicated the need for a recognized universal standard establishing professional qualifications to operate as a support member for the fire service.

There are currently no known standards that address the role of individuals operating in the role of support member in the fire service.

If standards development is approved, the development of appropriate documents will necessitate the establishment of a new NFPA Technical Committee comprised of technical experts from within the field, including the public and private sectors. Standard development based upon this request, if approved, will focus on:

- Developing a scope for personnel supporting active fire service operations not subject to Immediate Dangerous to Life or Health (IDLH) environments;
- Performing a Job Task Analysis related to the proposed support position; and
- Identifying Job Performance Requirements (JPRs) to establish professional qualifications for the position of support member.

NFPA is currently soliciting comments from interested organizations and individuals to gauge whether support exists for standards development addressing the scope of this project in relation to existing professional qualification documents and assigning this project to the appropriate technical committee.

NFPA specifically seeks input on the following:

1. Are you, or your organization, in favor of the development of an NFPA Standard pertaining to minimum standards for fire service support personnel?
2. Please state your reason(s) for supporting or opposing such standards development.
3. Are you, or your organization, in favor of the development of the NFPA Standard to establish Professional Qualifications for Fire Service Support Personnel
4. Are you or your organization interested in applying for membership on the Technical Committee if the Standards Council initiates development activities on the proposed project? If yes, please submit an application, in addition to your comments in support of the project, online at: Submit online application*

Please submit all comments, in support or opposition, by October 13, 2017 to address combustibility of exterior and interior wall panels at: stds_admin@nfpa.org

New Change Indicators Appearing

NFPA takes seriously the feedback we receive and value the opinions of those who use and rely on our information. Since the implementation of our new publishing platform, we have been working to improve: focusing heavily on including change indicators in all of our codes and standards. A solution is now being launched in the 2018 editions of our codes and standards.

In the past, NFPA incorporated vertical rules and bullets to indicate changes. Where a section had a change to the text, a vertical rule would appear in the left margin of that section. Where there was a deletion, a bullet would appear in the left margin of that line.

This manual process left the reader with no specific information of that change (added text, replaced text, modified text). The indicator simply flagged the reader that there was a change, leaving the reader to research the previous edition to determine the nature of that change.

NFPA's new change indicators capture text revisions, text deletions, figure/table revisions, section deletions, and new content. These are auto-generated in the XMS publishing system by simply running a differentiation tool against the previous edition.

You will see these new change indicators in 2018 editions of NFPA Standards.

The following explanatory text that will appear in all 2018 editions on the disclaimer page:
Can you provide comparison of a number of tests that demonstrate the proposed smaller scale test provides equivalency to the larger scale tests listed? The 25 and 50 foot FM tests are quite rigorous (approximately 5MW ignition source). How about comparing the proposed test with NFPA 285? A parallel panel test is a good addition, but probably not a replacement. Exterior facade fire losses have shown that re-radiation channels contribute to fire spread (they create a chimney effect).
1. I am an officer with FM Global and we are in favor of the development of an NFPA Standard pertaining to a new fire test for wall panels?

2. Reasons for supporting such a test standard are as follows:
   A. The proposed test should serve as an alternative to, and not a replacement for NFPA 285. While NFPA 285 is already available, its scope is limited to exterior walls. The proposed test standard could be used for interior or exterior walls.
   B. The fire exposure in the NFPA 285 test (maximum of 40 kW/m$^2$) represents an uncontrolled fire of interior origin that flashes over, breaks windows in exterior walls and exposes the exterior wall surface. The fire exposure in the proposed test can simulate such a fire scenario, but can also simulate either an interior fire exposure directly against the inside surface, or an exterior fire exposure such as from adjacent buildings, yard storage or back of house combustibles including open or plastic topped dumpsters, trash, and wood or plastic crates or pallets found on loading docks (incident heat flux = 100 kW/m$^2$).
   C. The proposed test is of intermediate scale and can be conducted with a fraction of the cost and materials needed for historic large scale wall fire tests, such as the 25 ft. and 50 ft. corner test.
   D. The proposed test requires only moderately sized equipment of limited complexity.
   E. The proposed test uses a propane-sand burner exposure for more consistent reproducibility vs. a wood crib.
   F. A peer reviewed journal article (Nam, Bill) discussing the development of the proposed test has been published in the SFPE Journal of Fire Protection Engineering.

Thanks and regards.
Dick

Richard J. Davis, P.E., FSFPE, M.ASCE
Staff Vice President and Senior Engineering Technical Specialist
FM Global
Engineering Standards Division
Mary,

In the October edition of Fire News there was an article about consideration of a committee on Fire Test for Wall Panels. There were some bullet points that I would like to answer on behalf of GAPS LLC.

1. Are you, or your organization, in favor of the development of an NFPA Standard pertaining to a fire test for wall panels? Yes

2. Please state your reason(s) for supporting or opposing such standards development. We need another test besides NFPA 285 to test these panels. NFPA 285 does not adequately test these panels.

3. Are you, or your organization, in favor of the development of an NFPA Standard to establish a new fire test for wall panels? Yes

4. Are you or your organization interested in applying for membership on the Technical Committee if the Standards Council initiates development activities on the proposed project? Yes If yes, please submit an application, in addition to your comments in support of the project. See attached

Pete

Peter J. Gore Willse, P.E., FSFPE
Vice President - Director of Research
Property Risk Engineering / GAPS
XL Catlin

Global Asset Protection Services, LLC
100 Constitution Plaza, 12th Floor
Hartford, CT 06103 USA
Phone: +1 860 293-7900
Mobile: +1 860 460-1965
Mail to: peter.willse@xlcatlin.com
http://xlcatlin.com/insurance/insurance-coverage/property-risk-engineering

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PRIVACY POLICY: XL Group companies are committed to compliance with applicable data protection laws. Please contact compliance@xlcatlin.com for further information on our privacy policy.
Ms. Fuller – This email constitutes my comments concerning the New fire test for wall panels. I am not in favor of the development of this new fire test standard. My reasons are:

1. Currently NFPA 285 is the exterior wall test used in all US Codes (NFPA 5000 & IBC)
2. The performance of exterior walls that is demonstrated in the NFPA 285 has been verified by actual fire performance (Monte Carlo, Grenfell Towers, etc.)
3. The NFPA 285 test simultaneously exposes the interior side of the wall, the window header area of the wall as flames exit the burn room and the exterior face of the wall. This exposure is a “worst case” condition to evaluate the overall fire performance of the wall assembly.
4. The proposed test method is primarily used by FM to evaluate vertical flame spread of materials. The only wall panel that has been evaluated is Insulated Metal Panels (IMPs). These panels have been tested in other full-scale fire tests and the proposed test is a reduced-scale test used to evaluate changes to formulations, etc.
5. I am not aware of any test data where the proposed test method has been used to evaluate complete wall assemblies as is done in NFPA 285.
6. The proposed test method only evaluates one side of the wall assembly. Thus, the simultaneous complex exposure used in NFPA 285 is not replicated nor evaluated.
7. The use of a second test that does not correlate with the existing test method will cause significant confusion within the construction. For example, if a wall assembly passes the proposed test but fails the other test, which test should be used? How will architects, building owners, specifiers decide which test results to use.
8. In the past history of the NFPA Fire Test Committee, the “unwritten agreement” with other standards writing organizations such as ULI and ASTM was to eliminate duplicate versions of the same tests so as to decrease potential conflict of test results. This work has occurred over the last 10 years and each organization has withdrawn standards and this helped reduce conflicts in test standards.
9. The development of the proposed test method will only increase potential conflicts in evaluating the fire performance of exterior wall assemblies.

In conclusion, I do not favor the development of the proposed test method. NFPA 285 provides the needed evaluation of exterior wall assemblies and has since 1997.

Thank you for your consideration - Jess

Jesse J. Beitel | Senior Scientist

JENSEN HUGHES
Advancing the Science of Safety

3610 Commerce Drive | Suite 817 | Baltimore, MD 21227
O: +1 410-737-8677 | jbeitel@jensenhughes.com | www.jensenhughes.com
Linda,

I am forwarding the attached draft of NFPA 770 on behalf of the Technical Committee on Hybrid (Water & Inert Gas) Fire Extinguishing Systems for consideration at the December Standards Council meeting. Pending the results of a ballot, the committee believes that the draft is ready for public review.

I am already working with Yiu Lee to issue the ballot, and the results should be available on or before October 27.

The committee respectfully requests that the document be placed in the Annual 2020 revision cycle, which has a Public Input Closing Date of June 28, 2018.

PINS INFORMATION:

<table>
<thead>
<tr>
<th>Number</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>770</td>
<td>Standard on Hybrid (Water and Inert Gas) Fire Extinguishing Systems</td>
</tr>
</tbody>
</table>

### Document Scope:

1.1 **Scope.** This standard contains the minimum requirements for the design, installation, acceptance, maintenance, and testing of hybrid fire-extinguishing systems that use a combination of atomized water and inert gas to extinguish fire.

1.1.1 The scope of this standard does not include systems that use only inert gas to achieve extinguishment. *(See NFPA 2001.)*

1.1.2 The scope of this standard does not include systems that use only atomized water (water mist) to achieve extinguishment. *(See NFPA 750.)*

1.1.3 The scope of this standard does not include twin fluid water mist systems that use inert gas to propel and/or atomize water mist droplets without generating a significant inert gas concentration in the protected space. *(See NFPA 750.)*

Please let me know if you need any additional information.

Thank you.

Barry Chase
Fire Protection Engineer
NFPA
1 Batterymarch Park
Quincy, MA 02169-7471
Standard on Hybrid (Water and Inert Gas) Fire-Extinguishing Systems

FINAL DRAFT FOR BALLOT
Chapter 1  Administration

1.1 Scope. This standard contains the minimum requirements for the design, installation, acceptance, maintenance, and testing of hybrid fire-extinguishing systems that use a combination of atomized water and inert gas to extinguish fire.

1.1.1 The scope of this standard does not include systems that use only inert gas to achieve extinguishment. (See NFPA 2001.)

1.1.2 The scope of this standard does not include systems that use only atomized water (water mist) to achieve extinguishment. (See NFPA 750.)

1.1.3 The scope of this standard does not include twin fluid water mist systems that use inert gas to propel and/or atomize water mist droplets without generating a significant inert gas concentration in the protected space. (See NFPA 750.)

1.2 Purpose. This standard is prepared for the use and guidance of those charged with the purchasing, designing, installing, testing, inspecting, approving, listing, operating, or maintaining of hybrid fire-extinguishing systems, in order that such equipment will function as intended throughout its life.

1.3 Retroactivity. The provisions of this standard reflect a consensus of what is necessary to provide an acceptable degree of protection from the hazards addressed in this standard at the time the standard was issued.

1.3.1 Unless otherwise specified, the design, installation, and acceptance requirements of Chapter 4 through Chapter 12 shall not apply to facilities, equipment, structures, or installations that existed or were approved for construction or installation prior to the effective date of the standard.

1.3.2 Unless otherwise specified, inspection, testing, and maintenance requirements in Chapter 13 shall apply to new and existing facilities, equipment, structures, or installations.

1.3.3 In those cases where the authority having jurisdiction determines that an existing situation presents an unacceptable degree of risk, the authority having jurisdiction shall be permitted to apply retroactively any portions of this standard.

1.3.4 Requirements that are retroactively applied in accordance with this standard shall be permitted to be modified if their application clearly would be impractical in the judgment of the authority having jurisdiction, and only where it is clearly evident that a reasonable degree of safety is provided.

1.4 Equivalency. Nothing in this standard is intended to prevent the use of systems, methods, or devices of equivalent or superior quality, strength, fire resistance, effectiveness, durability, and safety over those prescribed by this standard.

1.4.1 Technical documentation shall be submitted to the authority having jurisdiction to demonstrate equivalency.

1.4.2 The system, method, or device shall be approved for the intended purpose by the authority having jurisdiction.

1.5 Units of Measurement. The units of measurement used in this standard are in accordance with Table 1.5.
Table 1.5 Units of Measurement

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Primary Unit</th>
<th>Secondary Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Name</td>
<td>Symbol</td>
</tr>
<tr>
<td>Area, surface</td>
<td>square meters</td>
<td>m²</td>
</tr>
<tr>
<td>Distance, general</td>
<td>meters</td>
<td>m</td>
</tr>
<tr>
<td>Distance, orifice diameter/droplet</td>
<td>micrometers</td>
<td>μm</td>
</tr>
<tr>
<td>size</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Distance, pipe/tube dimensions</td>
<td>millimeters</td>
<td>mm</td>
</tr>
<tr>
<td>Mass, general</td>
<td>kilograms</td>
<td>kg</td>
</tr>
<tr>
<td>Pressure, atmospheric</td>
<td>millimeters of mercury</td>
<td>mm Hg</td>
</tr>
<tr>
<td>Pressure, system/nozzle</td>
<td>bar</td>
<td>bar</td>
</tr>
<tr>
<td>Time, general</td>
<td>minutes</td>
<td>minutes</td>
</tr>
<tr>
<td>Time, discharge/extinguishment</td>
<td>seconds</td>
<td>seconds</td>
</tr>
<tr>
<td>Time, inspection interval</td>
<td>months</td>
<td>months</td>
</tr>
<tr>
<td>Time, maintenance interval</td>
<td>years</td>
<td>years</td>
</tr>
<tr>
<td>Volume, enclosure/inert gas</td>
<td>cubic meters</td>
<td>m³</td>
</tr>
<tr>
<td>Volume, water</td>
<td>liters</td>
<td>L</td>
</tr>
</tbody>
</table>

1.5.1 **Primary Units.** Primary units of measurement are in accordance with the modernized metric system known as the International System of Units (SI), except where specific units are customary for industry practice.

1.5.2 **Secondary Units and Conversions.**

1.5.2.1 Secondary units of measurement, where provided, are in accordance with U.S. customary units (inch-pound units), except where specific units are customary for industry practice.

1.5.2.2 Where secondary units are not provided, converted values and converted trade sizes can be used.

1.5.2.3 Where extracted text contains values expressed in only one system of units, the values in the extracted text have been retained without conversion to preserve the values established by the responsible technical committee in the source document.

1.5.3 **Measurement of Pressure.** All measurements of pressure are gauge values, unless otherwise noted.

1.5.4 **Unit Application and Enforcement.**

1.5.4.1* The values presented in this standard are expressed with a degree of precision that is appropriate for practical application and enforcement.

1.5.4.2* Either the primary units or secondary units are acceptable for satisfying the requirements in this standard.
Chapter 2   Referenced Publications

2.1 General. The documents or portions thereof listed in this chapter are referenced within this standard and shall be considered part of the requirements of this document.

2.2 NFPA Publications. National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471.

2.3 Other Publications.

2.3.1 ANSI Publications. American National Standards Institute, Inc., 25 West 43rd Street, 4th Floor, New York, NY 10036.

2.3.2 ASME Publications. American Society of Mechanical Engineers, Two Park Avenue, New York, NY 10016-5990.

2.3.3 ASTM Publications. ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959.

2.3.4 CGA Publications. Compressed Gas Association, 14501 George Carter Way, Suite 103, Chantilly, VA 20151-2923.

CGA C-6, Standard for Visual Inspection of Steel Compressed Gas Cylinders, 2013.

2.3.5 ISO Publications. International Organization for Standardization, ISO Central Secretariat, BIBC II, Chemin de Blandonnet 8, CP 401, 1214 Vernier, Geneva, Switzerland.


2.3.7 Other Publications.


2.4 References for Extracts in Mandatory Sections.


Chapter 3  Definitions

3.1 General.

The definitions contained in this chapter shall apply to the terms used in this standard. Where terms are not defined in this chapter or within another chapter, they shall be defined using their ordinarily accepted meanings within the context in which they are used. Merriam-Webster’s Collegiate Dictionary, 11th edition, shall be the source for the ordinarily accepted meaning.

3.2 NFPA Official Definitions.

3.2.1* Approved. Acceptable to the authority having jurisdiction.

3.2.2* Authority Having Jurisdiction (AHJ). An organization, office, or individual responsible for enforcing the requirements of a code or standard, or for approving equipment, materials, an installation, or a procedure.

3.2.3 Labeled. Equipment or materials to which has been attached a label, symbol, or other identifying mark of an organization that is acceptable to the authority having jurisdiction and concerned with product evaluation, that maintains periodic inspection of production of labeled equipment or materials, and by whose labeling the manufacturer indicates compliance with appropriate standards or performance in a specified manner.

3.2.4* Listed. Equipment, materials, or services included in a list published by an organization that is acceptable to the authority having jurisdiction and concerned with evaluation of products or services, that maintains periodic inspection of production of listed equipment or materials or periodic evaluation of services, and whose listing states that either the equipment, material, or service meets appropriate designated standards or has been tested and found suitable for a specified purpose.

3.2.5 Shall. Indicates a mandatory requirement.

3.2.6 Should. Indicates a recommendation or that which is advised but not required.

3.2.7 Standard. An NFPA Standard, the main text of which contains only mandatory provisions using the word “shall” to indicate requirements and that is in a form generally suitable for mandatory reference by another standard or code or for adoption into law. Nonmandatory provisions are not to be considered a part of the requirements of a standard and shall be located in an appendix, annex, footnote, informational note, or other means as permitted in the NFPA Manuals of Style. When used in a generic sense, such as in the phrases “standards development process” or “standards development activities”, the term “standards” includes all NFPA Standards, including Codes, Standards, Recommended Practices, and Guides.

3.3 General Definitions

3.3.1 Classes of Fire.

3.3.1.1 Class A Fire. A fire in ordinary combustible materials, such as wood, cloth, paper, rubber, and many plastics.

3.3.1.2 Class B Fire. A fire in flammable liquids, combustible liquids, petroleum greases, tars, oils, oil-based paints, solvents, lacquers, alcohols, and flammable gases.

3.3.1.3 Class C Fire. A fire that involves energized electrical equipment.

3.3.2* Deficiency. For the purposes of inspection, testing, and maintenance of fire protection systems, a condition that will or has the potential to adversely impact the performance of a system or portion thereof but does not rise to the level of an impairment.

3.3.2.1 Critical Deficiency. A deficiency that, if not corrected, can have a material effect on the ability of the fire protection system or unit to function as intended in a fire event. [25, 2017]

3.3.2.2 Noncritical Deficiency. A deficiency that does not have a material effect on the ability of the fire protection system or unit to function in a fire event, but correction is needed to meet the requirements of this standard or for the proper inspection, testing, and maintenance of the system or unit. [25, 2017]
3.3.3 *Dv*. A drop diameter such that the cumulative volume, from zero diameter to this respective diameter, is the fraction, \( f \), of the corresponding sum of the total distribution. [750, 2015]

3.3.4 Enclosures.

3.3.4.1 Normally Occupied Enclosure or Space. An enclosure or space where one or more persons are present under normal conditions. [2001, 2018]

3.3.4.2 Occupiable Enclosure or Space. An enclosure or space that has dimensions and physical characteristics such that it could be entered by a person. [2001, 2018]

3.3.4.3 Unoccupiable Enclosure or Space. An enclosure or space that has dimensions and physical characteristics such that it could not be entered by a person. [12, 2018]

3.3.5 Hybrid Fire-Extinguishing System. A fire-extinguishing system capable of delivering hybrid media at the specified design rate and proportion.

3.3.6* Hybrid Media. An extinguishing media created by the simultaneous discharge of water and an inert gas agent in a controlled proportion from a common discharge device that results in an oxygen concentration less than 18 percent.

3.3.7 Hybrid Nozzle. A special purpose device containing one or more orifices specifically designed to deliver the hybrid media to the fire.

3.3.8* Impairment. A condition where a fire protection system or unit or portion thereof is out of order, and the condition can result in the fire protection system or unit not functioning in a fire event. [25, 2017]

3.3.8.1* Emergency Impairment. A condition where a fire protection system or portion thereof is out of order due to an unplanned occurrence, or the impairment is found while performing inspection testing or maintenance activities. [25, 2017]

3.3.8.2 Preplanned Impairment. A condition where a fire protection system or a portion thereof is out of service due to work planned in advance, such as revisions to the water supply or sprinkler system piping.

3.3.9 Inert Gas Agent. An agent that contains as primary components one or more of the gases helium, neon, argon, or nitrogen. Inert gas agents that are blends of gases can also contain carbon dioxide as a secondary component. [2001, 2018]

3.3.10 Inspection, Testing, and Maintenance.

3.3.10.1 Inspection A visual examination of a system or portion thereof to verify that it appears to be in operating condition and is free of physical damage.

3.3.10.2 Maintenance. Work, including, but not limited to, repair, replacement, and service, performed to ensure that equipment operates properly.

3.3.10.3 Testing. Periodic operation of a component or system to determine operational status.

3.3.11 Lockout Valve. A manually operated valve that can be locked in the closed position and that is supervised.

3.3.12 Occupant Safety.

3.3.12.1 Lowest Observable Adverse Effect Level (LOAEL). The lowest concentration at which an adverse physiological or toxicological effect has been observed. [2001, 2018]

3.3.12.2 No Observed Adverse Effect Level (NOAEL). The highest concentration at which no adverse toxicological or physiological effect has been observed. [2001, 2018]

3.3.12.3 Sea Level Equivalent of Oxygen. The oxygen concentration (volume percent) at sea level for which the partial pressure of oxygen matches the ambient partial pressure of oxygen at a given altitude. [2001, 2018]

3.3.13 Pressure.
3.3.13.1 **Maximum Allowable Working Pressure.** The maximum pressure to which a system can be subjected without exceeding the pressure rating of any of its component parts.

3.3.13.2* **Maximum Operating Pressure.** The maximum pressure to which pipe or components will be subjected, determined at the maximum listed storage temperature.

3.3.14 **System Design Methods.**

3.3.14.1 **Engineered Systems.** Those systems for which flow rates, quantities of extinguishing agent, pipe size, pipe lengths, fittings, and size, type, and placement of nozzles are determined by individual design and calculation based on individual hazard volume, configuration, and fuel loading.

3.3.14.2* **Pre-Engineered Systems.** Those systems having predetermined flow rates and quantities of extinguishing agent with specific pipe sizes, maximum and minimum pipe lengths, flexible-hose specifications, number of fittings, and number, type, and locations of nozzles listed for specific hazards of predetermined volume and fuel loading.

3.3.15 **Water Mist.** A water spray for which the $D_{90.99}$, for the flow-weighted cumulative volumetric distribution of water droplets, is less than 1000 μm within the nozzle operating pressure range. [750, 2015]

3.3.16 **Working Plans.** Documentation used for review and installation of the fire protection system. *(See Chapter 10.)*
Chapter 4  General Information

4.1 Use and Limitations.

4.1.1 Hybrid systems shall be permitted to be used to extinguish Class A, Class B, and Class C fires.

4.1.2* Hybrid systems shall not be used on fires involving the following materials unless the hybrid media has been tested to the satisfaction of the authority having jurisdiction:

1. Certain chemicals or mixtures of chemicals, such as cellulose nitrate and gunpowder, which are capable of rapid oxidation in the absence of air
2. Chemicals capable of undergoing autothermal decomposition, such as certain organic peroxides and hydrazine
3. Water-reactive materials, including, but not limited to, the following:
   a. Reactive metals such as lithium, sodium, potassium, magnesium, titanium, zirconium, uranium, and plutonium
   b. Metal hydrides
   c. Metal alkoxides, such as sodium methoxide
   d. Metal amides, such as sodium amide
   e. Carbides, such as calcium carbide
   f. Halides, such as benzoic chloride and aluminum chloride
   g. Hydrides, such as lithium aluminum hydride
   h. Oxyhalides, such as phosphorus oxybromide
   i. Silanes, such as trichloromethylsilane
   j. Sulfides, such as phosphorus pentasulfide
   k. Cyanates, such as methylisocyanate

4.1.3 Pre-Engineered Systems. All pre-engineered systems shall be installed to protect hazards within the limitations that have been established by the listing. Provisions of this standard regarding personnel safety, commissioning, inspection, testing, and maintenance shall apply.

4.1.4 Temperature Limits. Hybrid system equipment shall be designed to function from 4°C to 54°C (40°F to 130°F) or marked to indicate temperature limitations.

4.2* Safety Considerations.

4.2.1 Unnecessary exposure to atmospheres flooded by a hybrid system resulting in low oxygen atmospheres shall be avoided.

4.2.2 Suitable safeguards shall be provided to ensure prompt evacuation from and prevent entry into hazardous atmospheres and also to provide means for prompt rescue of any trapped personnel. Safety items such as personnel training, warning signs, discharge alarms, self-contained breathing apparatus (SCBA), evacuation plans, and fire drills shall be considered.

4.2.3 In the event of a system discharge, unprotected personnel shall not enter the space until it has been ventilated and it is determined that the atmosphere is safe for unprotected personnel to enter.

4.2.4 Before system cylinders are handled or moved, the following steps shall be taken:

1. Cylinder outlets shall be fitted with anti-recoil devices, cylinder caps, or both whenever the cylinder outlet is not connected to the system pipe inlet.
2. Actuators shall be disabled or removed before cylinders are removed from retaining bracketing.

4.2.4.1 Safe handling procedures shall be followed when transporting system cylinders.

4.2.4.2 Equipment designed for transporting cylinders shall be used. When dollies or carts are used, cylinders shall be secured.
4.2.4.3 The system manufacturer’s service procedures shall be followed for specific details on system operation, maintenance, and safety considerations.

4.3 Use Restrictions

4.3.1 Normally Occupied Areas. Hybrid systems shall be permitted in normally occupied areas only where one of the following conditions is applicable:

1) Where exposure times to sea level equivalent oxygen concentrations above 12 percent can be limited to 5 minutes
2) Where exposure times to sea level equivalent oxygen concentrations above 10 percent can be limited to 3 minutes

4.3.2 Normally Unoccupied Areas. Hybrid systems with sea level equivalent oxygen concentrations above 8 percent shall be permitted in normally unoccupied areas when exposure time can be limited to 30 seconds.

4.3.3 Unoccupiable Areas. Hybrid systems with sea level equivalent oxygen concentrations of 8 percent or lower shall be permitted in unoccupiable areas.

4.3.4* Altitude Considerations. In considering the oxygen concentration developed by a hybrid system, the effect of altitude on oxygen concentration shall be considered for elevations that vary from sea level by more than 915 m (3000 ft).

4.3.5 For a system protecting a normally occupied or occupiable enclosure or space where the sea level equivalent oxygen concentration is below the permitted limits for that space, the following safeguards shall be provided:

(1) Predischarge alarm
(2) Predischarge delay
(3) Warning signs

4.4 Qualifications. Hybrid systems shall be designed, installed, serviced, and maintained by personnel that are trained and certified for the service performed by the manufacturer or an organization acceptable to the authority having jurisdiction.
Chapter 5  Components

5.1 Water Supply.

5.1.1* Quality. The water supply for a hybrid system shall be taken from a source that is equivalent in quality to a potable source with respect to particulate and dissolved solids.

5.1.2 Filters and Strainers for Nozzles.

5.1.2.1 Unless the requirements of 5.1.2.2 are met, a filter or strainer shall be provided at the supply side of each nozzle.

5.1.2.2 The requirements of 5.1.2.1 shall not apply to nozzles with multiple orifices and with minimum waterway dimensions greater than 800 μm (0.0315 in.) per opening.

5.1.3 Filters and Strainers for Water Supply Connections and Risers.

5.1.3.1 A filter or a strainer shall be provided at each water supply connection or system riser.

5.1.3.2 The filter or strainer shall be installed downstream (on the system side) of all piping that is not corrosion resistant.

5.1.3.3 A filter or strainer with mesh openings meeting the requirements of 5.1.4 shall be installed downstream (on the system side) of any reservoirs of stored water or a break tank with an air-water interface greater than 1 m² (10.8 ft²).

5.1.3.4 Such strainers shall be provided with a cleanout port and shall be arranged to facilitate inspection, maintenance, and replacement.

5.1.4 Filter Rating or Strainer Mesh Openings. The maximum filter rating or strainer mesh opening shall not be greater than 80 percent of the minimum nozzle waterway dimension.

5.2* Inert Gas Agent Supply. The inert gas agent supply shall be at least 99.9 percent pure with a water content <0.005 percent.

5.3 Storage Containers.

5.3.1 The inert gas agent and water storage containers shall be permitted to be cylinders, tubes, or fabricated tanks.

5.3.1.1 Storage containers shall be manufactured from a material or provided with an interior coating that is compatible with the material being stored.

5.3.1.2 Water storage containers shall be fabricated of corrosion-resistant material or be provided with a corrosion-resistant interior coating.

5.3.2 Storage containers and accessories shall be located and arranged to facilitate inspection, testing, recharging, and other maintenance.

5.3.3 Storage containers shall not be located where they are subject to severe weather conditions or to mechanical, chemical, or other damage.

5.3.3.1 Where exposure to severe weather conditions or to mechanical, chemical, or other damage cannot be avoided, approved safeguards or enclosures shall be provided.

5.3.3.2 External heating or cooling shall be permitted to be used to keep the temperature within the listed temperature range.

5.3.4 Storage containers shall be installed and mounted in accordance with the manufacturer's installation manual.

5.3.5 Each pressurized container or cylinder shall be provided with a safety device to relieve excess pressure.

5.3.6 A reliable means shall be provided to indicate the pressure in all storage containers that will be pressurized.
5.3.7 Water tanks shall be further supervised for the following conditions:
   
   (1) Water level
   
   (2) Water temperature (for tanks located in unheated areas)

5.3.8 A reliable means shall be provided to visually indicate the level in all water storage containers.

5.3.9 Each storage container shall have a permanent nameplate or other permanent marking that indicates the following:
   
   (1) For inert gas agent containers, the agent, pressurization level of the container, and nominal agent volume at standard temperature and pressure (STP)
   
   (2) For water containers, pressurization level of the container and nominal water volume

5.3.10 Containers meant to be transported while pressurized shall meet the requirements of U.S. Department of Transportation, Transport Canada specification, ISO 11114-1, or equivalent national codes for the country of use.

5.3.11 The design pressure for containers meant to be transported while pressurized shall be suitable for the maximum pressure developed at the maximum listed temperature.

5.3.12 Containers not covered in 5.3.10 shall be designed, fabricated, inspected, certified, and stamped in accordance with ASME Boiler and Pressure Vessel Code, Section VIII, Div. 1.

5.3.13 The design pressure for containers not covered in 5.3.10 shall be suitable for the maximum pressure developed at the maximum listed temperature.

5.4 Pipe, Fittings, and Valves.

5.4.1 General.

5.4.1.1 Pipe, tubing, fittings, and valves shall be compatible with the manufacturer’s hardware and media, as identified in the listing and installation instructions, and with the intended environment.

5.4.1.2 Pipe or tube shall meet or exceed one of the standards in Table 5.4.1.2, except as permitted by 5.4.1.3 or 5.4.1.4.
Table 5.4.1.2 Pipe or Tube Standards

<table>
<thead>
<tr>
<th>Materials and Dimensions and Standard Titles</th>
<th>Standard No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copper Tube (Drawn, Seamless)</td>
<td></td>
</tr>
<tr>
<td>Standard Specification for Seamless Copper Tube*</td>
<td>ASTM B75/B75M</td>
</tr>
<tr>
<td>Standard Specification for Seamless Copper Water Tube*</td>
<td>ASTM B88</td>
</tr>
<tr>
<td>Standard Specification for General Requirements for Wrought Seamless Copper and Copper-Alloy Tube</td>
<td>ASTM B251</td>
</tr>
<tr>
<td>Stainless Steel</td>
<td></td>
</tr>
<tr>
<td>Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service</td>
<td>ASTM A269/A269M</td>
</tr>
<tr>
<td>Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing (Small-Diameter) for General Service</td>
<td>ASTM A632</td>
</tr>
<tr>
<td>Standard Specification for Welded, Unannealed Austenitic Stainless Steel Tubular Products</td>
<td>ASTM A778/A778M</td>
</tr>
<tr>
<td>Standard Specification for Seamless and Welded Ferritic/Austenitic Stainless Steel Tubing for General Service</td>
<td>ASTM A789/A789M</td>
</tr>
<tr>
<td>Standard Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes</td>
<td>ASTM A312/A312M</td>
</tr>
<tr>
<td>Galvanized Steel Pipe</td>
<td></td>
</tr>
<tr>
<td>Standard Specification for Pipe, Steel, Black, and Hot-Dipped, Zinc-Coated, Welded and Seamless</td>
<td>ASTM A53/A53M</td>
</tr>
</tbody>
</table>

*Denotes tube suitable for bending (see 11.6.7) according to ASTM standards.

5.4.1.3 Pipe used exclusively to flow inert gas agent shall be permitted to be black steel, in accordance with ASTM A53/A53M or A106/A106M.

5.4.1.4 Where the pipe or tube identified in Table 5.4.1.2 or 5.4.1.3 is not suitable for the environmental conditions, other pipe materials that are manufactured to ASTM standards shall be permitted where the pipe or tube is investigated for compatibility with the system and the environment.

5.4.2 Pressure Rating Design Requirements.

5.4.2.1* Each piping network shall be designed to the maximum pressure and temperature to which it could be subjected within the system listing parameters.

5.4.2.2 The minimum design pressure for piping downstream of a pressure-reducing device shall be determined from the maximum anticipated pressure in the downstream piping as predicted by system flow calculations.

5.4.3 Pressure Relief.

5.4.3.1* A listed pressure relief device shall be installed in the sections of pipe where the pressure could exceed the maximum allowable working pressure.

5.4.3.2 The pressure relief device shall operate at a pressure not exceeding the maximum allowable working pressure.

5.4.4 Pipe Requirements.

5.4.4.1 Wherever the word pipe is used, it shall be understood also to mean tube.
5.4.4.2 Pipe shall be of material having physical and chemical characteristics such that its integrity under stress can be predicted with reliability.

5.4.4.2.1 Pipe shall have minimum working pressure ratings based on the maximum operating pressure of the system.

5.4.4.2.2* The thickness of the piping shall be calculated using the formula given in ASME B31.1.

5.4.5 Fittings and Piping Connections.

5.4.5.1 Fittings shall be of material having physical and chemical characteristics such that its integrity under stress can be predicted with reliability.

5.4.5.2 The fittings shall have corrosion resistance equal to the connected piping.

5.4.5.3 Fitting materials shall be compatible with the connected pipe to prevent galvanic corrosion at the connection joint.

5.4.5.4 Fittings shall have a minimum rated working pressure equal to or greater than the maximum system operating pressure or as otherwise listed or approved.

5.4.5.5 Cast-iron fittings shall not be used.

5.4.5.6 All threads used in joints and fittings shall conform to ASME B1.20.1 or ISO 7-1.

5.4.5.7 Joint compound, tape, or thread lubricant shall be applied only to the male threads of the joint.

5.4.5.8 Welding and brazing alloys shall have a melting point above 538°C (1000°F).

5.4.5.9 Where copper, stainless steel, or other suitable tubing is joined with compression-type fittings, the manufacturer’s pressure and temperature ratings of the fitting shall not be exceeded.

5.4.5.10 Where copper tubing is joined by soldering, the joining material used shall be adequate for the system listing temperature and piping network maximum pressure.

5.4.5.11 Grooved fittings shall be permitted provided they are listed for the pressure and temperature requirements and meet the corrosion resistance requirements of the piping network.

5.4.6 Strainers or Filters.

5.4.6.1 Strainers or filters shall be installed in the water distribution system per the manufacturer’s listed design, installation, and maintenance manual.

5.4.6.2 Strainers and filters shall be listed for the intended use.

5.4.7 Valves.

5.4.7.1 All valves shall be listed or approved for the intended use.

5.4.7.2 For flanged valves, the class and style of flanges required to match the valve’s flanged connection shall be used.

5.4.7.3 Valves shall be protected against mechanical, chemical, or other damage.

5.4.7.4 Special corrosion-resistant materials or coatings shall be used in corrosive atmospheres.

5.4.7.5 Where directional valves are used for multihazard protection, the directional valves shall be listed or approved for the intended purpose.

5.4.7.6 Where directional valves are used for multihazard protection, the control equipment shall be specifically listed for the number, type, and operation of those valves.

5.4.8 Lockout Valve. A mechanically operated lockout valve shall be provided on all systems to prevent the flow of inert gas agent and water to the discharge device(s) during maintenance of the system.
5.4.8.1 The lockout valve shall be located in accordance with the manufacturer’s instructions.

5.4.8.2 The lockout valve shall provide a supervisory signal when it is not in the open position.

5.4.9 Drain.

5.4.9.1 A low-point drain shall be provided in the water discharge pipeline to permit draining any residual water from the pipeline.

5.4.9.2 Where multiple low points in a water discharge piping network occur, a drain shall be provided at each occurrence.

5.4.9.3 The drain valve shall provide a supervisory signal when it is not in the closed position.

5.4.10 Identification of Valves.

5.4.10.1 All control, drain, and test connection valves shall be provided with permanently marked, weatherproof, metal or rigid plastic identification signs.

5.4.10.2 The sign shall be secured with corrosion-resistant wire, chain, or other approved means.

5.4.11 Pipe Hangers/Supports.

5.4.11.1 All references to hangers shall include supports.

5.4.11.2 Hangers shall be installed throughout the piping network to prevent excessive bending and shear stresses in both the horizontal and vertical axes during system discharge.

5.5 Hybrid Nozzles.

5.5.1 Hybrid nozzles shall be listed for the intended use.

5.5.2 Listing criteria shall include flow characteristics, area coverage, height limits, droplet size distribution, and operating pressure.

5.5.3 The hybrid nozzle shall produce a maximum water droplet size of 200 μm (0.0079 in.) at the system operating pressure, unless a larger droplet size is permitted by the listing.

5.5.4 Special corrosion-resistant materials or coatings shall be required in severely corrosive atmospheres.

5.5.5 Hybrid nozzles shall be permanently marked to identify the manufacturer as well as the type and size of the orifices.

5.6 Detection, Actuation, Alarm, and Control Systems.

5.6.1 Detection, actuation, alarm, and control systems shall be installed, tested, and maintained in accordance with NFPA 72 and NFPA 70.

5.6.2 Automatic detection and actuation shall be used.

5.6.3 Actuation by only manual means shall be permitted if acceptable to the authority having jurisdiction.

5.6.4 Adequate and reliable primary and 24-hour minimum standby sources of energy shall be used to provide for operation of the detection, signaling, control, and actuation requirements of the system.

5.6.5 Automatic Detection.

5.6.5.1 Automatic detection shall be by any listed method or device capable of detecting and indicating heat, flame, smoke, combustible vapors, or an abnormal condition in the hazard, such as process trouble, that is likely to produce fire.

5.6.5.2 Where a new hybrid system is being installed in a space that has an existing detection system, an analysis shall be made of the detection devices to ensure that the detection system is in good operating condition, will respond promptly to a fire situation, and is compatible with the hybrid system operating devices.
5.6.6 Operating Devices.

5.6.6.1 Operating devices shall include agent-releasing devices or valves, discharge controls, and shutdown equipment necessary for successful performance of the system.

5.6.6.2 Operation shall be by a listed mechanical, electrical, or pneumatic means with an adequate and reliable source of energy.

5.6.6.3 All devices shall be designed for the service they will encounter and shall not readily be rendered inoperative or susceptible to accidental operation.

5.6.6.4 All devices shall be located, installed, or suitably protected so that they are not subject to mechanical, chemical, or other damage that would render them inoperative.

5.6.6.5 A means of manual release of the system shall be provided.

5.6.6.5.1 Manual release shall be accomplished by a mechanical manual release or by an electrical manual release when the control equipment monitors the battery voltage level of the standby battery supply and provides a low-battery signal.

5.6.6.5.2 The release shall cause simultaneous operation of automatically operated valves controlling agent release and distribution.

5.6.6.5.3 Where mechanical system actuation is possible, a discharge pressure switch or a flow switch shall provide an alarm-initiating signal to the releasing panel.

5.6.6.5.4 A means of manual release shall not be required for automatic systems when the hazard being protected is unoccupiable, and the hazard is in a remote location where personnel are not normally present.

5.6.6.5.4.1 The normal manual control(s) for actuation shall be located for easy accessibility at all times, including at the time of a fire.

5.6.6.5.4.2 The manual control(s) shall be of distinct appearance and clearly recognizable for the purpose intended.

5.6.6.5.4.3 All manual operating devices shall be identified as to the hazard they protect.

5.6.6.5.4.4 Operation of any manual control shall cause the complete system including any required auxiliary functions to operate as designed.

5.6.7 Electric Actuator Supervision.

5.6.7.1 Removal of an electric actuator from the agent storage container discharge valve that it controls shall result in an audible and visual indication of system impairment at the system releasing control panel.

5.6.7.2 Removal of an electric actuator from the selector valve it controls shall result in an audible and visual indication of system impairment at the system releasing control panel.

5.6.8 Operating Alarms and Indicators.

5.6.8.1 Alarms or indicators or both shall be used to indicate the operation of the system, hazards to personnel, or failure of any supervised device.

5.6.8.1.1 The type (audible, visual, or olfactory), number, and location of the devices shall be such that their purpose is satisfactorily accomplished.

5.6.8.1.2 The extent and type of alarms or indicator equipment or both shall be approved.

5.6.8.2* Audible and visual predischarge alarms shall be provided within the protected area of occupiable spaces to give positive warning of impending discharge.

5.6.8.2.1 The time delay shall be sufficient to allow personnel evacuation prior to discharge.
5.6.8.2.2 The operation of the warning devices shall be continued after agent discharge until positive action has been taken to acknowledge the alarm and to proceed with appropriate action.

5.6.8.2.3 For hazard areas subject to fast growth fires, where the provision of a predischarge alarm and time delay would seriously increase the threat to life and property, the predischarge alarm and time delay shall be permitted to be eliminated.

5.6.8.3 Audible and visual alarms associated with the hybrid system shall be distinct from all other alarms, including the building fire alarm system.

5.6.8.4* Abort switches shall be permitted only where approved by the authority having jurisdiction.

5.6.8.4.1 Abort switches shall be located within the protected area, near the means of egress for the area.

5.6.8.4.2 The abort switch shall be of a type that requires constant manual pressure to cause abort.

5.6.8.4.3 In all cases, the normal manual control and the manual emergency control shall override the abort function.

5.6.8.4.4 Operation of the abort function shall result in both audible and distinct visual indication of system impairment.

5.6.8.4.5 The abort switch shall be clearly recognizable for the purpose intended.

5.6.8.5 Alarms indicating failure of supervised devices or equipment shall give prompt and positive indication of any failure and shall be distinctive from alarms indicating operation or hazardous conditions.

5.6.8.6 Warning and instruction signs at entrances to and inside protected areas shall be provided.

5.6.8.6.1 Warning signs shall be affixed in a conspicuous location in every protected space; at every entrance to protected spaces; at every remote manual actuation station; at every entrance to inert gas storage rooms; and where inert gas might collect and result in a reduced oxygen atmosphere in the event of a discharge from a safety device or control panel leak.

5.6.8.6.2 The safety sign format and color and the letter style of the signal words shall be in accordance with ANSI Z535.2, as shown in Figure 5.6.8.6.2(a) through Figure 5.6.8.6.2(d).

Figure 5.6.8.6.2(a) Sign in Every Protected Space.
Figure 5.6.8.6.2(b)  Sign at Every Entrance to Protected Space.

Figure 5.6.8.6.2(c)  Sign at Every Entrance to Inert Gas Storage Rooms or Areas where Inert Gas Could Collect in the Event of a Discharge from a Safety Device or Control Panel Leak.
5.6.9 Control Equipment.

5.6.9.1* The control equipment shall supervise the detection, manual controls, actuating devices, and associated wiring and, when activated, cause actuation of the system and operation of any required auxiliary functions.

5.6.9.2 The control equipment shall be specifically listed for compatibility with the number and type of actuating devices.

5.6.9.3 All circuitry that is monitoring or controlling the hybrid fire-extinguishing system shall be electrically supervised in accordance with NFPA 72.

5.6.9.4 Sensors providing feedback for system operation shall be identified as such on the sensor or an adjacent surface.

5.6.9.5 Conductors providing feedback for system operation shall be in accordance with the manufacturer’s specifications.

5.6.9.6* Where pneumatic control equipment is used, the pneumatic lines shall be protected against crimping and mechanical damage.

5.6.9.7 Where mechanical system operation is possible, a discharge pressure switch shall be installed on the system piping to provide an alarm-initiating signal to the releasing panel.

5.6.9.8 Disconnect Switch. To avoid unwanted discharge of an electrically actuated hybrid fire-extinguishing system, a supervised disconnect switch shall be provided.

5.6.9.8.1 The disconnect switch shall interrupt the releasing circuit to the suppression system.

5.6.9.8.2 The disconnect switch shall cause a supervisory signal at the releasing control unit.

5.6.9.8.3 The disconnect switch shall be secured against unauthorized use by one of the following methods:

1. Locate inside a lockable releasing control panel
2. Locate inside a lockable enclosure
3. Require a key for activation of the switch
5.6.9.8.4 When the disconnect switch requires a key for activation, the access key shall not be removable while disconnected so the suppression system can be quickly returned to the operational condition in the event of a fire.

5.6.9.8.5 Suppression system disconnect achieved via software programming shall not be acceptable for use in lieu of a physical disconnect switch.

5.6.9.8.6 The disconnect switch shall be listed or be an integrated component of listed equipment.
Chapter 6 System Design Requirements

6.1* General. Hybrid extinguishing systems shall be designed and installed for the specific hazards and protection objectives specified in the listing or in accordance with criteria approved by the authority having jurisdiction.

6.2 Pipe Network Layout and Design.

6.2.1 Pipe shall be sized for the intended system flow rates in accordance with the manufacturer’s manual.

6.2.2 Fixtures and connections shall be provided to facilitate system testing in accordance with Chapters 11, 12, and 13.
Chapter 7  Design Requirements for Total Flooding Systems

7.1 General.

7.1.1 Description. A total flooding system shall consist of a fixed supply of hybrid media permanently connected to a fixed pipe network with fixed nozzles arranged to discharge the hybrid media into an enclosed space or an enclosure about the hazard.

7.1.2 Uses. A total flooding system shall be used where there is a permanent enclosure around the hazard that enables the required density of hybrid media to be discharged for extinguishment and prevent fire re-ignition for the required period of time or for a time period sufficient to allow for response by trained personnel.

7.2 Enclosure Requirements.

7.2.1 Enclosure Strength and Pressure Relief.

7.2.1.1 The protected enclosure shall have the structural strength and integrity necessary to contain the agent discharge.

7.2.1.2 If the developed pressures present a threat to the structural strength of the enclosure, additional venting shall be provided to prevent excessive pressures.

7.2.1.3 Designers shall consult the system manufacturer’s recommended procedures relative to enclosure venting.

7.2.2* Enclosure Integrity and Loss of Hybrid Media. The concentration of hybrid media shall be maintained for the specified duration of protection. *(See Section 7.6.)*

7.2.3 Forced-Air Ventilation Systems and Loss of Hybrid Media.

7.2.3.1* Forced-air ventilation systems shall be shut down or closed automatically where their continued operation would adversely affect the performance of the fire-extinguishing system or result in propagation of the fire.

7.2.3.2 The volume of a recirculating ventilation system and associated ductwork shall be considered part of the total hazard volume when determining the quantity of hybrid media.

7.2.3.3 Where a non-recirculating ventilation system is not shut down, additional hybrid media shall be introduced to maintain the required design application density.

7.3 System Performance Characteristics.

7.3.1 Protection of Class A, Class B, and Class C Hazards.

The following characteristics of the system shall be determined for a given fuel or hazard type by test:

1. Discharge rate of inert gas agent
2. Discharge rate of water
3. Intended dry-basis concentration of oxygen
4. * Time to extinguishment
5. Design discharge time
6. Maximum protected volume per hybrid nozzle
7. Maximum ceiling height
8. Maximum coverage area dimensions (width × length) per hybrid nozzle
9. Minimum clearance to walls
10. Minimum and maximum clearance to ceiling
7.3.2 **Protection of Mixed Hazards.** For combinations of fuel or hazard types, the system design characteristics shall be determined by the fuel or hazard type that requires the most restrictive design parameters, unless tests are performed on the actual combination of fuel or hazard types.

7.4 **Hybrid Media Quantity.**

7.4.1 The minimum quantity of inert gas agent required shall be calculated in accordance with the following equation:

\[
Q_{min} = F_{S,IG} \cdot V_{enc} \cdot \left(\frac{294.4}{273 + T_{min}}\right) \cdot X \cdot F_{atm}
\]

where:

- \( Q_{min} \) = minimum volume of inert gas agent to be added [m³]
- \( F_{S,IG} \) = inert gas agent safety factor
- \( V_{enc} \) = volume of the enclosure [m³]
- \( T_{min} \) = minimum expected ambient enclosure temperature [°C]
- \( X \) = flooding factor at 21°C ambient temperature [m³/m³]
- \( F_{atm} \) = atmospheric correction factor

7.4.1.1 The inert gas agent safety factor, \( F_{S,IG} \), shall be 1.2.

7.4.1.2* The flooding factor, \( X \), shall be determined by test for the specific fuel or hazard type, per Section 7.3.

7.4.1.3 The design quantity of the inert gas agent shall be adjusted in accordance with Table 7.4.1.3 to compensate for ambient pressures that vary more than 11 percent [equivalent to approximately 915 m (3000 ft) of elevation change] from standard sea level pressures [760 mm Hg at 0°C (29.92 in. Hg at 70°F)].

**Table 7.4.1.3 Atmospheric Correction Factors, \( F_{atm} \)**

<table>
<thead>
<tr>
<th>Equivalent Altitude</th>
<th>Enclosure Pressure (Absolute)</th>
<th>Atmospheric Correction Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>ft</td>
<td>psi</td>
<td>mm Hg</td>
</tr>
<tr>
<td>-3,000</td>
<td>16.25</td>
<td>840</td>
</tr>
<tr>
<td>-2,000</td>
<td>15.71</td>
<td>812</td>
</tr>
<tr>
<td>-1,000</td>
<td>15.23</td>
<td>787</td>
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<td>0</td>
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<td>760</td>
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<tr>
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</tr>
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<td>2,000</td>
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<td>3,000</td>
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<td>550</td>
</tr>
<tr>
<td>9,000</td>
<td>10.22</td>
<td>528</td>
</tr>
<tr>
<td>10,000</td>
<td>9.77</td>
<td>505</td>
</tr>
</tbody>
</table>
7.4.2 The system discharge rate shall be calculated in accordance with the following equation:

\[ R_{sys,min} = \frac{Q_{min}}{t_D} \]  \[7.4.2\]

where:

- \( R_{sys,min} \) = minimum total system discharge rate [m³/min]
- \( Q_{min} \) = minimum volume of inert gas agent [m³]
- \( t_D \) = maximum time to discharge \( Q_{min} \) [min]

7.4.2.1* The maximum time, \( t_D \), to discharge the minimum volume of inert gas agent shall not exceed 3 minutes, unless a longer time is established by test for a specific hazard.

7.4.2.2 Where multiple hazard classifications exist in the protected enclosure, the shortest time to discharge, \( t_D \), shall be used.

7.4.3 The number of hybrid nozzles shall be determined in accordance with the following equation:

\[ N = \frac{R_{sys,min}}{R_{D,IG}} \]  \[7.4.3\]

where:

- \( N \) = minimum number of hybrid nozzles [nozzles]
- \( R_{sys,min} \) = minimum system inert gas agent discharge rate [m³/min]
- \( R_{D,IG} \) = inert gas agent discharge rate of the hybrid nozzle [m³/min/nozzle]

7.4.3.1 The calculated number of hybrid nozzles shall be rounded up to a whole number.

7.4.3.2 The spacing of hybrid nozzles shall not exceed the manufacturer’s specifications.

7.4.4 The supplied quantity of inert gas agent, \( Q_{supply} \), shall be not less than the minimum, as determined in 7.4.1.

7.4.5 The supplied quantity of water shall be calculated from the following equation:

\[ W = F_{S,H2O} \cdot \left( V_{pipe} + N \cdot R_{D,H2O} \cdot t \right) \]  \[7.4.5\]

where:

- \( W \) = quantity of water [L]
- \( F_{S,H2O} \) = water safety factor
- \( V_{pipe} \) = internal volume of the water-filled pipe [L]
- \( N \) = minimum number of hybrid nozzles [nozzles]
- \( R_{D,H2O} \) = water discharge rate of the hybrid nozzle [L/min/nozzle]
7.4.5.1 The water safety factor, \( F_{\text{H2O}} \), shall be 1.2.

7.4.5.2 The design discharge duration, \( t \), shall be determined from the supplied quantity of inert gas agent, \( Q_{\text{supply}} \), and the actual system discharge rate.

7.4.6 The supplied quantity of hybrid media shall be increased through the use of additional design factors to compensate for any special conditions that would affect the extinguishing efficiency.

7.5 Concentration of Oxygen.

7.5.1 The resultant concentration of oxygen shall be calculated using equation 7.5.1.

\[
C_{\text{oxygen,red}} = 20.95e^{-\frac{\left(273 + T_{\text{max}}\right)Q_{\text{supply}}}{294.4F_{\text{atm}}V_{\text{enc}}}} \tag{7.5.1}
\]

where:

- \( C_{\text{oxygen,red}} \) = concentration of oxygen after discharge [%vol/vol]
- \( T_{\text{max}} \) = maximum expected ambient enclosure temperature [°C]
- \( Q_{\text{supply}} \) = discharged volume of inert gas agent [m\(^3\)]
- \( F_{\text{atm}} \) = atmospheric correction factor (See 7.4.1.3.)
- \( V_{\text{enc}} \) = volume of the enclosure [m\(^3\)]

7.5.2 The concentration of oxygen after discharge shall not exceed the limitations specified in Section 4.3.

7.6 Hybrid Media Retention Time for Prevention of Re-ignition.

7.6.1* For fires involving Class A combustibles subject to deep-seated burning, an extinguishing atmosphere shall be maintained throughout the hazard zone for a time period sufficient to allow for response by personnel trained and equipped to extinguish the fire.

7.6.2 For hazards where there are objects that might be heated above ignition temperature of the fuel or where the ignition temperature of a flammable liquid fuel is below the boiling point of the fuel, the hybrid media concentration shall be maintained for a sufficient time to allow cooling below the fuel's ignition temperature or for response by personnel.

7.7 Hybrid Nozzle Selection, Quantity, and Location.

7.7.1 Hybrid nozzles shall be selected, located, and oriented in accordance with the criteria determined in accordance with 7.3.1.

7.7.2 Discharge of inert gas agent and water shall be established at every hybrid nozzle in 30 seconds or less from the time of system activation, unless a longer delivery time is permitted by the authority having jurisdiction.

7.7.3 Nozzles shall be placed such that their discharge will not splash flammable liquids or create dust clouds that could extend the fire, create an explosion, or otherwise adversely affect the contents or the integrity of the enclosure.
Chapter 8  Design Requirements for Local Application Systems

8.1 General.

8.1.1 Description. A local application system shall consist of a fixed supply of hybrid media permanently connected to a fixed pipe network with fixed nozzles arranged to discharge the hybrid media on or around the hazard or object to be protected.

8.1.2 Uses. A local application system shall be used to protect an object or a hazard in an unenclosed or partially enclosed condition.

8.1.3 General Requirements. Local application systems shall be designed, installed, tested, and maintained in accordance with the applicable requirements in Chapter 4 and with the additional requirements set forth in Chapter 12.

8.1.4 Application Characteristics. The characteristics of the local application shall be consistent with the listing of the system or approved by the authority having jurisdiction.

8.1.5 Safety Requirements. The safety requirements of Section 4.2 shall apply where locally high concentrations of the inert gas will be developed.

8.2 Hazard Specifications.

8.2.1 Extent of Hazard.

8.2.1.1 The entire hazard shall be protected.

8.2.1.2 The hazard shall include combustible objects, hazards which could cause spray fires, or all areas that are or can become coated by combustible liquids or shallow solid coatings, such as areas subject to spillage, leakage, dripping, splashing, or condensation.

8.2.1.3 The hazard shall also include all associated materials or equipment, such as freshly coated stock, drain boards, hoods, ducts, and so forth, which could extend fire outside or lead fire into the protected area.

8.2.1.4 The hazard shall be so isolated from other hazards or combustibles that fire will not spread outside the protected area.

8.2.1.5 Curbing or dikes to isolate flammable liquid spills shall be required to limit the spread of spills to the area protected by the hybrid local application system.

8.2.1.6 A series of interexposed hazards shall be permitted to be subdivided into smaller groups or sections with the approval of the authority having jurisdiction.

8.2.1.7 Systems for the protection of hazards that are subdivided in accordance with 8.2.1.6 shall be designed to give immediate independent protection to adjacent groups or sections as needed.

8.2.2 Location of Hazard.

8.2.2.1 The hazard shall be indoors.

8.2.2.2 The hybrid system shall be designed to account for air movement and the ambient temperature range of the protected hazard.

8.2.3 Flammable Liquid Hazards. Where flammable liquids with depth greater than 6 mm (1/4 in.) are to be protected, a minimum freeboard of 30 mm (1.2 in.) shall be provided, unless otherwise noted in the nozzle listing or as approved by the authority having jurisdiction.

8.3 Nozzle Selection, Quantity, and Location.

8.3.1 The basis for nozzle selection shall be performance data that clearly depict the interrelationship of agent quantity, discharge rate, discharge time, area coverage, orientation, and the horizontal and vertical distance of the nozzle from the protected surface.
8.3.2* The performance data required by 8.3.1 shall be determined by fire testing that is representative of the configuration and conditions of the hazard being protected.

8.3.3 A sufficient number of nozzles shall be used to cover the entire hazard area on the basis of the unit areas protected by each nozzle.

8.3.4 Local application nozzles shall be located in accordance with spacing and discharge rate limitations stated in nozzle listings or approved by the authority having jurisdiction.

8.3.5 Nozzles shall be located so as to protect coated stock or other hazards extending above a protected surface.

8.4 Discharge Rate.

8.4.1 The design discharge rate through individual nozzles shall be determined on the basis of location or projection distance in accordance with specific listings or be approved by the authority having jurisdiction.

8.4.2 The system discharge rate shall be the sum of the individual rates of all the nozzles and discharge devices used in the system.

8.5 Discharge Time.

8.5.1 The design discharge time shall be not less than the greater of the following:

(1) 120 seconds

(2) Twice the extinguishment time as determined in accordance with Section 8.3

8.5.2 The discharge time shall be increased to compensate for any hazard condition that would require a longer cooling period or for mechanical rundown time associated with ventilation equipment present to prevent re-ignition.

8.5.3 Where there is a possibility that metal or other material can become heated above the ignition temperature of the fuel, the discharge time shall be increased to allow adequate cooling time.

8.5.4* Where the fuel has an autoignition point below its boiling point, such as paraffin wax and cooking oils, the discharge time shall be increased to permit cooling of the fuel to prevent re-ignition.

8.6 Hybrid Media Quantity. The quantity of hybrid media required for local application systems shall be based on the rate of discharge and the time that the discharge must be maintained to ensure complete extinguishment.
Chapter 9  Design Requirements for Marine Systems

Reserved.
Chapter 10  System Documentation

10.1 System Working Plans.

10.1.1 Submittal of Working Plans. Working plans shall be submitted for approval to the authority having jurisdiction before any equipment is installed.

10.1.2 Deviations from Approved Plans. Deviation from approved plans shall be approved by the authority having jurisdiction.

10.1.3 Qualifications. The working plans shall be prepared by, or under the supervision of, an individual that is trained and certified by the system manufacturer.

10.1.4 Component Identification. Special symbols shall be defined and used to identify clearly the components of the hybrid system.

10.1.5 Required Information. The working plans shall provide the following information as pertaining to the design of the system:

1. Plan identification number or project number
2. Name and address of plans preparer and installing contractor
3. Hybrid extinguishing system manufacturer and system designation
4. Date of preparation and subsequent revisions
5. Name of owner and occupant
6. Property location, including street address and site elevation relative to sea level
7. Point of compass, drawing scale, and symbol legend
8. Plan view of the protected enclosure or equipment
9. Location and dimensions of obstructions that affect the system layout
10. Location of fire walls that affect the system layout
11. Enclosure cross section, with full height or schematic diagram, including location and construction of building floor/ceiling assemblies above and below, raised access floor, and suspended ceiling
12. Description of occupancies and hazards (fuels) being protected
13. Enclosure occupancy status (normally occupied, occupiable, or unoccupiable)
14. Inert gas agent used in the hybrid media
15. * Description of the critical system application criteria
16. Maximum and minimum expected ambient temperatures of the protected space and the agent storage container location(s)
17. Location and description of the water and inert gas agent supplies, including container quantity, capacity, weight, pressure, or other characteristics, as applicable
18. Identification of nozzles, including size and orifice or part number, as appropriate
19. Identification of pipe and fittings, including material specifications, grade, and pressure rating
20. Description of wire or cable
21. Equipment schedule or bill of materials for each piece of equipment or device, indicating the device name, manufacturer, model or part number, quantity, and description
22. Plan view of the protected area, showing enclosure partitions (full and partial height); piping layout, including identification of pipe type, contents, and size; nozzles; pipe hangers and rigid pipe supports; seismic bracing, if required; system actuation and control equipment; and signage
23. Plan view of the protected area, in accordance with NFPA 70 and NFPA 72, showing detection, alarm, and control system, including all devices; end-of-line device locations; location of controlled/interlocked devices, such as dampers/shutters, power supply equipment, fuel supplies, and air handling equipment
24. Isometric view of the hybrid distribution system, showing detailed descriptions of each pipe segment; pipe fitting, including reducers and strainers; control or selector valve; drain valve; and nozzle
25. Seismic separations and expansion joints, if any
26. Calculation of seismic loads, if seismic restraint is required
27. Details of hangers, rigid pipe supports, and bracing
28. Details of container mounting, including method of securing to building structure
29. System sequence of operations, including a complete step-by-step description of the functioning of abort and maintenance switches, delay timers, and any interlocks with HVAC equipment, dampers, production equipment, fuel shutoffs, electric shut-downs, and door closers
30. Riser diagram of the system control panel
31. Hydraulic and pneumatic calculations to determine flow rates, nozzle pressures, and maximum predicted pressure for each pipe network
32. Calculations to determine the quantity of water, quantity of inert gas agent, and discharge time
33. Calculations to determine the size of backup batteries (*See NFPA 72 for documentation requirements.*)
34. Details of any special features

### 10.1.6 As-Built Plans
If the final installation varies from the approved working plans, new working plans, representing the as-built installation, shall be prepared.

#### 10.2 System Flow Documentation

**10.2.1 Pre-Engineered Systems.** System flow calculations shall not be required for pre-engineered systems.

**10.2.2 Engineered Systems.**

10.2.2.1 Pneumatic calculations for the inert gas agent portion of the system shall be prepared on form sheets that include a summary and detailed work sheets.

10.2.2.2 Hydraulic calculations for the water portion of the system shall be prepared on form sheets that include a summary and detailed work sheets.

10.2.2.3 Where flow calculation software is used, flow calculation details shall include the version of the flow calculation program.

**10.2.3 Summary Sheets.** The calculation summary sheet shall contain the following information:

1. Name and address of plans preparer and installing contractor
2. Hybrid extinguishing system manufacturer and system designation
3. Date of preparation
4. Name of owner and occupant
5. Property location, including street address and site elevation relative to sea level
6. Description of occupancies and hazards (fuels) being protected
7. Type of application, total flooding or local application
8. System design requirements, including the following:
   a. Total flooding, design volume of space protected
   b. Local application area of water application
   c. Total gas requirement
   d. Total water requirement

**10.2.4 Detailed Work Sheets.** The calculation detailed work sheets shall contain the following information:

1. Sheet number
2. Nozzle description
3. Pipe size
4. Pipe lengths, center to center of fittings
5. Equivalent pipe lengths for fittings and devices
6. Calculated nozzle pressure
7. Maximum calculated pressure in the pipe network
8. Calculated flow rates:
   a. Inert gas flow: slpm (scfm)
   b. Water flow: lpm (gpm)
9. Calculated discharge time
10.3 Detection, Actuation, and Control Systems Documentation. Documentation for detection, actuation, and control systems shall meet the requirements of NFPA 72.

10.4* Owner's Documentation.

10.4.1 A copy of the manufacturer's design, installation, operation, and maintenance manual(s) shall be provided to the owner.

10.4.2 A copy of the as-built plans shall be provided to the owner.

10.5 System Information Sign.

10.5.1* The installing contractor shall provide a permanently marked system information sign.

10.5.2 The sign shall be placed within 1.5 m (5 ft) of the storage cylinders or releasing control panel.

10.5.3 The sign shall include the following information, as applicable:

1. Location of the protected area or areas
2. Description of the hazard protected
3. Design type application
4. System manufacturer and system designation
5. Volume or area protected, depending on application
6. Total number of nozzles protecting the hazard
7. Design application density
8. Design flow rate and duration
9. Total inert gas agent and water requirements, as calculated
10. Description of any compartment or enclosure characteristics that are essential to system performance
11. Name of installing contractor and contact information
12. Date of installation
13. Plan identification number or project number of the submitted as-built plans
Chapter 11  Installation Requirements

11.1 General.

11.1.1 Listed materials and devices shall be installed in accordance with their listing.

11.1.2 Materials and devices shall be installed in accordance with the manufacturer's instructions.

11.1.3 System components shall be located, installed, or protected so they are not subject to mechanical, corrosive (chemical, etc.), or other damage that could impair operation.

11.1.4 Working Plans.

11.1.4.1 The system shall be installed in accordance with the approved working plans.

11.1.4.2 Deviations from the approved working plans shall be approved.

11.1.5 Qualifications. Hybrid systems shall be installed by personnel that are qualified in accordance with Section 4.4.

11.2 Nozzles. Nozzles shall be installed in accordance with the manufacturer's instructions, including, but not limited to, the following installation criteria:

1. Minimum and maximum height above the floor
2. Minimum and maximum distances between nozzles
3. Minimum and maximum distance from nozzles to walls or partitions
4. Location of nozzles with respect to continuous or discontinuous obstructions
5. Clearance between the nozzle and the ceiling
6. Permitted nozzle orientation

11.3 Hazardous Locations. Components of the electrical portions of hybrid systems that are installed in classified locations as defined in Article 500 of NFPA 70 shall be listed for such use.

11.4 Electrical Clearances. All system components shall be located so as to maintain minimum electrical clearances from live parts in accordance with 29 CFR 1910, Subpart S.

11.5 Pipe Network.

11.5.1 Pipe Identification

11.5.1.1 All pipe, including specially listed pipe, shall be marked along its length by the manufacturer in such a way as to identify the type of pipe.

11.5.1.2 Pipe identification shall include the manufacturer's name, model designation, and/or schedule.

11.5.1.3 Pipe or tubing marking shall not be painted, concealed, or removed prior to approval by the authority having jurisdiction.

11.5.1.4 Welding shall be performed in accordance with Section IX, “Welding, Brazing, and Fusing Qualifications,” of the ASME Boiler and Pressure Vessel Code.

11.5.2 Pipe shall be cleaned internally and be free of foreign material before nozzles are installed.

11.5.3* If used, pipe joint compound, tape, or lubricant shall not be applied to the first 3 threads.

11.5.4 Installation Standards.
11.5.4.1 Where the maximum system operating pressure does not exceed 12.1 bar (175 psi), piping and tubing shall be installed in accordance with NFPA 13.

11.5.4.2 Where the maximum system operating pressure exceeds 12.1 bar (175 psi), piping and tubing shall be installed in accordance with ASME B31.1.

11.5.5 Pressure Rating. All system piping, tubing, and hose shall be rated for the maximum working pressure to which they are exposed.

11.5.6 Flexible Components. Any flexible piping, tubing, hose, or combination thereof shall be constructed and installed in accordance with the manufacturer's instructions.

11.5.7* Tube Bending.

11.5.7.1 Bending of Type K and Type L copper tube or stainless steel tube shall be permitted, provided that all bending details are in accordance with the tubing manufacturer’s recommendations, the strength requirements of ASME B31.1, or the following, whichever is greatest:

(1) For Type K or Type L copper tubing, the minimum bending radius is six pipe or tube diameters.
(2) For Type 304L or Type 316 stainless steel tube, the minimum bending radius is two diameters up to 38 mm (1 ½ in.) OD and four diameters for 51 mm (2 in.) tubing.

11.5.7.2 Bending tools shall be used for all bending in accordance with the following:

(1) Power bending tools with the correct radius dies shall be required for tube larger than 20 mm (¾ in.).
(2) Hand or bench dies with the correct radius dies shall be permitted to be used to bend tubing 20 mm (¾ in.) and smaller.
(3) Flattened bends where the larger diameter is greater than 1.08 times the least diameter shall not be permitted.

11.5.8* Pipe Hangers and Supports. Pipe hangers and supports shall be designed and installed in accordance with recognized industry practices and manufacturer’s instructions.

11.5.8.1 All pipe hangers and supports shall be attached directly to a rigid fixed structure.

11.5.8.2 All hangers and components shall be steel.

11.5.8.3 Ordinary cast-iron hangers/supports, conduit clamps, or “C” clamps shall not be used.

11.5.8.4 All pipe supports shall be designed and installed to prevent lateral movement of supported pipe during system discharge while permitting longitudinal movement to accommodate expansion and contraction caused by temperature changes.

11.5.8.4.1 Rigid hangers shall be installed wherever a change in elevation or direction occurs.

11.5.8.4.2 Nozzles shall be supported so as to prevent movement of the nozzle during discharge.

11.5.8.5 Where seismic bracing is required, bracing shall be in accordance with local codes and the authority having jurisdiction.

11.5.9 System Drainage. All system piping and fittings shall be installed so that the entire system can be drained.

11.5.10 Piping Slope Requirements. The wetted discharge piping shall be installed with a slope of at least 2 mm/m (¼ in. per 10 ft) of run toward the low point drain.

11.6 Gas and Water Storage Containers.
11.6.1.1 Storage containers and accessories shall be installed so that inspection, testing, recharging, and other maintenance are facilitated.

11.6.1.2 A clear space, at least 1 m (3 ft) in front of the containers, shall be marked to maintain access for maintenance.

11.6.2 Storage Temperatures.

11.6.2.1 Storage temperatures shall be maintained within the range specified in the manufacturer’s listing.

11.6.2.2 External heating or cooling shall be an approved method to keep the temperature of the storage container within desired ranges.

11.6.3 Container Securement. Containers shall be secured to prevent container movement and possible physical damage.

11.6.4* Strainers and Filters. A strainer or filter shall be installed at each water supply connection.

11.7 Valves and Pressure Gauges.

11.7.1 Valves and pressure gauges shall be installed such that they are accessible for operation, inspection, and maintenance.

11.7.2 Valves shall be installed with clearance to ensure operation of the valve from the fully closed to fully open position.

11.7.3 All control, drain, and test connection valves shall be provided with permanently marked, weatherproof, metal or rigid-plastic, identification signs, secured by corrosion-resistant wire or chain or by other approved means.

11.7.4 Valve Supervision. All valves controlling the supply of water, inert gas agent, or hybrid media to hybrid nozzles shall be installed to accommodate the means of supervision, as specified in the working plans.

11.7.5 Relief Valves. Relief valve discharge piping shall be routed in accordance with the working plans.

11.7.6 Check Valves. Check valves shall be installed in the direction of flow.

11.8 Electrical Equipment and Systems.

11.8.1 Electrical equipment associated with hybrid systems shall be installed in accordance with the requirements of NFPA 70.

11.8.2 All signaling system circuits and wiring shall be installed in accordance with NFPA 72.

11.8.3 All signaling line circuits and wiring shall be installed in accordance with NFPA 72.

11.8.4 All initiating and releasing circuit wiring shall be installed in conduit or closed raceway.

11.9 System Review and Testing. The completed system shall be reviewed and tested by personnel qualified in accordance with Section 4.4 to determine that the system has been properly installed and will function as specified.

11.9.1 Only listed or approved equipment and devices shall be used in the system.

11.9.2 Review of Installation.

11.9.2.1 It shall be determined that the protected enclosure is in general conformance with the construction documents.
11.9.2.2 All operating devices shall be checked for proper operation following directions to be given in the manufacturer's installation operation and maintenance manual.

11.9.2.3 Proper operation of auxiliary devices such as pressure switches, flow alarms, and pressure trips shall be verified.

11.9.2.4 Proper operation of all alarms and indicators shall be verified.

11.9.2.5 Proper operation of the fire alarm control panel and all connected devices such as detectors, manual stations, time delays, alarms, remote annunciators and releasing devices shall be verified.

11.9.2.6* Sensors providing feedback for system operation shall be verified for proper connection to the system in accordance with the manufacturer's instructions.

11.9.2.7 All filters and strainers shall be inspected and cleaned or replaced as necessary.

11.9.3 Pressure Test of Pipe.

11.9.3.1 The pipe system shall be pressure tested in a closed circuit using nitrogen or other dry gas.

11.9.3.2* The pipe shall be pressurized to the normal operating pressure for the pipe.

11.9.3.3 After removing the source of pressurizing gas, the pressure in the pipe shall be not less than 90 percent of the test pressure after 10 minutes.

11.9.4 Flow Tests.

11.9.4.1 Flow tests shall be conducted to verify that each nozzle discharges gas and water and that the discharge patterns are per design.

11.9.4.2 A flow test shall be performed before nozzles are installed to verify unobstructed flow from each nozzle pipe connection.

11.9.4.3 For hazards involving Class B fuels or Class A fuels subject only to surface burning, a full flow or partial flow test shall be conducted to verify that inert gas and water discharge from each nozzle and that the discharge patterns are per design.

11.9.4.4 For systems protecting Class A fuels subject to deep-seated burning, a full flow test shall be conducted to verify that inert gas and water discharge from each nozzle, that the discharge patterns are per design, and that the design inert gas concentration is achieved and maintained for the required retention time.

11.9.5 Test Report.

11.9.5.1 The system review and testing shall be documented in a report.

11.9.5.2 The report shall be maintained by the system owner for the life of the system.
Chapter 12  Acceptance Testing

12.1 Approval of Installations.

12.1.1* An acceptance test plan shall be approved prior to scheduling of acceptance testing.

12.1.2 A complete step-by-step description of the proposed acceptance test procedure, identifying all devices controls and functions to be tested and how the test will be conducted, shall be approved prior to scheduling of acceptance testing.

12.1.3 Where a hybrid fire-extinguishing system operates in conjunction with other building systems, functions, or components, the final testing shall be conducted with those systems as appropriate.

12.1.4 The completed system shall be reviewed and tested by qualified personnel to meet the approval of the authority having jurisdiction.

12.1.5 The completed system shall be reviewed to confirm that only listed or approved equipment and devices have been used.

12.1.6 The installing contractor shall take the following actions:

(1) Notify the authority having jurisdiction and the owner's representative of the time and date testing is to be performed.

(2) Perform all required acceptance tests.

(3) Confirm in writing the status of all system components and controls.

(4) When the system has not been left in service, confirm in writing those responsible for placing the system in service.

12.1.7 The acceptance testing shall be documented in a test report.

12.1.8 The acceptance test report shall be maintained by the system owner for the life of the system.

12.2 Acceptance Requirements.

12.2.1 Review of Mechanical Components.

12.2.1.1 It shall be determined that the protected enclosure is in general conformance with the construction documents.

12.2.1.2 The piping system shall be inspected to determine that it is in compliance with the design and installation documents and hydraulic calculations.

12.2.1.3 Nozzles and pipe size shall be in accordance with the approved working plans.

12.2.1.4 The means of pipe size reduction and the attitudes of tees shall be checked for conformance to the design for proper orientation.

12.2.1.5 Piping joints, discharge nozzles, and piping supports shall be restrained to prevent unacceptable vertical or lateral movement during discharge.

12.2.1.6 Discharge nozzles shall be installed in such a manner that piping cannot become detached during discharge.

12.2.1.7 The discharge nozzles, piping, and mounting brackets shall be installed in such a manner that they do not cause injury to personnel.

12.2.1.8 All water and gas storage containers shall be located in accordance with an approved set of system drawings.
12.2.1.9 All containers and mounting brackets shall be fastened in accordance with the manufacturer’s requirements.

12.2.1.10 All filters and strainers shall be inspected for proper location and relocated as necessary.

12.2.1.11 Discharge nozzles shall be inspected for minimum clearances to obstructions per the manufacturer’s requirements.

12.2.2 Review of Electrical Components.

12.2.2.1 All wiring systems shall be checked for proper installation in conduit and in compliance with the approved drawings.

12.2.2.2 It shall be confirmed that ac wiring and dc wiring are not combined in a common conduit or raceway unless properly shielded and grounded.

12.2.2.3* All wiring systems shall be checked for grounding and shielding in accordance with the working plans.

12.2.2.4* All field circuits shall be confirmed to be free of ground faults and short circuits.

12.2.2.5 It shall be verified that the hybrid system branch piping has not been used as an electrical ground.

12.2.2.6 The detection devices shall be checked for proper type and location as specified on the system drawings.

12.2.2.7 Manual pull stations shall be confirmed as accessible, accurately identified, and properly protected to prevent damage.

12.2.2.8 Abort Switches. Where abort switches are allowed by the authority having jurisdiction, verify the following:

   (1) Switches do not remain in the abort position when released.

   (2) Manual controls override the abort function.

12.2.2.9 Enclosure Integrity. For total flooding systems, the enclosure shall be examined to verify that the number and size of unclosable openings are in accordance with working plans.

12.2.3 Functional Tests. If the system is connected to an alarm receiving office, the alarm receiving office shall be notified that the fire system test is to be conducted and that an emergency response by the fire department is not desired.

12.2.3.1 All operating devices shall be checked for proper operation following directions and procedures given in the manufacturer’s installation operation and maintenance manual.

12.2.3.2 Proper operation of auxiliary devices such as pressure switches, flow alarms, and pressure trips shall be verified.

12.2.3.3 Proper operation of all alarms and indicators shall be verified.

12.2.3.4 Proper operation of the fire alarm control panel and all connected devices such as detectors, manual stations, time delays, alarms, remote annunciators, and releasing devices shall be verified.

12.2.3.5 Where practicable, the maximum number of systems that are expected to operate in case of fire shall be in full operation simultaneously when the adequacy and condition of the water supply are checked.

12.2.4 Flow Tests.

12.2.4.1 Except as permitted in 12.2.5.1.2, a flow test shall be conducted.
12.2.4.1.1* The discharge from all nozzles shall be observed to ensure the following:

(1) Nozzle orifices are not clogged.
(2) Nozzles are correctly positioned.

12.2.4.1.2* Where acceptable to the authority having jurisdiction, an alternative test method that does not require inert gas or water to be discharged shall be permitted to confirm that each nozzle discharges water and inert gas.

12.2.4.2 For systems protecting Class A fuels subject to deep-seated burning, a full discharge test shall be conducted to verify that the design concentration of hybrid media is achieved and maintained for the required retention time.

12.2.4.3 Subsequent to a flow or discharge test, all filters and strainers shall be inspected and cleaned or replaced as necessary.

12.3 System Design Information Sign. The accepting authority shall confirm that the system design information sign has been provided and that it accurately reflects the system design parameters.

12.4 Owner’s Documentation. Documentation shall be provided to the owner in accordance with Section 10.4.
Chapter 13  Inspection, Testing, and Maintenance

13.1 General.

13.1.1* The property owner or designated representative shall be responsible for properly maintaining a fire protection system.

13.1.2 Inspection, testing, maintenance, and impairment procedures shall be implemented in accordance with those established in this document and in accordance with the manufacturer's instructions.

13.1.3 Personnel performing inspection, testing, or maintenance shall be qualified in accordance with Section 4.4.

13.1.4 The date the inspection is performed and the initials of the person performing the inspection shall be recorded.

13.1.5 Personnel making inspections shall keep records for those extinguishing systems that were found to require corrective actions.

13.1.6 A completed copy of the inspection report shall be furnished to the owner of the system or an authorized representative.

13.1.7 Inspection, testing, and maintenance records shall be retained by the owner for the life of the system.

13.1.8* Those charged with maintenance of the system or using maintenance for corrective actions shall be trained in the maintenance of the specific make and model system.

13.1.9 Maintenance personnel shall review all manufacturer's service bulletins pertaining to the system.

13.1.10 The inspection, testing and maintenance records shall be retained for a period of 1 year after the next inspection, test, or maintenance of that type required by the standard.

13.2 Periodic Inspection and Maintenance.

13.2.1 A manufacturer's test and maintenance procedure shall be provided to the owner.

13.2.2* Weekly Inspection.

13.2.2.1 At least weekly, the following shall be inspected:

   1) Inert gas and water supply lines are intact.
   2) Nozzles are not obstructed.
   3) Protective caps if supplied are in place on every nozzle.
   4) Fire alarm control panel is in "normal" ready condition.
   5) System isolation valves are locked in full open position.
   6) Tamper seals are in place.

13.2.2.2 Any deficiencies shall be corrected.

13.2.3 Semiannual Inspection.

13.2.3.1 The following tasks, in addition to the weekly inspection tasks, shall be performed at least semiannually:

   (1) Check inert gas supply tanks for proper pressure corrected for ambient temperature. If any tank shows a pressure loss of more than 10 percent corrected for temperature, check for the root cause and repair or replace the tank as necessary to provide the required quantity of inert gas in storage.

   (2) Check the water level in the storage tank (if applicable). If the water level is more than 5 percent below design level, check for the root cause and repair or replace the tank as necessary to provide the required quantity of water in storage.
13.2.3.2 Any deficiencies shall be promptly corrected.

13.2.3.3 The results of an inspection shall be recorded on both of the following:

1. A record tag secured to each cylinder
2. A suitable inspection report

13.2.4 Annual Maintenance.

13.2.4.1 The following shall be checked by competent personnel (see 13.2.4.2) at least annually using available documentation required in Chapter 10:

1. Check and test the system for operation.
2. Check hybrid media containers for signs of damage. (See Section 13.4.)
3. Cycle all system valves (discharge of hybrid media is not required).
4. Clean or replace strainers and filters per system manufacturer’s instructions.
5. Check that there have been no changes to the size, type, and configuration of the hazard and system.
6. Check and test all time delays for operation.
7. Check and test all audible notification appliances for operation.
8. Check and test all visual notification appliances for operation.
9. Check that all warning signs are installed and visible.
10. Check operation of all manual release devices.
11. Check and test each automatic detector using methods specified in NFPA 72.

13.2.4.2* Those charged with maintenance of the system shall be trained in the maintenance of the specific make and model system.

13.2.4.3 Maintenance personnel shall review all manufacturer’s service bulletins pertaining to the system.

13.3 Hose Test.

13.3.1 All system hose shall be examined annually for damage.

13.3.2 All hose shall be tested or replaced every 5 years or at any time when visual examination shows any deficiency.

13.3.3 The test pressure shall be equal to 1½ times the maximum system operating pressure.

13.3.4 The testing procedure shall be as follows:

1. The hose is removed from any attachment.
2. The hose assembly is then placed in a protective enclosure designed to permit visual observation of the test.
3. The hose must be completely filled with water before testing.
4. Pressure then is applied at a rate-of-pressure rise to reach the test pressure within 1 minute. The test pressure is then maintained for 1 full minute. Observations are then made to note any distortion or leakage.
5. After observing the hose for leakage, movement of couplings, and distortion, the pressure is released.

13.3.5 The hose assembly shall be considered to pass if all of the following criteria are met:

1. No loss of pressure during the test
2. No movement of the couplings while under pressure
3. No permanent distortion of the hose

13.3.6 Each hose assembly that passes the hydrostatic test shall be marked with the date of the test.

13.3.7* Each hose assembly that passed the test shall be dried internally before being reinstalled.

13.3.8 Each hose assembly that fails the hydrostatic test shall be marked and destroyed.
13.4* Inert Gas Agent Container Test. Inert gas storage containers shall be periodically inspected and tested in accordance with this section.

CAUTION: Inert gas agent containers are under high pressure. Observe safety precautions when handling cylinders, including installation of anti-recoil devices on cylinder outlets immediately upon disconnecting the cylinder outlet from the system pipe and before removing the cylinder from its bracket.

13.4.1 Inert gas agent containers built in accordance with U.S. Department of Transportation (DOT), Transport Canada (TC), or similar regulatory bodies shall be periodically requalified in accordance with the provisions of the governing regulatory body.

13.4.2 Inert gas agent containers continuously in service without discharging shall be given a complete external visual inspection every 5 years or more frequently if required.

13.4.2.1 The visual inspection shall be in accordance with Section 3 of CGA C-6, except that inert gas agent containers need not be emptied and shall not be stamped while under pressure.

13.4.2.2 The results of the visual inspection shall be recorded on both of the following:

   (1) A record tag attached to each cylinder

   (2) A suitable inspection report

13.4.2.3 A completed copy of the inspection report shall be furnished to the owner of the system or an authorized representative.

13.4.2.4 Container inspection records shall be retained by the owner for the life of the system.

13.4.2.5 When an external visual inspection indicates that the container has been damaged, the container shall be requalified in accordance with the requirements of the applicable regulatory body.

13.5 Water Storage Container Inspection and Test.

13.5.1 Water storage containers shall be subjected to an annual external visual inspection.

13.5.2 Water storage containers shall be drained and subjected to an internal inspection in accordance with 13.5.2.1 or 13.5.2.2.

13.5.2.1 Water storage containers constructed of corrosion-resistant material shall be inspected every 5 years.

13.5.2.2 Water storage containers that have an internal corrosion-resistant coating shall be inspected annually.

13.5.3 Water storage containers built in accordance with U.S. Department of Transportation (DOT), Transport Canada (TC), or similar regulatory bodies shall be periodically requalified in accordance with the provisions of the governing regulatory body.

13.5.4 The results of the visual inspection shall be recorded on both of the following:

   (1) A record tag attached to each cylinder

   (2) A suitable inspection report

13.5.5 A completed copy of the inspection report shall be furnished to the owner of the system or an authorized representative.

13.5.6 Container inspection records shall be retained by the owner for the life of the system.

13.6 Actuation/Impairment.

13.6.1 Actuation, impairment, and restoration of the system shall be reported promptly to the authority having jurisdiction.

13.6.2 Following actuation, the system shall be returned to service by personnel who are specifically trained and qualified to maintain the system.
13.7 Training.

13.7.1 All persons that will be expected to inspect or operate fire-extinguishing systems shall be trained and kept trained in the functions they are expected to perform.

13.7.2* Personnel working in an enclosure protected by a hybrid system shall receive training regarding system operating procedures and safety issues.

13.7.3 Training for personnel working in the protected space shall be refreshed periodically on a schedule determined by the system owner but not less frequently than every 12 months.

13.7.4 The system owner shall maintain a record of the most recent training for each person.

13.8* Corrections and Repairs.

13.8.1* The property owner or designated representative shall correct or repair deficiencies or impairments.

13.8.1.1 Where any deficiency is noted, the appropriate corrective action shall be taken.

13.8.1.2 Where an impairment to protection occurs, the procedures outlined in Chapter 15 shall be followed.

13.8.2 Corrections and repairs shall be performed by personnel qualified as required by Section 4.4.
Chapter 14  Reserved
Chapter 15  Impairment

15.1* General.

15.1.1 Minimum Requirements.

15.1.1.1 This chapter shall provide the minimum requirements for a fire protection system impairment program.

15.1.1.2 Measures shall be taken during the impairment to ensure that increased risks are minimized and the duration of the impairment is limited. \[25:15.1.1.2\]

15.2 Impairment Coordinator.

15.2.1 The property owner or designated representative shall assign an impairment coordinator to comply with the requirements of this chapter. \[25:15.2.1\]

15.2.2 In the absence of a specific designee, the property owner or designated representative shall be considered the impairment coordinator. \[25:15.2.2\]

15.2.3 Where the lease, written use agreement, or management contract specifically grants the authority for inspection, testing, and maintenance of the fire protection system(s) to the tenant, management firm, or managing individual, the tenant, management firm, or managing individual shall assign a person as impairment coordinator. \[25:15.2.3\]

15.3 Tag Impairment System.

15.3.1* A tag shall be used to indicate that a system, or part thereof, has been removed from service. \[25:15.3.1\]

15.3.2* The tag shall be posted at each fire department connection and the system control valve, and other locations required by the authority having jurisdiction, indicating which system, or part thereof, has been removed from service. \[25:15.3.2\]

15.4 Impaired Equipment.

15.4.1 The impaired equipment shall be considered to be the fire protection system, or part thereof, that is removed from service.

15.4.2 The impaired equipment shall include hybrid (water and inert gas) systems.

15.5* Preplanned Impairment Programs.

15.5.1 All preplanned impairments shall be authorized by the impairment coordinator. \[25:15.5.1\]

15.5.2 Before authorization is given, the impairment coordinator shall be responsible for verifying that the following procedures have been implemented:

(1) The extent and expected duration of the impairment have been determined.

(2) The areas or buildings involved have been inspected and the increased risks determined.

(3) Recommendations to mitigate any increased risks have been submitted to management or the property owner or designated representative.

(4) Where a fire protection system is out of service for more than 10 hours in a 24-hour period, the impairment coordinator shall arrange for one of the following:

(a) Evacuation of the building or portion of the building affected by the system out of service

(b)* An approved fire watch

(c)* Establishment of a temporary water supply

(d)* Establishment and implementation of an approved program to eliminate potential ignition sources and limit the amount of fuel available to the fire
(5) The fire department has been notified.

(6) The insurance carrier, the alarm company, property owner or designated representative, and other authorities having jurisdiction have been notified.

(7) The supervisors in the areas to be affected have been notified.

(8) A tag impairment system has been implemented. (*See Section 15.3.*)

(9) All necessary tools and materials have been assembled on the impairment site.

[25:15.5.2]

15.6* Emergency Impairments.

15.6.1 Emergency impairments shall include, but are not limited to, interruption of water supply, frozen or ruptured piping, and equipment failure, and includes impairments found during inspection, testing, or maintenance activities. [25:15.6.1]

15.6.2* The coordinator shall implement the steps outlined in Section 15.5. [25:15.6.2]

15.7* Restoring Systems to Service. When all impaired equipment is restored to normal working order, the impairment coordinator shall verify that the following procedures have been implemented:

(1) Any necessary inspections and tests have been conducted to verify that affected systems are operational. The appropriate chapter of this standard shall be consulted for guidance on the type of inspection and test required.

(2) Supervisors have been advised that protection is restored.

(3) The fire department has been advised that protection is restored.

(4) The property owner or designated representative, insurance carrier, alarm company, and other authorities having jurisdiction have been advised that protection is restored.

(5) The impairment tag has been removed.

[25:15.7]
ANNEX A  Explanatory Material

Annex A is not a part of the requirements of this NFPA document but is included for informational purposes only. This annex contains explanatory material, numbered to correspond with the applicable text paragraphs.

A.1.2 No standard can be promulgated that will provide all the necessary criteria for the implementation of hybrid fire-extinguishing systems. Technology in this area is under constant development, and this will be reflected in revisions to this standard. The user of this standard must recognize the complexity of hybrid fire-extinguishing systems. Therefore, the designer is cautioned that the standard is not a design handbook. The standard does not do away with the need for competent engineering judgment to be exercised in the design and application of the hybrid system. It is intended that a designer capable of applying a more complete and rigorous analysis to special or unusual problems shall have latitude in the development of such designs. In such cases, the designer is responsible for demonstrating the validity of the approach.

A.1.5.4.1 It is not intended that the application or enforcement of these values be more precise than the precision expressed.

A.1.5.4.2 Users of this standard should apply one system of units consistently and not alternate between units.

A.3.2.1 Approved. The National Fire Protection Association does not approve, inspect, or certify any installations, procedures, equipment, or materials; nor does it approve or evaluate testing laboratories. In determining the acceptability of installations, procedures, equipment, or materials, the authority having jurisdiction may base acceptance on compliance with NFPA or other appropriate standards. In the absence of such standards, said authority may require evidence of proper installation, procedure, or use. The authority having jurisdiction may also refer to the listings or labeling practices of an organization that is concerned with product evaluations and is thus in a position to determine compliance with appropriate standards for the current production of listed items.

A.3.2.2 Authority Having Jurisdiction (AHJ). The phrase “authority having jurisdiction,” or its acronym AHJ, is used in NFPA documents in a broad manner, since jurisdictions and approval agencies vary, as do their responsibilities. Where public safety is primary, the authority having jurisdiction may be a federal, state, local, or other regional department or individual such as a fire chief; fire marshal; chief of a fire prevention bureau, labor department, or health department; building official; electrical inspector; or others having statutory authority. For insurance purposes, an insurance inspection department, rating bureau, or other insurance company representative may be the authority having jurisdiction. In many circumstances, the property owner or his or her designated agent assumes the role of the authority having jurisdiction; at government installations, the commanding officer or departmental official may be the authority having jurisdiction.

A.3.2.4 Listed. The means for identifying listed equipment may vary for each organization concerned with product evaluation; some organizations do not recognize equipment as listed unless it is also labeled. The authority having jurisdiction should utilize the system employed by the listing organization to identify a listed product.

A.3.3.2 Deficiency. Depending on the nature and significance of the deficiency, it can result in a system impairment. Critical deficiencies will adversely impact performance but without the need for the implementing impairment procedures. Noncritical deficiencies have the potential to impact performance.

Table A.3.3.2 provides examples for classifying conditions needing repair or correction that are identified during the inspection, testing, and maintenance of suppression systems. The conditions are classified as an impairment, critical deficiency, or noncritical deficiency. The table is not all inclusive but is included to provide guidance in responding to these conditions. For example, an impairment should be addressed promptly by either immediately correcting the condition or implementing the impairment procedures found in Chapter 15. Critical and noncritical deficiencies should be corrected as soon as practical after considering the nature and severity of the risk. It should be noted that many jurisdictions have requirements for the timely correction of impairments and/or deficiencies.
### Table A.3.3.2 Hybrid Fire Protection System Inspection and Test Findings

<table>
<thead>
<tr>
<th>Item</th>
<th>Finding</th>
<th>Reference</th>
<th>Impairment</th>
<th>Critical Deficiency</th>
<th>Noncritical Deficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inspection</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inert gas and water supply</td>
<td>Missing or not intact</td>
<td>13.2.2.1</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>lines</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Damaged but intact</td>
<td>13.2.2.1</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nozzles</td>
<td>Multiple nozzles</td>
<td>13.2.2.1</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>obstructions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Single nozzle</td>
<td>13.2.2.1</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>obstructions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The table does not take into account every variation of the conditions needing repair or correction. For example, a single lightly painted sprinkler in a large warehouse might be noncritical in its risk while a single painted sprinkler in a battery charging station might be considered a critical deficiency or perhaps an impairment. In addition, the nature of the hazard or the life safety exposure of the occupancy should be considered when assigning a classification. The table should be used with good judgment and could require input from the authority having jurisdiction.

#### A.3.3.6 Hybrid Media

Hybrid media is differentiated from a twin fluid water mist system, which uses water for cooling, vaporization, and inverting. The gas in a twin fluid system does not play a role in the extinguishment process and only serves as a medium for the water to atomize. For twin fluid water mist systems, see NFPA 750.

#### A.3.3.8 Impairment

The use of the phrase fire protection system or unit is a broad reference to those terms used in this standard and NFPA 25. Some fire protection features are referred to as systems in the installation standards (e.g., sprinkler, standpipe, water spray, foam-water, water mist, and hybrid), or are referred to as units (e.g., fire pumps), and others use neither term (e.g., private service fire mains and water tanks). For the purpose of this standard, the term unit refers to a fire pump and its connections required by NFPA 20, or a water storage tank and its connections required by NFPA 22, or a private service fire main and its connections required by NFPA 24. The use of the term unit in the definitions of impairment, deficiency, critical deficiency, and noncritical deficiency is not referring to an individual component such as a sprinkler, valve, fitting, switch, piece of pipe, and so forth. [25, 2017]

Temporarily shutting down a system as part of performing the routine inspection, testing, and maintenance on that system while under constant attendance by qualified personnel, and where the system can be restored to service quickly, should not be considered an impairment. Good judgment should be considered for the hazards presented. [25, 2017]

#### A.3.3.8.1 Emergency Impairment

Examples of emergency impairments might include a ruptured pipe, an operated sprinkler, or an interruption of the water supply to the system. [25, 2017]

#### A.3.3.13.2 Maximum Operating Pressure

The operating pressure to which portions of the hybrid system will be subjected could vary depending on the location of pressure reducing devices on the pipe serving the inert gas supply and various other system specific conditions. The maximum operating pressure is intended to reflect the highest pressure to which each component or section of pipe, including hoses where used, would be subjected.

#### A.3.3.14.2 Pre-Engineered Systems

These systems have the agent quantity, flow rates, specific pipe size, maximum and minimum pipe lengths, flexible hose specifications, number of fittings, and number, types, and locations of nozzles prescribed by a testing laboratory. All other provisions of this standard are to be followed.
Based on actual test fires, the hazards protected by these systems are specifically limited as to type and size by a testing laboratory. Limitations on hazards that are allowed to be protected by these systems are contained in the manufacturer’s installation manual, which is referenced as part of the listing.

**A.4.1.2** Materials listed are not all inclusive, and hybrid systems might not be appropriate for applications that involve other materials that are not listed. Inappropriate applications are those where the hybrid systems are not effective (increased heat absorption and/or oxygen displacement mechanisms for extinguishment not effective), or where the application of the hybrid media could result in vigorous or violent reactions or the release of hazardous compounds due to reactions with the water contained in the hybrid media.

**A.4.2** Hybrid fire-extinguishing systems utilize both inert gas and water to extinguish the fire. The typical inert gas design concentration will reduce the oxygen level to between 12.5 percent and 16 percent. The primary health concern of inhalation of oxygen deficient atmospheres is asphyxiation. For nitrogen and argon, the two inert gases most likely to be used in hybrid systems, the NOAEL is 43 percent (12 percent oxygen) and the LOAEL is 52 percent (10 percent oxygen).

Other considerations with respect to personnel safety when hybrid systems are used include the following:

1. **Noise.** Discharge of a hybrid system can cause noise loud enough to be startling; however, the noise level is generally not high enough to cause permanent or traumatic injury.
2. **Turbulence.** Discharge of a hybrid system can cause enough turbulence to move unsecured, light objects.
3. **Temperature/Visibility.** Discharge of a hybrid can cause reduction in temperature and visibility. Visibility will return to predischarge state when the temperature in the enclosure rises above the dew point temperature.
4. **Wetting of Surfaces.** When discharged under fire conditions, some or all of the water droplets will evaporate to steam resulting in little or no wetting of surfaces. Some wetting of surfaces, however, is possible particularly if there is little heat present to evaporate the water droplets. Caution is advised when walking on surfaces that might have been wetted by the discharge. Electrical energy could be conducted across wetted surfaces.

**A.4.3.4** Subsection 4.3.4 makes reference to limiting concentrations of inert gas agents corresponding to certain values of “sea level equivalent” of oxygen. The mean atmospheric pressure of air at sea level is 760 mm Hg (29.92 in. Hg). Atmospheric air is 21 volume percent oxygen. The partial pressures of oxygen in ambient air and air diluted agent to the limiting sea level concentrations corresponding to permissible exposure times of 5 minutes, 3 minutes, and 1/2 minute are given in Table A.4.3.4(a).

**Table A.4.3.4(a) Oxygen Partial Pressure at Sea Level Corresponding to Exposure Limits Given in 4.3.4**

<table>
<thead>
<tr>
<th>Exposure Time (min)</th>
<th>Agent Concentration (vol %)</th>
<th>O₂ % at Sea Level</th>
<th>Partial Pressure of O₂ (mm Hg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air reference</td>
<td>0</td>
<td>21</td>
<td>159.6</td>
</tr>
<tr>
<td>5</td>
<td>43</td>
<td>12.0</td>
<td>91.0</td>
</tr>
<tr>
<td>3</td>
<td>52</td>
<td>10.1</td>
<td>76.6</td>
</tr>
<tr>
<td>1/2</td>
<td>62</td>
<td>8.0</td>
<td>60.6</td>
</tr>
</tbody>
</table>

Note: Mean atmospheric pressure at sea level is 760 mm Hg.

In 3.3.12.3, sea level equivalent of oxygen is defined in terms of the partial pressure at sea level. The mean atmospheric pressure decreases with increasing altitude, as shown in Table 7.4.1.3. The partial pressure of oxygen is 21 percent of the atmospheric pressure. The concentration of added agent, which dilutes air to the sea level limiting partial pressure of oxygen, is given by

\[
\text{vol } \% = \left( \frac{0.21P_{\text{ATM}} - P_{O_2\text{,LIM}}}{0.21P_{\text{ATM}}} \right) \times 100 \tag{A.4.3.4}
\]
where:

\[ P_{\text{ATM}} \] local mean atmospheric pressure [mm Hg (in. Hg)]
\[ P_{O_2,\text{LIM}} \] limiting partial pressure of oxygen corresponding to a sea level exposure time limit [mm Hg (in. Hg)]

The effect of altitude on limiting agent concentrations is given in Table A.4.3.4(b) and Figure A.4.3.4.

### Table A.4.3.4(b) Relationship of Altitude to Atmospheric Pressure, Oxygen Partial Pressure in Air, and Limiting Agent Concentration

<table>
<thead>
<tr>
<th>Altitude Above Sea Level (ft)</th>
<th>( P_{\text{ATM}} ) (mm Hg)</th>
<th>( O_2 ) Partial Pressure in Air (mm Hg)</th>
<th>Limiting Agent Concentration (% vol.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>5 min Exposure ( P(O_2) = 91 \text{ mm Hg} )</td>
</tr>
<tr>
<td>-3,000</td>
<td>840</td>
<td>176.4</td>
<td>48.4</td>
</tr>
<tr>
<td>-2,000</td>
<td>812</td>
<td>170.5</td>
<td>46.6</td>
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<tr>
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### Figure A.4.3.4 Inert Gas Limiting Agent Concentrations at Altitude.

A.5.1.1 The water is required to be equivalent in quality to potable water. The particular hazard being protected or the application might dictate a higher quality of water such as distilled, deionized, or demineralized. In these cases, the storage of water and piping must be compatible with the type of water being used. For example, wet bench
applications or other applications where contamination of process materials could occur due to the use of ionized water, circulating deionized water should be used.

A.5.2 It is recommended to have and in some instances the authority having jurisdiction might require a reserve quantity of inert gas when the time to recharge the inert gas source will unacceptably impact continuation of operations within the protected space.

A.5.4.2.1 Hybrid systems consist of two agents. Some hybrid systems mix the agents at the container location and use one piping network to carry the hybrid mixture to the nozzle. Other hybrid systems use independent pipe networks to carry the separate agents to the nozzle where they are mixed.

Some plastic pipe materials, such as CPVC and PVC, are not appropriate for use with compressed gases, and the failure mode could be catastrophic. The designer should consider the pipe manufacturer’s recommendations for the specific media or agent being used and the maximum service pressure.

A.5.4.3.1 The designer should consider credible failure scenarios that could require pressure relief, such as failure of a pressure regulator, a flow-control valve, or system controls.

A.5.4.4.2.2 Paragraph 5.4.4.2.2 requires that “the thickness of the piping shall be calculated in accordance with ASME B31.1.” This does not imply that all the provisions of ASME B31.1 are to be applied. Rather it indicates that the formula for pipe wall thickness shall be used. ASME B31.1 also provides tables of allowable stress values for various metallic pipe materials.

To comply with the requirement of 5.4.4.2.2, the guidelines found in the FSSA Pipe Design Handbook for Use with Special Hazard Fire Suppression Systems should be followed. The FSSA Pipe Design Handbook for Use with Special Hazard Fire Suppression Systems provides guidance on how to apply ASME B31.1 in a uniform and consistent manner in the selection of acceptable types of pipe and tubing used in special hazard fire suppression systems.

A.5.6.8.2 One objective of predischarge alarms and time delays is to prevent human exposure to atmospheres with oxygen concentrations lower than 19.5 percent. Where a predischarge time delay is required, it should delay the discharge of the system for sufficient time to allow evacuation of personnel from areas within the spaces most remote from the exits.

Hazards associated with fast growth fires would include, but not be limited to, flammable liquid storage or transfer areas and aerosol filling areas.

A.5.6.8.4 Abort switches are a means of delaying automatic agent release. The function of an abort switch should be approved by the authority having jurisdiction. The following two abort functions have been approved by listing agencies. Other abort functions might be possible.

(1) UL — A releasing event starts a predischarge timer. If the abort switch is activated, the timer counts down to 10 seconds and holds there. When the abort switch is released, the timer resumes the countdown from 10 seconds and is irreversible.

(2) IRI — The abort type functions the same way as the UL type, except that the abort switch will not function unless it is activated before a second input device is activated in a “cross-zone” detection scheme.

A.5.6.9.1 Required auxiliary functions include any functions that must occur to ensure effective control or extinguishment of fire. Examples of required auxiliary functions could be power disconnect, fuel shut-off, HVAC control, damper closure, door closure, and the like.

A.5.6.9.6 Where installations could be exposed to conditions that could lead to loss of integrity of the pneumatic lines, special precautions should be taken to ensure that no loss of integrity will occur.

A.6.1 Currently, no generic design method is recognized for hybrid extinguishing systems. The relationship between flux density or nozzle spacing and performance in controlling fires is not consistent between systems designed by different manufacturers. The system features, such as nozzle spacing, flow rate, droplet size distribution, cone angle, and other characteristics, need to be determined for each manufacturer’s system through full-scale fire testing to obtain a listing for each specific application.
The results of the listing testing should identify the following, as applicable:

1. System flow rate (minimum and maximum)
   (a) Flow rate per unit area
   (b) Flow rate per unit volume
   (c) Water-to-inert ratio

2. System pressure
   (a) Nozzle operating pressure range
   (b) Pump/cylinder operating pressure range
   (c) Pump inlet and outlet pressure and flow rate requirements

3. General water requirements
   (a) Quantity/duration
   (b) Quality
   (c) Temperature

4. General inert gas requirements
   (a) Quantity/duration
   (b) Quality
   (c) Temperature

5. Nozzle characteristics
   (a) Type(s)/model number(s)
   (b) Flow rate (minimum and maximum)
   (c) Operating pressure range

6. Nozzle spray characteristics
   (a) Spray angle
   (b) Drop size distribution
   (c) Momentum/velocity

7. Nozzle installation parameters
   (a) Distance above floor (minimum and maximum)
   (b) Distance below ceiling (minimum and maximum)
   (c) Distance above hazard (minimum and maximum)
   (d) Nozzle spacing (minimum and maximum)
   (e) Orientation
   (f) Minimum distance from walls
   (g) Minimum distance from obstructions

8. Activation device
   (a) Type/model number
(b) Activation, temperature
(c) Activation, smoke obscuration

(9) General design parameters
(a) Pipe requirements
   (1) Size
   (2) Design pressures/wall thicknesses
(b) Fittings
   (1) Type
   (2) Design pressure
(c) Pumps
   (1) Valves, fittings, and filters
   (2) Power requirements
   (3) Operating pressure and flow rates
   (4) Water requirements
(d) Cylinders
   (1) Valves and fittings
   (2) Capacity
   (3) Operating pressures

Requirements for complete hybrid extinguishing systems, including fire test protocols, system component test procedures, and the manufacturer's design and installation manual review, have been published in FM 5580. Other listing organizations generally apply their own requirements.

The test fire hazard reflects the application specified in the listing. The test fires should be chosen such that the performance objectives of the system can be determined. If fire suppression or fire extinguishment is the preferred performance objective, and the fire tests are conducted inside a compartment, the test fires should be chosen such that the influence from the compartment is minimized (i.e., fire size not too large). If fire control is the preferred performance objective, the test fire sizes should be chosen in a way that the system's ability to limit the exposure from the fire can be evaluated (i.e., fire size not too small).

A.7.2.2 Unclosable openings in the enclosure membrane should not exceed the manufacturer's tested tolerance.

A.7.2.3.1 The effect on the water mist density due to filters or equipment installed in a self-contained recirculating ventilation system should be considered.

A.7.3.1(4) The time to extinguishment is intended to be less than the design discharge time.

A.7.4.1.2 The flooding factor can be calculated in accordance with the following equation:

\[ X = \ln \left( \frac{20.95}{C_{\text{oxygen}}} \right) \]  \[ \text{[A.7.4.1.2]} \]

where:
- \( X \) = flooding factor [m³/m³]
- \( C_{\text{oxygen}} \) = design concentration of oxygen at 21°C [% vol/vol]
A.7.4.2.1 A shorter time to discharge the minimum volume of inert gas could be more appropriate for a specific hazard. The risk of delayed extinguishment should be weighed against the effects of increasing the system discharge rate (e.g., enclosure pressurization).

A.7.6.1 Two types of fires can occur in solid fuels: (1) one in which volatile gases resulting from heating or decomposition of the fuel surface are the source of combustion and (2) one in which oxidation occurs at the surface of or in the mass of fuel. The first type of fire is commonly referred to as “flaming” combustion, while the second type is often called “smoldering” or “glowing” combustion. The two types of fires frequently occur concurrently, although one type of burning can precede the other. For example, a wood fire can start as flaming combustion and become smoldering as burning progresses. Conversely, spontaneous ignition in a pile of oily rags can begin as a smoldering fire and break into flames at some later point.

Flaming combustion, because it occurs in the vapor phase, can be extinguished with relatively low levels of hybrid media. In the absence of smoldering combustion, it will stay out. Unlike flaming combustion, smoldering combustion is not subject to immediate extinguishment. Characteristic of this type of combustion is the slow rate of heat losses from the reaction zone. Thus, the fuel remains hot enough to react with oxygen, even though the rate of reaction, which is controlled by diffusion processes, is extremely slow.

Smoldering fires can continue to burn for many weeks — for example, in bales of cotton and jute and heaps of sawdust. A smoldering fire ceases to burn only when either all the available oxygen or fuel has been consumed or the fuel surface is at too low a temperature to react. Smoldering fires usually are extinguished by reducing the fuel temperature, either directly by application of a heat-absorbing medium, such as water, or by blanketing with an inert gas. The inert gas slows the reaction rate to the point where heat generated by oxidation is less than heat losses to surroundings. This causes the temperature to fall below the level necessary for spontaneous ignition after removal of the inert atmosphere.

For the purposes of this standard, smoldering fires are divided into two classes: (1) where the smoldering is not deep seated and (2) deep-seated fires. Whether a fire will become deep seated depends, in part, on the length of time it has been burning before application of the extinguishing agent. This time is usually called the “preburn” time.

Another important variable is the fuel configuration. While wood cribs and pallets are easily extinguished with Class A design concentrations, vertical wood panels closely spaced and parallel can require higher concentrations and long hold times for extinguishment. Fires in boxes of excelsior and in piles of shredded paper also can require higher concentrations and long hold times for extinguishment. In these situations, heat tends to be retained in the fuel array rather than being dissipated to the surroundings. Radiation is an important mechanism for heat removal from smoldering fires.

In order to cool deep-seated fires and to prevent re-ignition of a surface fire, the extinguishing concentration of the hybrid media must be maintained in a defined hazard zone that incorporates the anticipated fire location(s).

A.8.3.2 Test and performance data can be obtained from the manufacturer or listing agency.

A.8.5.4 Most flammable liquids have a boiling point below the autoignition temperature of the fuel. The maximum temperature of the liquid mass is limited to the boiling point. Some fuels, however, have boiling points above their autoignition temperature. These fuels will burn before they boil, and the temperature of the mass of fuel might continue to rise above the autoignition temperature. The resultant “super-heated” mass of fuel will be subject to re-ignition until the fuel has cooled below its autoignition temperature.

The time required for the temperature of such fuels to drop below the autoignition temperature depends on the mass and configuration of the fuel.

A.10.1.5(15) Critical system application criteria define the design basis of the system. This could include the hybrid media density, target flow rate, or other criteria that are critical to fire extinguishment.
A.10.4 Owner’s documentation should provide information to the user or a third party to verify that the system has been designed and installed properly. Manuals also should include operation and maintenance instructions for each piece of equipment or device of the as-built system.

A.10.5.1 Permanent markers do not meet the intent of this requirement, as the ink can degrade over time.

A.11.5.3 It is essential that pipe sealants, Teflon tape, or lubricants not be allowed to enter the pipe network. By leaving the first 3 threads on the end of a pipe devoid of sealant, tape, or lubricant, the possibility of these substances entering the pipe network and plugging small orifices in control devices or discharge nozzles is greatly reduced.

A.11.5.7 See Figure A.11.5.7 and Table A.11.5.7.

![Figure A.11.5.7 Installation Measurements for Application of Table A.11.5.7.](image)

Table A.11.5.7 Recommended Minimum Bending Radii for Different Sizes of Tube

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<th>Tolerance ± (mm)</th>
<th>Wall Thickness, S (mm)</th>
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For U.S. units, 25.4 mm = 1 in.; 0.4536 kg = 1 lb.

A.11.5.8 The FSSA Pipe Design Guide for Use with Special Hazard Fire Suppression Systems provides guidance on pipe hangers and supports, following established industry practices. Additional guidance based on “best industry standard practice” is found in ANSI/MSS SP-58 for locations where seismic qualification is not required or in MSS SP-127 for locations where seismic qualification is required.
A.11.5.8.4.1 A single rigid hanger could be designed to support multiple changes in direction.

A.11.6.4 The strainer or filter can be integral to supplied system components.

A.11.9.2.6 Verification of the connection between the device and the pipe can be achieved by visual inspection or test. Sensors installed in nitrogen piping can be verified by a pneumatic test of the piping system or an abbreviated discharge using inert gas only.

A.11.9.3.2 The pressure test is intended to identify any major leaks in the pipeline that might compromise the proper operation of the system. It is not intended to be a proof pressure test of the strength of the pipeline. The normal operating pressure is the expected pressure in the pipeline during discharge. On systems that have a high-pressure inert gas supply manifold as well as low-pressure piping, the test pressure for the respective sections of pipe should correspond to the normal operating pressure at ambient temperature for that section of pipe.

A.12.1.1 When a hybrid fire-extinguishing system is integrated with other fire protection and life safety systems, NFPA 3 should be referenced for incorporation of the acceptance test into the commissioning plan.

A.12.1.3 Where a hybrid fire-extinguishing system operates in conjunction with other building systems, functions, or components, the final testing should be conducted simultaneously with those systems per NFPA 4.

A.12.2.2.3 Proper shielding and grounding is particularly important if ac and dc wiring are combined in a common conduit or raceway.

A.12.2.2.4 Where measuring field circuitry, the following should apply:

1. All electronic components, such as smoke and flame detectors or special electronic equipment for other detectors or their mounting bases, should be removed.
2. Jumpers should be installed properly to prevent the possibility of damage within these devices.
3. All components should be replaced after measuring.

A.12.2.4.1.1 For engineered systems, the pressure at the most remote nozzle should be measured and verified to be in accordance with the manufacturer's specifications.

A.12.2.4.1.2 Alternative test methods could include the following:

(1) Flowing through a dedicated test nozzle
(2) Flowing inert gas through the water supply piping, in lieu of water
(3) Flowing air, in lieu of inert gas or water

A.13.1.1 Any portion or all of the inspection, testing, and maintenance can be permitted to be contracted with an inspection, testing, and maintenance service. When an inspection, testing, and maintenance service company agrees to perform inspections and tests at a specific frequency required by this standard, the inspection, testing, and maintenance service company should perform all inspections and tests that are required more frequently than the specified frequency. For example, the ITM service provider agrees to perform required inspections and tests on an annual basis. Those inspections and tests required on a daily, weekly, quarterly, and semiannual frequency should also be performed during the annual inspections and tests.

A.13.1.8 It is essential that personnel be trained to maintain the specific make and model of the system in accordance with the system manufacturer's guidelines.

A.13.2.2 An inspection of the system is a quick check to give reasonable assurance that the extinguishing system is fully charged and operable. It is done by seeing that the system is in place, that it has not been actuated or tampered with, and that there is no obvious physical damage or condition to prevent operation. This quick check of the system will generally be done by the owner’s representative.

A.13.2.4.2 It is essential that personnel be trained to maintain the specific make and model of the system in accordance with the system manufacturer’s guidelines.
A.13.3.7 If heat is used for drying, the temperature should not exceed the manufacturer's specification.

A.13.4 One of the major causes of personnel injury and property damage is attributed to the improper handling of agent containers by untrained and unqualified personnel. In the interest of safety and to minimize the potential for personnel injury and property damage, the following guidelines should be adhered to:

1. If any work is to be performed on the fire suppression system, qualified fire service personnel, trained and experienced in the type of equipment installed, should be engaged to do the work.

2. Personnel involved with fire suppression system cylinders must be thoroughly trained in the safe handling of the containers as well as in the proper procedures for installation, removal, handling, shipping, and filling; and connection and removal of other critical devices, such as discharge hoses, control heads, discharge heads, initiators, and anti-recoil devices.

3. The procedures and cautions outlined on the cylinder nameplates and in the operation and maintenance manuals, owner's manuals, service manuals, and service bulletins that are provided by the equipment manufacturer for the specified equipment installed should be followed.

4. Most fire suppression system cylinders containing agent under pressure are furnished with valve outlet anti-recoil devices and in some cases cylinder valve protection caps. Do not disconnect cylinders from the system piping or move or ship the cylinders if the anti-recoil devices or protection caps are missing. Obtain these parts from the distributor of the manufacturer's equipment or the equipment manufacturer. These devices are provided for safety reasons and should be installed at all times, except when the cylinders are connected into the system piping or being filled.

5. All control heads, pressure-operated heads, initiators, discharge heads, or other type of actuation devices should be removed before disconnecting the cylinders from the system piping, and anti-recoil devices and/or protection caps should be immediately installed before the cylinders are moved or shipped. Fire suppression system equipment often varies from manufacturer to manufacturer; therefore, it is important to follow the instructions and procedures provided in the specific equipment manufacturer's manuals. The preceding procedures should be undertaken only by qualified fire suppression system service personnel.

6. Safety is of prime concern. Never assume that a cylinder is empty. Treat all cylinders as if they are fully charged. Inert gas cylinders are under high pressure and can produce high discharge thrusts out of the valve outlet if not handled properly. Remember, pressurized cylinders are extremely hazardous. Failure to follow the equipment manufacturer's instructions and the guidelines contained herein can result in serious bodily injury, death, or property damage.

A.13.7.2 Training should cover the following:

1. Health and safety hazards associated with exposure to extinguishing agent caused by inadvertent system discharge

2. Difficulty in escaping spaces with inward swinging doors that are overpressurized due to an inadvertent system discharge

3. Possible obscuration of vision during system discharge

4. Need to block open doors at all times during maintenance activities

5. Need to verify that a clear escape path exists to compartment access

6. A review of how the system could be accidentally discharged during maintenance, including actions required by rescue personnel should accidental discharge occur

A.13.8 Needed corrections and repairs should be classified as an impairment, critical deficiency, or noncritical deficiency according to the effect on the fire protection system and the nature of the hazard protected.
Impairments are the highest priority problem found during inspection, testing, and maintenance and should be corrected as soon as possible. The fire protection system cannot provide an adequate response to a fire, and implementation of impairment procedures outlined in Chapter 15 is required until the impairment is corrected.

Critical deficiencies need to be corrected in a timely fashion. The fire protection system is still capable of performing, but its performance can be impacted and the implementation of impairment procedures might not be needed. However, special consideration must be given to the hazard in the determination of the classification. A deficiency that is critical for one hazard might be an impairment in another.

Noncritical deficiencies do not affect the performance of the fire protection system but should be corrected in a reasonable time period so that the system can be properly inspected, tested, and maintained.

Assembly occupancies, health care facilities, prisons, high-rise buildings, other occupancies where the life safety exposure is significant, or facilities that cannot be evacuated in a timely manner require special consideration. As an example, a nonfunctioning waterflow alarm might be considered a critical deficiency in a storage warehouse but an impairment in a hospital.

High hazard occupancies where early response to a fire is critical also require special consideration. A small number of painted sprinklers could be considered an impairment for a system protecting a high hazard occupancy but might be considered a critical deficiency in a metal working shop.

Classifications of needed corrections and repairs are shown in Table A.3.3.2.

**A.13.8.1** System deficiencies not explained by normal wear and tear, such as hydraulic shock, can often be indicators of system problems and should be investigated and evaluated by a qualified person or engineer. Failure to address these issues could lead to catastrophic failure.

**A.15.1** The general model for impairment procedures is based on NFPA 25, Chapter 15. It is recognized that hybrid systems will commonly exist alongside water-based fire protection systems and should follow essentially the same impairment procedures.

**A.15.3.1** A clearly visible tag alerts building occupants and the fire department that all or part of the fire protection system is out of service. The tag should be weather resistant, plainly visible, and of sufficient size [typically 100 mm × 150 mm (4 in. × 6 in.)]. The tag should identify which system is impaired, the date and time impairment began, and the person responsible. Figure A.15.3.1 illustrates a typical impairment tag.
A.15.3.2 An impairment tag should be placed on the fire department connection to alert responding fire fighters of an abnormal condition. An impairment tag that is located on the system riser only could go unnoticed for an extended period if fire fighters encounter difficulty in gaining access to the building or sprinkler control room. [25:A.15.3.2]

A.15.5 The need for temporary fire protection, termination of all hazardous operations, and frequency of inspections in the areas involved should be determined. All work possible should be done in advance to minimize the length of the impairment. Where possible, temporary feedlines should be used to maintain portions of systems while work is completed.

Fire protection systems should not be removed from service when the building is not in use. Where a system that has been out of service for a prolonged period, such as in the case of idle or vacant properties, is returned to service, qualified personnel should be retained to inspect and test the systems.

A.15.5.2(4)(b) A fire watch should consist of trained personnel who continuously patrol the affected area. Ready access to fire extinguishers and the ability to promptly notify the fire department are important items to consider. During the patrol of the area, the person should not only be looking for fire, but making sure that the other fire protection features of the building such as egress routes and alarm systems are available and functioning properly. [25:A.15.5.2(4)(b)]

A.15.5.2(4)(c) Temporary water supplies are possible from a number of sources, including use of a large-diameter hose from a fire hydrant to a fire department connection, use of a portable tank and a portable pump, or use of a standby fire department pumper and/or tanker. [25:A.15.5.2(4)(c)]
A.15.5.2(4)(d) Depending on the use and occupancy of the building, it could be enough in some circumstances to stop certain processes in the building or to cut off the flow of fuel to some machines. It is also helpful to implement “No Smoking” and “No Hot Work” (cutting, grinding, or welding) policies while the system is out of service because these activities are responsible for many fire ignitions. [25:A.15.5.2(4)(d)]

A.15.6 Emergency impairments include, but are not limited to, system leakage, interruption of water supply, frozen or ruptured piping, equipment failure, or other impairments found during inspection, testing, or maintenance activities. [25:A.15.6]

A.15.6.2 When one or more impairments are discovered during inspection, testing, and maintenance activities, the owner or owner’s authorized representative should be notified in writing. See Figure A.15.6.2 for an example of written notification. [25:A.15.6.2]

Figure A.15.6.2 Sample Impairment Notice. [25:Figure A.15.6.2]

A.15.7 Occasionally, fire protection systems in idle or vacant buildings are shut off and drained. When the equipment is eventually restored to service after a long period of not being maintained, it is recommended that qualified personnel or a qualified contractor perform the work.
ANNEX B  Informational Resources

B.1 Referenced Publications. The documents or portions thereof listed in this annex are referenced within the informational sections of this standard and are not part of the requirements of this document unless also listed in Chapter 2 for other reasons.

B.1.1 NFPA Publications. National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471.


B.1.2 Other Publications.

B.1.2.1 ASME Publications. American Society of Mechanical Engineers, Two Park Avenue, New York, NY 10016-5990.


B.1.2.2 FM Approvals Publications. FM Approvals, 1175 Boston-Providence Turnpike, P.O. Box 9102, Norwood, MA 02062 (www.fmapprovals.com).


B.1.2.4 FSSA Publications. Fire Suppression Systems Association, 3601 E. Joppa Road, Baltimore, MD 21234 (www.fssa.net).


B.1.2.5 MSS Publications. Manufacturers Standardization Society (MSS) of the Valve and Fittings Industry, 127 Park St. NE, Vienna VA 22180-4602.


B.2 Informational References.

   The following documents or portions thereof are listed here as informational resources only. They are not a part of the requirements of this document.

   Raia, Peter and Michael J. Gollner, Literature Review on Hybrid Fire Suppression Systems, University of MD/Fire Protection Research Foundation, May 2014.
   VdS 2562en, Procedure for the approval of new extinguishing techniques, VdS Schadenverhütung GmbH, Amsterdamer Str. 172-174, 50735 Köln, Germany, 2013-03.

B.3 References for Extracts in Informational Sections.

MEMORANDUM

TO: Technical Committee on Hybrid (Water and Inert Gas) Fire Extinguishing Systems

FROM: Yiu Lee, Project Administrator

DATE: October 18, 2017

SUBJECT: NFPA 770 Preliminary Draft Release Final Ballot Results

According to the final ballot results, the Preliminary Draft Release ballot did receive the necessary affirmative votes to pass ballot:

19 Members Eligible to Vote

2 Members Not Returned (Groden, Upson)

17 Agree (w/ comment: Kasiski, Taylor)

0 Disagree

0 Abstentions

The Criteria necessary to pass ballot is a simple majority of those eligible to vote. See section 4.3.2.1(b) of the Regulations Governing the Development of NFPA Standards.
Results by Revision

I am in agreement to Release the NFPA 770 Preliminary Draft and approve the assignment to the A2020 revision cycle.

Eligible to Vote: 19
Not Returned: 2
Robert Upson, Walter Groden

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<thead>
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<th>Vote Selection</th>
<th>Votes</th>
<th>Comments</th>
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<tr>
<td>Affirmative with Comment</td>
<td>2</td>
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While voting in the Affirmative, the pre-draft of NFPA 770 has several items that still need to be addressed in the First Revision Cycle for it to be a comprehensive minimum standard to fulfill its' Scope. The deficiencies are as follow: • The definition and/or specifications of hybrid media, which is the foundation of the standard, is not complete to differentiate it from a water mist and inert gas fire extinguishing systems. The current requirement identifies a upper limit boundary for oxygen level from a water mist system. But lacks a requirement to prevent a hybrid fire extinguishing system to also be an inert gas system as identified in NFPA 2001, Clean Agent Extinguishing Systems, since there is no lower boundary requirement. In addition, there needs to be a more comprehensive understanding of water vapor concentration in order to accurately define whether water droplet size is a limiting specification of hybrid media. • In the last meeting the Technical Committee mutually agreed the design of hybrid fire extinguishing systems is to be developed based upon fire test of the given fuel or hazard type. There is no guidance provided in the Standard to achieve this objective. A new Chapter should be included that contains requirements on the parameters of the Design Objectives and Fire Test Protocols. This is especially important since besides having these fire extinguishing systems listed there is the allowance for the manufacturer to conduct testing for submission to the Authority Having Jurisdiction (AHJ). Also equations have been added to Chapter 7 without clearly defining the usage/derivation of the variables, e.g. flooding factor. A new Chapter would provide consistency for the elements and parameters to be included in the fire test protocols that are to be part of this Standard. • The Design Chapters 6, 7 and 8 lack guidance to accurately identify the method(s) currently being used for design of those hybrid systems which are currently listed by an Nationally Recognized Testing Laboratory (NRTL). • The Design Chapters 6, 7 and 8 do not provide requirements for pre-engineered hybrid fire extinguishing systems.
Matthew G. Taylor  
NFPA 770 2017-10-03 Draft Comments Matthew Taylor, Mitsubishi Hitachi Power Systems, Principal Committee Member  
2 Q: Do the dates of publications get checked again just prior to the standard publishing?  
3 R: Define Dry Basis O2 concentration (from 7.3.1)  
4.2.3 Q: Are there commercially available systems/sensors that can measure O2 in a wet environment like this? Consider adding to A.4.2.3? (Also applies to 11.9.4.4)  
4.3.2 R: Apply the same provisions as normally occupied areas where the concentrations are in those same ranges – I.E. add, “Or the same exposure levels and limits as normally occupied areas may also be applied.”  
5.4.4.2.2 R: change “formula” to “formulas”, there are more than one in B31.1 depending on the case.  
5.5.3 Q: Why not use Dv0.99 instead of maximum droplet size, as that’s statistically more reasonable to measure and confirm?  
7.3.1 R: Add maximum protected volume to the list of characteristics.  
7.6.2 R: Add a reference to Class B in this paragraph.  
10.1.3 R: Add a reference to section 4.4 under qualifications for preparation of plans.  
11.6.2 R: Add a similar section for maintaining piping in the temperature range per the manufacturer and allowance to heat the pipe to maintain it. There is a chance that frozen pipe running between the pump skid and protected hazards may be exposed to below-freezing temperatures and could freeze the water during a discharge.  
A.6.1 Q: “...full scale fire testing...” Why isn’t scaled fire testing allowable for hybrid as is it for water mist in FM 5560?  
A.6.1 R: Add Maximum hazard volume and Maximum ceiling height to this list of characteristics as these are key parameters listed in the FM Approvals. Also consider including a note that the maximum hazard volume is the net air space volume that is protected inside a hazard and may discount the volume of large equipment or structure that is in place during system operation.  
Q:Question, R:Recommendation I support the standard as written, all questions and recommendations are optional to be addressed now or could be added to a list of items for the committee to review in the next revision cycle.  

Negative 0  
Abstain 0  

Total Voted : 17  

For Simple majority, the affirmative votes needed are 10