<table>
<thead>
<tr>
<th>18-4-1</th>
<th>Act on the issuance of proposed Tentative Interim Amendment (TIA) to revise Table 17.2.2.1 of the 2016 edition and Table 22.5 of the proposed 2019 edition of NFPA 13, <em>Automatic Sprinkler Systems</em> (TIA No. 1351)</th>
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</thead>
<tbody>
<tr>
<td>18-4-1-a</td>
<td>Text of proposed TIA No. 1351. See Attachment 18-4-1-a</td>
</tr>
<tr>
<td>18-4-1-b</td>
<td>Ballot results of TIA No. 1351. <strong>PASSED</strong> TC Ballot on both technical merit and emergency nature – 34 voting members/28 agree on technical merit/1 disagree/1 abstained/29 agree on emergency nature/1 disagree/0 abstained/4 ballot not returned. <strong>PASSED</strong> CC Ballot on both correlation and emergency nature – 20 voting members/15 agree on correlation/1 disagree/0 abstained/16 agree on emergency nature/0 disagree/0 abstained/4 ballots not returned. See Attachment 18-4-1-b</td>
</tr>
<tr>
<td>18-4-1-c</td>
<td>No comments were received. No Attachment</td>
</tr>
<tr>
<td>18-4-2</td>
<td>Act on the issuance of proposed Tentative Interim Amendment (TIA) to revise sections 2.3.3, 3.3.31, 3.3.37, 3.3.62, 4.5.1 and F.1.2.4 of the 2016 edition of NFPA 31, <em>Standard for the Installation of Oil-Burning Equipment</em> (TIA No. 1355)</td>
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<tr>
<td>18-4-2-a</td>
<td>Text of proposed TIA No. 1355. See Attachment 18-4-2-a</td>
</tr>
<tr>
<td>18-4-2-b</td>
<td>Ballot results of TIA No. 1355. <strong>PASSED</strong> TC Ballot on both technical merit and emergency nature – 24 voting members/21 agree on technical merit/2 disagree/1 abstained/22 agree on emergency nature/1 disagree/1 abstained/0 ballots not returned. See Attachment 18-4-2-b</td>
</tr>
<tr>
<td>18-4-2-c</td>
<td>One comment was received. See Attachment 18-4-2-c</td>
</tr>
<tr>
<td>18-4-3</td>
<td>Act on the issuance of proposed Tentative Interim Amendment (TIA) to add new section 6.13.3.3 to the 2017 edition of NFPA 58, <em>Liquid Petroleum Gas Code</em> (TIA No. 1350)</td>
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<tr>
<td>18-4-3-a</td>
<td>Text of proposed TIA No. 1350. See Attachment 18-4-3-a</td>
</tr>
<tr>
<td>18-4-3-b</td>
<td>Ballot results of TIA No. 1350. <strong>PASSED</strong> TC Ballot on both technical merit and emergency nature – 32 voting members/20 agree on technical merit/4 disagree/0 abstained/18 agree on emergency nature/6 disagree/0 abstained/8 ballots not returned. See Attachment 18-4-3-b</td>
</tr>
<tr>
<td>18-4-3-c</td>
<td>Three comments were received. See Attachment 18-4-3-c</td>
</tr>
<tr>
<td>18-4-4</td>
<td>Act on the issuance of proposed Tentative Interim Amendment (TIA) to revise sections 555.2 and 555.3 of the 2017 edition of NFPA 70, <em>National Electrical Code</em>® (TIA No. 1348)</td>
</tr>
<tr>
<td>18-4-4-a</td>
<td>Text of proposed TIA No. 1348. See Attachment 18-4-4-a</td>
</tr>
<tr>
<td>18-4-4-b</td>
<td>Ballot results of TIA No. 1348. <strong>PASSED</strong> Panel Ballot on both technical merit and emergency nature – 17 voting members/13 agree on technical merit/0 disagree/0 abstained/13 agree on emergency nature/0 disagree/0 abstained/4 ballots not returned. <strong>PASSED</strong> CC Ballot on both correlation and emergency nature – 12 voting members/11 agree on correlation/0 disagree/0 abstained/11 agree on emergency nature/0 disagree/0 abstained/1 ballot not returned. See Attachment 18-4-4-b</td>
</tr>
<tr>
<td>18-4-4-c</td>
<td>Seven comments were received. See Attachment 18-4-4-c</td>
</tr>
</tbody>
</table>
18-4-5 Act on the issuance of proposed Tentative Interim Amendment (TIA) to revise sections 682.2 and 682.15 of the 2017 edition of NFPA 70, *National Electrical Code*® (TIA No. 1349)

18-4-5-a Text of proposed TIA No. 1349. See Attachment 18-4-5-a

18-4-5-b Ballot results of TIA No. 1349. **PASSED** Panel Ballot on both technical merit and emergency nature – 14 voting members/11 agree on technical merit/2 disagree/1 abstained/11 agree on emergency nature/2 disagree/1 abstained/0 ballot not returned. **PASSED** CC Ballot on both correlation and emergency nature – 12 voting members/10 agree on correlation/1 disagree/0 abstained/10 agree on emergency nature/0 disagree/0 abstained/1 ballot not returned. See Attachment 18-4-5-b

18-4-5-c Three comments were received. See Attachment 18-4-5-c

18-4-6 Act on the issuance of proposed Tentative Interim Amendment (TIA) to revise section 11.7.4 and add new section 11.7.4.2 to the 2012, 2015 and 2018 editions of NFPA 99, *Health Care Facilities Code* (TIA No. 1353)

18-4-6-a Text of proposed TIA No. 1353. See Attachment 18-4-6-a

18-4-6-b Ballot results of TIA No. 1353. **PASSED** TC Ballot on both technical merit and emergency nature – 17 voting members/15 agree on technical merit/0 disagree/1 abstained/13 agree on emergency nature/2 disagree/1 abstained/1 ballot not returned. **PASSED** CC Ballot on both correlation and emergency nature – 20 voting members/15 agree on correlation/0 disagree/0 abstained/13 agree on emergency nature/2 disagree/0 abstained/5 ballot not returned. See Attachment 18-4-6-b

18-4-6-c No comment was received. No Attachment

18-4-7 Act on the issuance of proposed Tentative Interim Amendment (TIA) to revise sections 6.3.3.6, 6.3.3.7, 6.3.3.9, A.6.3.3.5, and A.6.3.3.8 of the 2017 edition of NFPA 130, *Fixed Guideway Transit and Passenger Rail Systems* (TIA No. 1354)

18-4-7-a Text of proposed TIA No. 1354. See Attachment 18-4-7-a

18-4-7-b Ballot results of TIA No. 1354. **PASSED** TC Ballot on both technical merit and emergency nature – 30 voting members/22 agree on technical merit/1 disagree/0 abstained/23 agree on emergency nature/0 disagree/0 abstained/7 ballot not returned. See Attachment 18-4-7-b

18-4-7-c No comments were received. No Attachment


18-4-8-a Text of proposed TIA No. 1264R. See Attachment 18-4-8-a

18-4-8-b Ballot results of TIA No. 1264R. **FAILED** TC Ballot on both technical merit and emergency nature – 28 voting members/16 agree on technical merit/8 disagree/2 abstained/15 agree on emergency nature/9 disagree/2 abstained/2 ballots not returned. See Attachment 18-4-8-b

18-4-8-c Three comments were received. See Attachment 18-4-8-c

18-4-9 Discuss the request to process a TIA on the 2011 and 2014 editions of NFPA 25, *Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems*. No Attachment

18-4-10 Consider requests from NFPA Committees to change revision cycles for the following documents:

<table>
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<tr>
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<tbody>
<tr>
<td>1006</td>
<td>2017</td>
<td>F2021</td>
<td>F2021 to A2020</td>
<td>One Time Move</td>
<td>5 to 3 ½ rev cycle</td>
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<tr>
<td>472</td>
<td>2018</td>
<td>A2021</td>
<td>A2021 to F2021</td>
<td>One Time Move</td>
<td>5 to 4 ½ rev cycle</td>
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<tr>
<td>473</td>
<td>2018</td>
<td>A2021</td>
<td>A2021 to F2021</td>
<td>One Time Move</td>
<td>5 to 4 ½ rev cycle</td>
</tr>
</tbody>
</table>

See Attachment 18-4-10

April 4, 2018
Supplemental Agenda-April 10-11, 2018 Standards Council Meeting
Consider the request of David Bernzweig, Columbus Firefighters Union, to develop a standard to establish the minimum requirements for the effective contamination control of personal protective equipment (PPE), accessories, and equipment. A notice was published in *NFPA News* soliciting comments on the proposed project. A total of 147 comments were received. 139 comments supported development of the project, 8 comments did not support the development of the project and 16 of the commenters indicated an interest in participating if a Committee was developed.

A webinar was conducted by NFPA Staff on the campaign for contamination control where nearly 900 people registered. The participants were polled on the need for standardized procedures for fire service contamination. Seventy percent (127 respondents) selected there is a need for a single, new, separate NFPA standard, Seventeen percent (32 respondents) selected there is need to expand NFPA 1582 to address this topic. See Attachment 18-4-11  

Consider the request of Bassem Khalil, Abu Dhabi Civil Defense, to develop a standard to establish protocols and practices for the use of remote video inspections of existing buildings, buildings under construction, and building systems for code compliance. 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 18-4-12

Consider the request of Axel Bogdan, 3M Science, to develop a standard on low pressure dispensing containers. This new project request was approved at the April 2016 Standards Council meeting. The Council directed that a call for members interested in serving on the new Technical Committee on Low Pressure Dispensing Containers (LPDC) be published. The NFPA Staff reported back to the Council that due to the lack of applying participants, interest for a new committee and stand-alone project appeared limited.

After review of all the material before them, the Council instructed the NFPA Staff to return to the Council with a plan on how it is intended to incorporate this material into other NFPA Documents and if those documents scopes need to be changed to accommodate this new material.

In November 2017 the Technical Committee on Aerosol Products was balloted to secure committee member approval for the new project. The ballot passed – 26 voting members/19 affirmative/4 negative/0 abstained/3 ballots not returned.

The Committee is requesting the Council dissolve the LPDC TC and move the document to the Technical Committee on Aerosol Products and work to staff the technical committee with individuals with the expertise to write the document. The scope of the Technical Committee on Aerosol Products will need to be revised to include LPDC work. See Attachment 18-4-13

At the April 2017 Standards Council meeting, the Council approved the request of Chief Otto Drozd, of the Orange County Fire Rescue Department, to develop a standard for preparedness and response to active shooter scenarios and incidents (See Standards Council minute item 17-4-5 and related item 17-4-11-c). The Council approved the title of the standard, *Standard for Preparedness and Response to Active Shooter and/or Hostile Events*, appointed members as the initial roster for the technical committee charged with standards development, and established the Committee’s scope.

At the December 2017 Standards Council meeting the Council issued a decision
to expedite the standards development process to develop a Provisional Standard (PS), NFPA 3000 (PS), *Standard for Preparedness and Response to Active Shooter and/or Hostile Events* (Standards Council Decision D#17-11, Minute Item 17-12-54).

The Council requested that the NFPA Board of Directors adopt by reference Annex B of the 2017 ANSI Essential Requirements, entitled “Procedures for the Development of a Provisional American National Standard (ANS) or a Provisional Amendment to an ANS” for the purpose of authorizing both the processing of NFPA 3000 as a Provisional Standard and the Council to issue a provisional standard on preparedness and response to active shooter and/or hostile events. The Board voted to approve this request on December 22, 2017.


The Technical Committee on Cross Functional Emergency Preparedness and Response was balloted on the release of the Preliminary Draft of NFPA 3000, and is now accepting Public Input. The Committee will hold their First Draft meeting March 19-23, 2018. See Attachment 18-4-14


| 18-4-16 | Consider the request of the Technical Committee on Electronic Safety Equipment to approve the proposed document, NFPA 1802, *Standard on Personal Portable (Hand-Held) Two-Way Radio Communications Devices for Use by Emergency Personnel in the Hazard Zone*, and open it for Public Input, in the Fall 2020 revision cycle. |

| 18-4-17 | Consider the request of the Technical Committee on Hazardous Materials Protective Clothing and Equipment to approve proposed document, NFPA 1891, *Standard on Selection, Care, and Maintenance of Hazardous Materials Clothing and Equipment*, and open it for Public Input, revision Cycle in the Fall 2020 revision cycle. |

| 18-4-18 | Review of the Process of Standards Council Decision Making by Suzanne Gallagher, Associate General Counsel. No Attachment |

| 18-4-19 | **Annual 2018 Revision Cycle Consent Standards** that did not receive NITMAMs, will be letter balloted by the Council with an **issuance date of May 4, 2018** and an **effective date of May 24, 2018**:

| NFPA 13R | Standard for the Installation of Sprinkler Systems in Low-Rise Residential Occupancies |
| NFPA 20 | Standard for the Installation of Stationary Pumps for Fire Protection |
| NFPA 24 | Standard for the Installation of Private Fire Service Mains and Their Appurtenances |
| NFPA 30B | Code for the Manufacture and Storage of Aerosol Products |
| NFPA 40 | Standard for the Storage and Handling of Cellulose Nitrate Film |
| NFPA 77 | Recommended Practice on Static Electricity |
| NFPA 80 | Standard for Fire Doors and Other Opening Protectives |
| NFPA 86 | Standard for Ovens and Furnaces |
| NFPA 88A | Standard for Parking Structures |
| NFPA 105 | Standard for Smoke Door Assemblies and Other Opening Protectives |
| NFPA 150 | Standard on Fire and Life Safety in Animal Housing Facilities |
| NFPA 291 | Recommended Practice for Fire Flow Testing and Marking of Hydrants |
| NFPA 306 | Standard for the Control of Gas Hazards on Vessels |
The following 2018 Annual Revision Cycle Standards passed letter ballot of the Council as Consent Standards with the following issuance dates and effective dates:

- **NFPA 111**  
  *Standard on Stored Electrical Energy Emergency and Standby Power Systems*  
  **Issue Date:** December 24, 2017 and **Effective Date:** January 13, 2018

- **NFPA 610**  
  *Guide for Emergency and Safety Operations at Motorsports Venues*  
  **Issue Date:** November 12, 2017 and **Effective Date:** December 2, 2017

### 18-4-20
Report of the Committee Membership Task Group J. Golinveaux (Chair).

| 18-4-20-a | Act on pending applications for Committee Members. No Attachment |
| 18-4-20-a-1 | Additional information re TC application for EMB-AAA ADDITION  No Attachment |
| 18-4-20-b | Consider a request from NFSA for Multi-Representation on a Committee. No Attachment |
| 18-4-20-c | Discuss the make-up of an NFPA Committee  ADDITION  No Attachment |
| 18-4-20-d | Discuss interest categories of Organizations   ADDITION  No Attachment |

### 18-4-21
Report of the Awards Task Group (K. Bell, Chair).  No Attachment

### 18-4-22
Report of the Policy and Procedures Task Group (D. O’Connor, Chair). No Attachment

### 18-4-23
Hear a report from the Recording Secretary on the December 2017 Minutes, which were approved with an editorial correction. No Attachment

### 18-4-24
The Council will review the dates and locations of upcoming Council meetings, as follows:

- **August 13-15, 2018**
  - Quincy, MA
- **December 12-13, 2018**
  - TBD

### 18-4-25
At the December 2017 meeting, the Council reviewed the request of Richard Davis and Dr. Dong Zeng, FM Global, to develop a project addressing test methods for determining the flammability of interior/exterior wall panels.

After a review of all material submitted, the Council took action to direct the Technical Committee on Fire Tests to review the Factory Mutual Report that was recently released on this subject and report back to the Council at the April 2018 meeting with its findings. The Report – Evaluation of the Fire Performance of Aluminum Cladding Material (ACM)
<p>| | |</p>
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<tbody>
<tr>
<td>The Technical Committee will be meeting March 22-23, 2018 and its findings will be included in the Supplemental Agenda. See Attachment 18-4-25 <strong>SA18-4-25</strong></td>
<td></td>
</tr>
<tr>
<td><strong>18-4-26</strong></td>
<td>Consider the Correlation between NFPA 70 and the Combustible Dust Documents. <strong>ADDITION SA18-4-26</strong></td>
</tr>
</tbody>
</table>
To: Dawn Michele Bellis  
NFPA Standards Council Secretary

From: Richard Serino  
Chair, Technical Committee for Cross Functional Emergency Preparedness and Response

Dear Ms. Bellis:

On November 28, 2017 the NFPA Technical Committee for Cross Functional Emergency Preparedness and Response met to complete the draft process for the new standard NFPA 3000; Standard for Preparedness and Response to Active Shooter and/or Hostile Events. Upon completing the draft, the committee engaged in a discussion regarding the release of the standard and the timeframe it would take to become an ANSI accredited standard. Understanding that the normal development cycle of a document can take anywhere from 18 to 24 months, the Technical Committee voted unanimously to write this letter to request that the Standards Council take any available action within the ANSI regulations to release this standard in the fastest manner possible. The committee believes that there is an emergent need for this standard to be released as soon as possible for a number of reasons.

First and foremost all responders must be provided with guidance that allows them to respond to these types of events as safely and rapidly as possible. In addition they must have the necessary information to safeguard the responders and provide them with the information necessary to safely assist victims.

Active Shooter/hostile events are occurring more frequently than in the past with no sign of them slowing down. They are no longer a once every few years occurrence. They are occurring in cities and towns with populations of hundreds of thousands as well as those with as few as 600 residents. They are occurring in venues where large and small groups assemble, in concert venues, churches, schools and malls to name a few. It is apparent that no community or event is exempt.

The provisions in this standard will result in improvements to the safeguarding of life by better preparing responders to reduce the impact deaths and injuries related to these types of events.

We believe that the standard 24 month NFPA development cycle would cause an undue delay to the release of this information based on the emergent need for this standard.

The Technical Committee is prepared to conduct any additional meetings or development work necessitated to expedite the development process. Please let me know if you have any questions or require any further information.

Sincerely,

Richard Serino
Standards Council Decision (Final): D#17-11
Standards Council Agenda Item: SC#17-12-54
Date of Decision*: 6 December 2017

Proposed NFPA 3000(PS), Standard for Preparedness and Response to Active Shooter and/or Hostile Events

SUMMARY OF ACTION (for convenience only; not part of official decision): The Standards Council has voted to proceed with the development of a standard for emergency preparedness and response to active shooter events as a provisional standard designated as NFPA 3000(PS), Standard for Preparedness and Response to Active Shooter and/or Hostile Events.

HISTORY:
At the meeting of the NFPA Standards Council held April 4-5, 2017, the Council approved the request of Chief Otto Drozd, of the Orange County Fire Rescue Department, to develop a standard for preparedness and response to active shooter scenarios and incidents (See Standards Council minute item 17-4-5 and related item 17-4-11-c). The Council approved the title of the standard, Standard for Preparedness and Response to Active Shooter and/or Hostile Events, appointed members as the initial roster for the technical committee charged with standards development, and established the committee’s scope as follows:

This Committee shall have primary responsibility for documents relating to the preparedness, planning and response to cross functional, multi-discipline, and cross coordinated emergency events that are not already established by the NFPA. This includes all documents that establish criteria for the professional qualifications of those who are responsible for preparation, planning, exercising, and responding to cross functional, cross jurisdictional events.

DECISION:
At the December 5-6, 2017 Council meeting—given the importance, timeliness and potential safety implications of this project, recent active shooter/hostile events, and at the request of the Technical Committee to expedite the standards development process by any appropriate and available means—the Council considered whether steps should be taken to expedite the development of this project. The Council found that there are numerous recent active shooter and hostile events of increasing magnitude occurring across the globe, which are resulting in tragic loss of life as well as countless injuries. The very nature of these unpredictable deadly events and the frequency of recurrence establishes the need for prompt dissemination of standards for preparedness and response. Moreover, the Council found that the urgency in addressing these serious safety concerns warranted the initiation of expedited standards development procedures in light of the nearly two-year minimum time frame for standards development under NFPA’s accredited procedures.

Therefore, the Council requested that the NFPA Board of Directors adopt by reference Annex B of the 2017 ANSI Essential Requirements, entitled “Procedures for the Development of a Provisional American National Standard (ANS) or a Provisional Amendment to an ANS” for the purpose of authorizing both the processing of NFPA 3000 as a Provisional Standard and the Council to issue a provisional standard on preparedness and response to active shooter and/or hostile events. The Board voted to approve this request on December 22, 2017.
The procedures set forth in Annex B, allow an ANSI-accredited standards developer to initially develop a standard as “provisional” standard using the expedited Annex B Procedures (Annex B of the 2017 ANSI Essential Requirements is attached to this decision) provided that all of the following circumstances apply:

- When implementation of the Provisional ANSI or Provisional Amendment may result in an improvement to the safeguarding of life, and there is a well-established need for the prompt dissemination of information that addresses an emergency situation or other special circumstance;
- When the use of the accredited procedures of the ASD would cause an undue delay in the issuance of a related standard; and
- When an ASD supports the development of a Provisional ANSI or a Provisional Amendment with the intention of initiating the processing as an ANSI, of the Provisional ANSI or the Provisional Amendment to an ANSI, within 45 days of its approval date. Processing of the ANSI shall be in accordance with the ASD’s accredited procedures, including ANSI public review in Standards Action and consensus body ballot.

Having found that the circumstances necessary for the processing and development of a provisional standard apply to the subject of preparedness and response to active shooter and hostile events, and as authorized by the Board of Directors the Standards Council directs:

1. That the public notice by B.1.1 of ANSI Annex B Procedures be published announcing the development of a provisional standard designated as NFPA 3000 (PS), Standard for Preparedness and Response to Active Shooter and/or Hostile Events.
2. The Technical Committee on Cross Functional Emergency Preparedness and Response proceed expeditiously to develop a provisional standard on preparedness and response to active shooter and hostile events in accordance with Annex B procedures and that the Technical Committee call for public review of the draft provisional standard.
3. Once the Technical Committee has finalized its work through balloting, as with all NFPA Standards, the provisional standard shall be submitted to the Standards Council for issuance with the expectation that if NFPA 3000 is issued as a provisional standard, that following such issuance, the Standards Council would initiate processing of the standard in accordance with the Regulations Governing the Development of NFPA Standards through normal NFPA ANSI-accredited revision procedures.
Annex B: Procedures for the Development of a Provisional American National Standard (ANS) or a Provisional Amendment to an ANS

B.1 Procedures for the Development of a Provisional American National Standard (ANS) or a Provisional Amendment to an ANS

When an alternative process is not otherwise reflected in an ANSI-Accredited Standards Developer’s (ASD’s) accredited procedures, these procedures set forth the requirements for the issuance of a Provisional ANS or a Provisional Amendment to an existing ANS and may be used when all of the following circumstances apply:

- When implementation of the Provisional ANS or Provisional Amendment may result in an improvement to the safeguarding of life, and there is a well-established need for the prompt dissemination of information that addresses an emergency situation or other special circumstance;

- When the use of the accredited procedures of the ASD would cause an undue delay in the issuance of a related standard; and

- When an ASD supports the development of a Provisional ANS or a Provisional Amendment with the intention of initiating the processing as an ANS, of the Provisional ANS or the Provisional Amendment to an ANS, within 45 days of its approval date. Processing of the ANS shall be in accordance with the ASD’s accredited procedures, including ANSI public review in Standards Action and consensus body ballot.

B.1.1 Public notice

An announcement identifying the standard and describing the circumstances that warrant the issuance of a Provisional ANS or Provisional Amendment shall be provided to ANSI in a timely manner for publication in ANSI's Standards Action along with relevant developer contact information. The requirements in clause 2.5 Notification of standards development and coordination shall not apply with regard to a Provisional ANS or Provisional Amendment that is promulgated in accordance with these procedures.

B.1.2 Minimum consensus body ballot period

A developer using these procedures may utilize the minimum ballot period established by their accredited procedures for an ANS or the consensus body may establish a ballot period that is not less than two weeks.

B.1.3 Approval of a Provisional ANS or a Provisional Amendment to an ANS

Approval of a Provisional ANS or a Provisional Amendment to an ANS requires approval by the consensus body of at least two-thirds of those voting, excluding abstentions.

B.1.4 Comment resolution

All comments accompanying the ballot shall be circulated to the consensus body in order to afford all members an opportunity to respond, reaffirm, or change their vote. For recirculation of comments, a minimum period of not less than one week is required. An attempt to resolve the comments received relative to the Provisional ANS or Provisional Amendment is not required.

B.1.5 Right to appeal

The right to appeal shall not be required in connection with the issuance of a Provisional ANS or Provisional Amendment. After the standard or revision has been issued, if a directly and materially affected party believes that the Provisional ANS or Provisional Amendment should be withdrawn, then the Withdrawal for cause procedures detailed in the ANSI Essential Requirements: Due process requirements for American National Standards shall apply.

B.1.6 Approval notification to ANSI

Notice of the approval of a Provisional ANS or Provisional Amendment by an ASD shall be submitted to ANSI within 5 days of the approval of the document. The notice shall include the designation and title of the new or affected document, the approval date and a certification that the developer has followed these procedures. An informational announcement shall be published in Standards Action.

B.1.7 Processing the Provisional ANS as an American National Standard

The ASD shall initiate the processing, as an ANS, of the Provisional ANS, or the Provisional Amendment to the ANS, within 45 days of its approval date. This processing shall be in accordance with the ASD’s accredited procedures and shall include publication of a PINS, either before or after publication of the initial announcement in
Standards Action that identified the Provisional ANSI or Provisional Amendment to the ANSI and described the circumstances that warranted its issuance per 2.1.1 and before ANSI public review of the draft proposed ANSI or amendment in Standards Action and consensus body ballot. Following the publication of the PINS, all of the other requirements of 2.5 Notification of standards and coordination associated with a PINS apply.

B.1.8 Withdrawal
A Provisional ANSI or Provisional Amendment shall exist for no longer than two years from the date on which it is approved by the ASD. If consensus is achieved and the affected standard (either the Provisional ANSI or the ANSI as modified by the Provisional Amendment) is published as an ANSI, the Provisional ANSI or Provisional Amendment is superseded and shall be withdrawn. If consensus is not achieved, the Provisional ANSI or Provisional Amendment shall be withdrawn at that time, but no later than two years from the date on which it was approved. A notice of the withdrawal shall be published in ANSI's Standards Action.

B.1.9 Identification of a Provisional ANSI or Provisional Amendment
A standard or an amendment to a standard promulgated in accordance with these procedures shall be referred to as a Provisional American National Standard or Provisional Amendment, respectively, and identified clearly as such on the cover or title page. In addition, a standard processed as a Provisional American National Standard, shall be identified by a unique alphanumeric designation in accordance with the following guidelines:

ANSI/ABCD 123 (PS), where ABCD reflects the developer’s acronym.

And an American National Standard with a provisional amendment shall be identified as follows:

ANSI/ABCD 123 (PA)

The following or similar text shall be included in the foreword of a Provisional Standard or adjacent to a Provisional Amendment when included in the text of an ANSI:

“This document or some of the information contained in this document has been processed in accordance with ANSI’s requirements for a Provisional American National Standard or Provisional Amendment to an ANSI. The same or similar document or amendment (as applicable) will undergo the standards development process set forth in the ASD’s accredited procedures. This Provisional ANSI or pertinent Provisional Amendment(s) shall be withdrawn on or before the two year anniversary date of its approval as such.”

The ANSI approval logo and the words “an American National Standard” shall not be used to identify an entire standard that has not received ANSI approval or been approved by an accredited standards developer who has been granted authority to designate its standards as American National Standards.

B.1.10 Audit of Use of Provisional ANSI Process
Evidence of compliance with these procedures shall be retained. This documentation shall be examined during the next scheduled audit of the developer.
Public Notice of the Development of a Provisional American National Standard (ANS) by the National Fire Protection Association

(in accordance with Annex B of the 2017 edition of the ANSI Essential Requirements)

In accordance with Annex B, Procedures for the Development of a Provisional American National Standard (ANS) or a Provisional Amendment to an ANS, of the ANSI Essential Requirements, the National Fire Protection Association is preparing a Provisional Standard for Preparedness and Response to Active Shooter and/or Hostile Events, NFPA 3000. The Standards Council found that there are numerous recent active shooter and hostile events of increasing magnitude occurring globally, which are resulting in tragic loss of life, as well as countless injuries. The very nature of these unpredictable, deadly events and the frequency of recurrence establishes the need for prompt dissemination of standards for preparedness and response. Moreover, the Council found that the urgency in addressing these serious safety concerns warranted the initiation of expedited standards development procedures. The standard is being developed to address preparedness, planning, and response to cross-functional, multi-discipline, and cross-coordinated emergency events that are not already established by the NFPA. This includes provisions that establish criteria for the professional qualifications of those who are responsible for preparation, planning, exercising, and responding to cross-functional, cross-jurisdictional events.

The standard is being processed as a Provisional Standard to ensure the prompt dissemination of new safety criteria. The Technical Committee will meet March 19-23, 2018 at NFPA Headquarters (One Batterymarch Park, Quincy, Massachusetts) with details available at www.nfpa.org/3000. Notice of the approval and issuance of the Provisional Standard by NFPA will be submitted to ANSI within 5 days of the approval and issuance of the standard by the NFPA Standards Council. Within 45 days of NFPA 3000 (PS) being submitted to ANSI, the provisional standard will be entered into the complete NFPA revision process, in accordance with the Regulations Governing the Development of NFPA Standards and as required by ANSI.

For additional information or questions relating to the development of this provisional standard, please contact NFPA Standards Administration, NFPA Headquarters, One Batterymarch Park, Quincy, Massachusetts 02169, 617-984-7246, or via email at stds_admin@nfpa.org. Interested parties should review www.nfpa.org/3000 for updates on progress, including technical committee meeting notices and potential calls for public review and input.
In response to rising toll of active shooter and hostile events, NFPA to fast-track a new standard for unified response

For only the second time in history, NFPA authorizes a provisional standard

January 8, 2018 – A rise in active shooter incidents and the escalating impact of hostile events has prompted the National Fire Protection Association (NFPA) to process NFPA 3000, Standard for Preparedness and Response to Active Shooter and/or Hostile Events as a provisional standard, which means it would be available for use as early as April, 2018. As part of the standards process, NFPA 3000 is now open for input until February 23, 2018.

This marks only the second time in NFPA’s 121-year history that provisional standard status has been authorized by the NFPA Standards Council.

“Hostile events are happening with greater frequency and ferocity today. It’s critical that we take steps to protect people from this increasing threat,” NFPA President Jim Pauley said. “By employing the unified response outlined in NFPA 3000, first responders, facility managers, hospital officials, and community members can minimize risk before, during and after these devastating incidents.” Pauley added, “We were clearly hearing the need for such a standard from those on the frontlines. Through this process, we are able to respond quickly to provide a critical body of knowledge to those who are faced with such horrendous events, ultimately making them and the public safer.”

NFPA 3000 establishes preparedness, response and recovery benchmarks with a focus on integrated protocol, and civilian and responder safety. When issued, the standard will provide guidance for organizing, managing, and sustaining an active preparedness and response program so that the risk, effect, and impact of hostile events can be reduced.

Efforts to establish NFPA 3000 began in October 2016, shortly after the Pulse Nightclub incident. A new NFPA Technical Committee comprised of representatives from the Department of Homeland Security; Department of Justice; the FBI; NSA; national police, fire and EMS organizations; hospitals; private security; and universities, was quickly formed. Initial public comments on the issue were gathered in just four months; the NFPA Standards Council unanimously approved the new standards project; and development of NFPA 3000 began in June.

Although this standard will benefit authorities around the world, mass killings are largely a United States phenomenon accordingly to a recent CNN article. With just five percent of the world’s population, the U.S. holds the unfortunate title to 31 percent of all public mass shootings. Over the course of nearly 17 months from June of 2016 until early November 2017, a trio of domestic perpetrators inflicted nearly half the casualties that the nation witnessed during the course of a thirteen year period from 2000 through 2013. A shooting at the Pulse Nightclub in Orlando, Florida left 49 dead and 58 wounded on June 12, 2016; a massacre in Las Vegas, Nevada on October 1, 2017 killed 58 and wounded 441; and less than 35 days later on November 5, a gunman took the lives of 27 and injured 20 more in Sutherland, Texas. These numbers reflect a dramatic increase based on the 160 incidents, 486 deaths and 557 injuries (not including suspect injuries or deaths) documented by the FBI during the years 2000 through 2013.

“Hostile events are happening with greater frequency and ferocity today. It’s critical that we take steps to protect people from this increasing threat,” NFPA President Jim Pauley said. “By employing the unified response outlined in NFPA 3000, first responders, facility managers, hospital officials, and community members can minimize risk before, during and after these devastating incidents.” Pauley added, “We were clearly hearing the need for such a standard from those on the frontlines. Through this process, we are able to respond quickly to provide a critical body of knowledge to those who are faced with such horrendous events, ultimately making them and the public safer.”

NFPA 3000 establishes preparedness, response and recovery benchmarks with a focus on integrated protocol, and civilian and responder safety. When issued, the standard will provide guidance for organizing, managing, and sustaining an active preparedness and response program so that the risk, effect, and impact of hostile events can be reduced.
NFPA 3000 fact sheet

Active shooter/Hostile event preparedness and response
As more hostile events continue to occur around the world, it is critical for first responders, emergency personnel, facility managers, hospital officials, community members, and others to have the information they need to be prepared when attacks occur. NFPA is developing a new standard – NFPA 3000, Standard for Preparedness and Response to Active Shooter and/or Hostile Events – to address that need.

Download the fact sheet.

Learn more about the world’s first active shooter/hostile event standard by:
• providing input on NFPA 3000;
• downloading and sharing a new fact sheet;
• accessing the full draft text of the proposed standard online for free; and by
• following the development of NFPA 3000 via updates as soon as they are available

For this release and other announcements about NFPA initiatives, research and resources, please visit the NFPA press room.

About the National Fire Protection Association (NFPA)
Founded in 1896, NFPA is a global, nonprofit organization devoted to eliminating death, injury, property and economic loss due to fire, electrical and related hazards. The association delivers information and knowledge through more than 300 consensus codes and standards, research, training, education, outreach and advocacy; and by partnering with others who share an interest in furthering the NFPA mission. For more information, visit www.nfpa.org. All NFPA codes and standards can be viewed online for free at www.nfpa.org/freeaccess.

Contact: Lorraine Carli, Public Affairs Office: +1 617 984-7275

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April 21, 2017

Chief Otto Drozd III, EFO, CFO
Orange County Fire Rescue Department
6590 Amory Court
Winter Park, FL 32792-7426

Dear Chief Drozd:

I am transmitting to you herewith the following action of the Standards Council (April 4-5, 2017):

The Council approved the request of Chief Otto Drozd, Orange County Fire Rescue Department to develop a standard for preparedness and response to active shooter scenarios and incidents. The Council also approved the title of the project and committee scope as follows:

**Approved Committee Title:** Technical Committee for Cross Functional Emergency Preparedness and Response

**Approved Committee Scope:** This Committee shall have primary responsibility for documents relating to the preparedness, planning and response to cross functional, multi-discipline, and cross coordinated emergency events that are not already established by the NFPA. This includes all documents that establish criteria for the professional qualifications of those who are responsible for preparation, planning, exercising, and responding to cross functional, cross jurisdictional events.

Very truly yours,

Linda Fuller, Senior Manager, Standards Operations
Codes and Standards Administration

c: D. Baio, C. Cronin, E. Conlin, M. Housewright, J. Montes
   Interested Parties

17-4-5
TO: John Montes
FROM: Linda Fuller
DATE: April 21, 2017
SUBJECT: Start Up Roster – TC Responding to Active Shooter Incidents

I am transmitting to you herewith the following action of the Standards Council (April 4-5, 2017):

The Council voted to approve the start-up roster for the Technical Committee on Active Shooter Scenarios and Incidents. See Minutes Attachment 17-4-11-a

c: E. Conlin

Encl. Minutes Attachment 17-4-11-a

17-4-11-c
MEMORANDUM

TO: Technical Committee on Cross Functional Emergency Preparedness and Response

FROM: Jenny Depew, Project Administrator

DATE: April 4, 2018

SUBJECT: Ballot to Release NFPA 3000™ (PS) Final Results

According to the final results, the ballot to release NFPA 3000™ (PS), Standard for an Active Shooter/Hostile Event Response (ASHER) Program, 2018 edition has received the necessary affirmative votes to pass ballot. Please see the attached report for the breakdown of the results.

45 Eligible to Vote
4 Not Returned (Beebe, Ciottone, Corbett, Delo)

The criteria necessary to pass ballot is a simple majority of the Technical Committee and Correlating Committee, if any.
This ballot is for formally voting on whether or not you agree with the Committee’s actions to release the draft of NFPA 3000™ (PS), Standard for an Active Shooter/Hostile Event Response (ASHER) Program, 2018 edition

Eligible to Vote: 45
Not Returned : 4 (Beebe, Ciottone, Corbett, Delo)

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Total Voted : 41

For Simple majority, the affirmative votes needed are 23
NFPA 3000™ (PS), Standard for an Active Shooter/Hostile Event Response (ASHER) Program, 2018 edition

Chapter 1 Administration

1.1 Scope. The scope of this standard is limited to the necessary functions and actions related to preparedness, response, and recovery from an active shooter/hostile event response (ASHER).

1.1.1 This standard applies to any community, authority having jurisdiction (AHJ), facility, and member of any organization who responds to or prepares for ASHER incidents.

1.2 Purpose. The purpose of this standard is to identify the program elements necessary to organize, manage, and sustain an ASHER program.

1.2.1 Specific policies, tactics, and protocols shall be the responsibility of the AHJ.

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

1.3.1 Technical documentation shall be submitted to the AHJ to demonstrate equivalency.

1.4* Application. This standard applies to organizations that have a defined responsibility to prepare for, respond to, and recover from ASHER incidents.

1.4.1* All portions of this standard might not apply to every jurisdiction or entity applying the standard.

1.4.2* This standard does not apply to prevention.

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.


C-TECC Tactical Emergency Casualty Care (TECC) Guidelines for First Responders with a Duty to Act, 2017.


National Institute of Justice (NIJ) Standard-0101.06, Ballistic Resistance of Body Armor.


2.4 References for Extracts in Mandatory Sections.


Chapter 3 Definitions

3.1 General. The definitions contained in this chapter apply to the terms used in this standard. Where terms are not defined in this chapter or within another chapter, they should be defined
using their ordinarily accepted meanings within the context in which they are used. *Merriam-Webster's Collegiate Dictionary*, 11th edition, should be used as 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* 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.

3.2.4 Recommended Practice. A document that is similar in content and structure to a code or standard but that contains only nonmandatory provisions using the word “should” to indicate recommendations in the body of the text.

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. Non-mandatory 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 phrase “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 Access and Functional Needs (AFN). Persons requiring special accommodations because of health, social, economic, or language challenges. [1600, 2016]

3.3.2* Active Assailant(s) (AA). One or more individuals actively engaged in harming, killing, or attempting to kill people in a populated area with means other than the use of firearms.

3.3.3 Active Shooter(s) (AS). One or more individuals actively engaged in harming, killing, or attempting to kill people in a populated area with the use of firearm(s).
3.3.4 Active Shooter Hostile Event Response (ASHER). An incident where one or more individuals are or have been actively engaged in harming, killing, or attempting to kill people in a populated area by means such as firearms, explosives, toxic substances, vehicles, edged weapons, fire, or a combination thereof.

3.3.5 Active Shooter/Hostile Events Response (ASHER) Program. A community-based approach to preparedness, mitigation, response, and recovery from an ASHER incident, including public and private partnerships, emergency management, the medical community, emergency responders, and the public.

3.3.6* After Action Report (AAR). A comprehensive document to be completed following a review of a planned or spontaneous operation to include the actions taken (or failures to act and omissions) by personnel, mission results, and any pertinent and relevant information related to same operation, including lessons learned and any training recommendations identified.

3.3.7 Ambulance Exchange Point. A geographical location where transport vehicles are available to transport casualties.

3.3.8* Associated Offsite Operations. Areas of operations that are directly related to the management of the incident but are not in general geographic areas of the hot, warm, and cold zones.

3.3.9* Ballistic Protective Equipment (BPE). An item of personal protective equipment (PPE) intended to protect the wearer from threats that could include ballistic threats, stabbing, fragmentation, or blunt force trauma.

3.3.10 Building Sides. A method of identifying locations in and around a building or structure.

3.3.10.1 Side A (Alpha). Side A, also known as Side Alpha, is normally the front or main entrance/access to the building and usually the side bearing the building address. For buildings with an unusual side A, side A will be identified by the incident commander.

3.3.10.2 Side B (Bravo). Side B, also known as Side Bravo, is the first side of the building or structure clockwise from Side A.

3.3.10.3 Side C (Charlie). Side C, also known as Side Charlie, is the second side of the building or structure clockwise from Side A. Generally, this is the back of the building or structure.

3.3.10.4 Side D (Delta). Side D, also known as Side Delta, is the third side of the building or structure clockwise from Side A. Generally, this is to the right of Side A.

3.3.11 Casualty. A person who is injured or killed at the incident, including as a result of responding to the incident.
3.3.12* Casualty Collection Point (CCP). A temporary location used for the gathering, triage (sorting), medical stabilization, and subsequent evacuation of nearby casualties. Where vehicular access might be limited and is usually occurring in the warm zone.

3.3.13 Clear. A term used by law enforcement where a primary sweep has been conducted by law enforcement and no obvious threats have been found. Law enforcement might or might not maintain a physical presence in a cleared area. Victims might or might not be in a cleared area.

3.3.14 Communications Center. A building or portion of a building that is specifically configured for the primary purpose of providing emergency communications services or public safety answering point (PSAP) services to one or more public safety agencies under the authority or authorities having jurisdiction. [1221, 2016]

3.3.15 Community Resiliency Center (CRC). A place of healing and support dedicated to serving as a resource and referral center for residents, visitors, and responders affected by an ASHER incident. A CRC will also continue to provide ongoing services and assistance to victims, family members, first responders, and community members.

3.3.16 Competence. Possessing knowledge, skills, and judgment needed to perform indicated objectives.

3.3.17* Complex Coordinated Attack. Multiple assailants simultaneously attacking multiple locations typically occurring in a single jurisdictional location.

3.3.18 Concealment. The protection from observation. Anything that prevents direct observation from the threat that might or might not provide protection from the threat.

3.3.19 Consensus Standard. A standard that has been adopted and promulgated by a nationally recognized and accredited standards-producing organization under procedures whereby it can be determined that persons interested and affected by the scope or provisions of the standard have reached substantial agreement on its adoption, it was formulated in a manner that afforded an opportunity for diverse views to be considered, and it has been designated as such.

3.3.20 Contact Team/Law Enforcement Entry Team. A team of law enforcement officers tasked with locating the suspect(s) and neutralizing the threat.

3.3.21 Containment. A law enforcement term that designates a perimeter position of target location(s) to control and isolate suspect movements.

3.3.22* Control Zones. The areas at ASHER incidents within an established perimeter that are designated based upon safety and the degree of hazard.
3.3.23 Coordination. The process of bringing individuals, stakeholders, and resources from different organizations together to work integrally and harmoniously in a common action or effort.

3.3.24 Cover. The protection from firearms or other hostile weapons.

3.3.25 Electronic Premises Security System. A system or portion of a combination system that consists of components and circuits arranged to monitor or control activity at or access to a protected premises. [731, 2017]

3.3.26 Emergency Operations Center (EOC). The physical location at which the coordination of information and resources to support incident management (on-scene operations) activities normally takes place.

3.3.27 Evacuation Corridor. A pathway secured by law enforcement for the purpose of accessing and removing victims.

3.3.28 Evaluate. The process of assessing or judging the effectiveness or need of an action or course of action within the training and capabilities of the emergency responder.

3.3.29 Extraction Team/Litter Bearers. Personnel used to move the injured/uninjured to an area of safety.

3.3.30 Family Assistance Center. A physical and/or virtual center where victims and family members can seek referrals to FEMA and local services for mental health counseling, health care, and child care; legal, travel, creditor, employee, and financial planning assistance; and information on insurance benefits, IRS and tax policies, social security and disability, and so forth.

3.3.31 Fusion Center. A focal point within the state, region, and/or major urban area for the receipt, analysis, gathering, and sharing of threat-related information between the federal government and state, local, tribal, territorial, and private sector partners.

3.3.32* Hazardous Device. A device placed or fabricated in an improvised or modified manner incorporating destructive, lethal, noxious, energetic, or incendiary materials and designed to destroy, incapacitate, harass, or distract.

3.3.33* Hospital. A building or portion thereof used on a 24-hour basis for the medical, psychiatric, obstetrical, or surgical care of four or more inpatients. [101, 2018]

3.3.34 Incident Command Post. A stationary work location used by the incident commander or a Unified Command for the purpose of command and control.

3.3.35 Incident Command System (ICS). A specific component of an incident management system (IMS) designed to enable effective and efficient on-scene incident management by
integrating organizational functions, tactical operations, incident planning, incident logistics, and administrative tasks within a common organizational structure.

3.3.36 Incident Commander (IC). The individual, regardless of rank, responsible for all incident activities, including the development of strategies and tactics and the ordering and the release of resources.

3.3.37 Incident Management System (IMS). A process that defines the roles and responsibilities to be assumed by personnel and the operating procedures to be used in the management and direction of emergency operations to include the Incident Command System (ICS), Unified Command, multi-agency coordination system, training, and management of resources.

3.3.38 Individual First Aid Kit (IFAK). A first responder’s personal first aid kit.

3.3.39 Joint Information Center (JIC). A location used to coordinate critical emergency information, crisis communications, and public affairs functions.

3.3.40 Law Enforcement Rescue. A warm or hot zone response modality in which law enforcement officers form teams for the purpose of triage, providing life-threatening treatment, and extraction of victims.

3.3.41 Mutual Aid. When agencies and/or jurisdictions assist one another on request by furnishing personnel, equipment, and/or expertise in a specified manner.

3.3.42 National Incident Management System (NIMS). A comprehensive, national approach to incident management that is applicable at all jurisdictional levels and across functional disciplines. It is intended to be applicable across a full spectrum of potential incidents, hazards, and impacts, regardless of size, location or complexity; improve coordination and cooperation between public and private entities in a variety of incident management activities; and provide common standard for overall incident management.

3.3.43 Notification and Reunification Center. A secure facility in a centralized location that provides information about missing or unaccounted-for persons and the deceased and that helps reunite victims with their loved ones. Notification/reunification centers also help displaced disaster survivors, including children, to re-establish contact with their family and friends after a period of separation.

3.3.44 Patient. A person who requires medical attention.

3.3.45 Personal Protective Equipment (PPE). Equipment worn to minimize exposure to hazards that cause serious injuries and illnesses.

3.3.46 Plan.
3.3.46.1 Emergency Action Plan (EAP). A document to facilitate and organize employer and employee actions during workplace emergencies.

3.3.46.2 Emergency Operations Plan (EOP). A document that assigns responsibility to organizations and individuals, sets forth lines of authority and organizational relationships, describes how people and property are protected, identifies personnel, equipment, facilities, supplies, and other resources, and reconciles requirements with other jurisdictions.

3.3.46.3 Incident Action Plan (IAP). A verbal plan, written plan, or combination of both that is updated throughout the incident and reflects the overall incident strategy, tactics, risk management, and member safety requirements approved by the incident commander. [1600, 2016]

3.3.47 Protected Corridor Operations. A warm zone response concept in which law enforcement forms a secure path through which fire and EMS responders can care for and extract victims.

3.3.48 Protected Island Operations. A warm zone response concept in which law enforcement forms a secure perimeter around fire and EMS responders.

3.3.49* Rescue Task Force (RTF). A combination of fire and/or EMS personnel and law enforcement who provide force protection. The RTF could provide the following tasks: threat-based care, triage, and extracting victims to a casualty collection point or other designated location. The RTF could also have other tactical objectives such as breaching, utility control, managing building systems, and fire control.

3.3.50 Risk Assessment. The process of hazard identification and the analysis of probabilities, vulnerabilities, and impacts. [1600, 2016]

3.3.51 Scenario. A sequence or synopsis of actual or imagined events used in the field or classroom to provide information necessary to meet student competencies; can be based upon threat assessment.

3.3.52* Secured. A law enforcement term for a geographic location where law enforcement has found no obvious threat and maintains a constant presence. This is an area where a secondary clear has not yet occurred.

3.3.53 Specialized Teams. A law enforcement unit or team responsible for specialized tactics at high-risk incidents; also known as law enforcement special response team (SRT) or special weapons and tactics (SWAT).

3.3.54 Threat-Based Care. Medical care provided as determined by the conditions that are present.
3.3.55 Treatment Area. Location for the treatment of victims after extraction and sorting, prior to loading for transport to definitive care.

3.3.56 Triage. To sift and sort; can occur in multiple phases and is a constant and re-occurring.

3.3.57 Unified Command. An authority structure in which the role of incident commander is shared by individuals from all responding organizations responsible for the incident, operating together to develop a single incident action plan. During an ASHER incident, Unified Command generally consists of law enforcement, fire, and EMS representatives at a minimum.

3.3.58* Unified Command Post. The field location at which the primary tactical level, on-scene unified incident command functions are performed.

3.3.59* Victim. A person who is directly or proximately harmed in the incident/crime and is used by law enforcement for the purpose of the classification of crimes.

3.3.60* Victim Advocate. Professionals trained to support victims of crime.

3.3.61* Victim Navigator. Serves as the point of contact for individuals and families impacted by mass violence or terrorism incidents.

3.3.62 Witness. A person who has information or evidence regarding an event or incident.

3.3.63 Witness Interview/Debrief Area. A location where individuals with knowledge of or involvement in the incident assemble.

3.3.64 Zones.

3.3.64.1* Hot Zone. An area where there is a known hazard or direct and immediate life threat.

3.3.64.2* Warm Zone. An area where there is the potential for a hazard or an indirect threat to life.

3.3.64.3* Cold Zone. Areas where there is little or no threat due to geographic distance from the threat or the area has been secured by law enforcement.

Chapter 4 ASHER Program Development Process

4.1 Administration.

4.1.1 Scope. This chapter outlines the process to develop an ASHER program administration.

4.1.2 Purpose. This chapter provides organizations including AHJs and stakeholders with a framework for developing an ASHER program.

4.2 ASHER Program Organizational Statement. The organization and/or jurisdiction shall maintain a documented policy that establishes the following:

(1) Existence of the ASHER program
(2) Services that the ASHER program will provide
(3) List of ASHER program stakeholders
(4) Functions that ASHER program stakeholders are expected to perform
(5) Risk assessment in accordance with Chapter 5
(6) Planning and coordination in accordance with Chapter 6
(7) Resource management in accordance with Chapter 7
(8) Unified Command policies in accordance with Chapter 8
(9) Facility preparedness in accordance with Chapter 9
(10) Financial management in accordance with Chapter 10
(11) Pre-, during, and post-event communications procedures in accordance with Chapter 11 and 17
(12) First responder and public training programs in accordance with Chapters 12, 13, and 15
(13) Use of personal protective equipment (PPE) in accordance with Chapter 14
(14) Public education in accordance with Chapter 16
(15) Continuity of operation in accordance with Chapter 18
(16) Hospital preparedness and response in accordance with Chapter 19
(17) Family notification/reunification and family assistance procedures in accordance with Chapter 20

Chapter 5 Risk Assessment

5.1 Administration.
5.1.1* Scope.
5.1.1.1 This chapter applies to those responsible for organizing, managing, and sustaining an ASHER prevention, preparedness, mitigation, and recovery program.
5.1.1.2 The chapter provides requirements for assessing a community's and a facility's risks associated with an ASHER incident.

5.1.2 Purpose. This chapter provides the requirements for conducting a community's and a facility's risk assessment, including hazard identification, vulnerability assessment, consequence identification, and risk analysis.
5.1.2.1 A community risk assessment characterizes the likelihood and the impact associated with an ASHER incident on the community.
5.1.2.2 Community risk assessment influences all phases of an ASHER preparedness program: prevention, preparedness, mitigation, response, and recovery.
5.1.2.3 Community risk assessment methods can vary but shall involve the characterization of risk within the organization/jurisdiction.

5.2 Identifying Threats.
5.2.1 Threat identification shall include all identified locations where ASHER incidents are capable of causing death, injury, property or environmental damage, and system disruptions.

5.2.2 At-risk locations that are considered targets, have large numbers of people, are of national significance, are of public significance, or have been the target of threats as gathered by intelligence groups shall be identified.

5.2.2.1 Consideration of surrounding conditions and circumstances adjacent to the potential incident site shall include the following:

(1) Population demographics, including vulnerable groups and neighborhood residents
(2)* Private and public property, including critical facilities, critical infrastructures, and transportation facilities and corridors
(3)* Any positions that would provide a tactical advantage
(4) Environmental features or conditions

5.3 Analyzing the Consequences of an Attack. The consequences of an attack shall be analyzed at each identified location within the organization/jurisdiction to include potential life loss, property loss, economic impact, and system disruptions.

5.3.1 Estimated outcomes shall include the following:

(1) Likely dimensions of the affected area, based on the type and scope of attack
(2) Likely number and types of injuries within the affected area, including people, environment, property, and systems, based on the type and scope of attack
(3) Likely physical, health, and safety hazards within the endangered area
(4) Likely areas of harm within the endangered area
(5) Likely outcomes within the endangered area based on exposures within the areas of harm

5.3.2 Cascading and Complex Coordinated Incidents.

5.3.2.1 It shall be recognized that cascading incidents and complex coordinated terrorist attacks can compound the stresses placed on the response system as a whole.

5.3.2.2 When evaluating cascading incident potential, each location shall be viewed as an individual incident within the context of a larger event.

5.4 Hazard/Risk Assessment (Probability/Consequence).

5.4.1 Community Risk Assessment. Community risk assessment shall be conducted to determine the probability of an incident and consequences of such an attack.

5.4.1.1 Consequences shall be defined as the results of the combination of the risks assessed of the hazard, the duration and nature of the event, property loss, personal injury or loss of life, economic losses, interruption of business and related operations, and damage to the environment.
5.4.1.2 These consequences shall be grouped into the following four categories:

1. Human impacts (civilian and responder injuries and deaths)
2. Economic impacts (property loss, both direct and indirect effects)
3. Psychological impact (public confidence)
4. Functional impact (continuity of operations)

5.4.2* Facility Risk Assessment. For each identified at-risk location, the following information shall be considered in the risk assessment and made available to the AHJ to be considered in the community risk assessment:

1. Occupant/attendee preparedness measures
2. Building owner or owner representative
3. Name or other identification of area/facility
4. Number of occupants/attendees and maximum capacity
5. Age groups of occupants/attendees
6. Security capabilities of venue (cameras, security)
7. Ingress
8. Egress
9. Area accessibility
10. Access control
11. Facility/area use
12. Alarm systems
13. Existence of fire protection systems
14. Building construction type
15. Availability of building map and/or site plan
16. Known intelligence
17. Distance to and capabilities of medical facilities
18. Nearby structures
19. Seasonal weather conditions
20. Emergency responder accessibility
21. Other relevant information as deemed pertinent

5.4.3 Prioritizing Community Vulnerability. Factors used to prioritize the need for individual facility risk assessment shall include, but are not limited to, the following:

1. High occupancy
2. Easy access
3. Public profile
(4) Known target or previous threats (known political and religious affiliation)

(5) Potential for significant public impact

5.4.3.1 Once risk assessment is complete, target hazards shall be ranked based on probability and consequence.

5.4.4* Geographic-Based Analysis. A geographic information system (GIS) provides layers of information that shall be used to map locations and assess potential impact, which allows planners to identify the relationships between the hazards, predict outcomes, visualize scenarios, and plan strategies.

Chapter 6 Planning/Coordination

6.1 Administration.

6.1.1 Scope. This chapter establishes the planning process for those jurisdictions responsible for developing, managing, and sustaining an ASHER program.

6.1.2 Purpose. This chapter addresses emergency operations plans (EOPs), standard operating procedures (SOPs), and standard operating guidelines (SOGs) for the safe, effective response to ASHER incidents.

6.2* Plan Development. The AHJ shall establish an ASHER program plan organized in a logical framework based on its resource capabilities and current risk assessment.

6.2.1* Multi-agency and multidiscipline relationships shall be established for the development of plans, risk assessments, mutual aid agreements, and memorandums of understanding (MOU).

6.2.2 The AHJ shall utilize a formal management systems to ensure that plans are developed, maintained, updated, tested, and activated along the following four-step process:

(1) A needs or gap assessment
(2) Plan development
(3) Implementation
(4) Evaluation

6.2.3 The AHJ’s planning team shall perform a needs or gap assessment of resources necessary to meet the mission identified in the plan.

6.2.4 Plans shall be based on the results of a risk assessment and an analysis of ASHER program capabilities in relation to the risk.

6.2.4.1 This analysis shall include the following at a minimum:

(1) Review of minimum standards for emergency responder competencies
(2) Current capabilities, including other plans and mutual aid of the AHJ
(3) Agreements already in place between agencies
(4) Gaps between minimal standards and current capabilities
(5) Capabilities required to bridge the gaps

6.2.5* Plans shall address coordination between agencies, including the following:
(1) Resource management
(2) Staffing
(3) Cross-training
(4) Health and medical issues
(5) Financial responsibilities and management
(6) Recovery and restoration

6.2.6 Plans shall provide a starting point for multi-agency multidisciplinary operations and be flexible so that they can be adjusted as circumstances and environments change.

6.2.7 Plans shall be organized in a logical framework of functions and topics.

6.3* EOPs. Local jurisdictions shall have an emergency operations plan with guidance for prevention, preparedness, mitigation, response, and recovery.

6.4* SOP Planning Components.

6.4.1 SOPs. SOPs shall be developed as part of the ASHER program to enhance personal safety, provide response consistency, serve as a guide for response action, enhance decisions process, allow for better coordination and interoperability with other agencies and organizations, and ensure unified incident management.

6.4.2* SOPs shall be built around relevant core capabilities as identified by the National Preparedness Goals.

6.5 Termination and Post-Incident Procedures. An ASHER program shall have procedures for specific processes that shall be followed after an active shooter hostile event incident.

6.5.1 Each participating entity shall conduct an immediate operations debrief when operationally possible.

6.5.2* After action reports shall be completed and include input from all participating entities.

6.5.3 Post-incident procedural steps shall be designed to do the following:
(1) Assess and document actions
(2) Restore capabilities
(3) Address problems
(4) Improve future state of preparedness and response capabilities

6.6 Incident Management. An ASHER program shall have an incident command structure that is consistent with the National Incident Management System (NIMS).
6.7* Active Shooter/Hostile Events Response Guideline. Guidelines for response to an incident involving active shooters and hostile events shall be based on available resources, trained personnel, and capabilities necessary to perform assigned tasks.

6.7.1 ASHER program personnel shall identify all hazards associated with the incident and take appropriate actions based on the risk versus reward.

6.7.2* As part of the ASHER program, the AHJ shall develop guidelines and procedures that outline the following:

1. Unified strategic objectives
2. Unified tactical considerations
3. Interoperability among resources
4. Resource needs
5. Dispatching and notification procedures
6. Telecommunicator pre-arrival instructions
7. Predetermined mutual aid requests
8. Emergency operation center activation trigger guidelines for response
9. Secure-in-place
10. Personnel recall
11. Incident stabilization
12. Information sharing
13. Considerations for those with access and functional needs
14. Social media management
15. Family notification and/or reunification
16. Establishing a safe and secure environment
17. Supporting the transition to recovery

6.8* Operational Security. Operation security (OPSEC) shall be an integral element of the organization/jurisdiction preparedness program.

6.9 Information and Intelligence Sharing. The AHJs shall develop and maintain relationships that help facilitate intelligence and information sharing, including formal relationships with government fusion centers, local/regional/state offices of emergency management, and law enforcement/fire/EMS partners to coordinate response plans consistent with current threats.

6.9.1 AHJs shall develop programs and plans that utilize social media for the purpose of intelligence gathering, evidence collection, and information distribution.

Chapter 7 Resource Management
7.1* Administration.

7.1.1 Scope. This chapter provides requirements for developing a resource management plan to ensure that required resources are available to meet program objectives.

7.1.2 Purpose. This chapter addresses needed resources for the safe, effective response to active shooter/hostile events.

7.2* Mutual Aid. ASHER program managers shall coordinate with local response and emergency management agencies and be familiar with existing mutual aid systems and available resources prior to calling for these resources to sustain operations at an existing emergency incident.

7.3* Logistics Management. A thorough and complete record-keeping system shall be established and maintained by AHJs to ensure that supply management is documented.

7.4 Personnel.

7.4.1 The AHJs and responsible parties shall create necessary personnel policies and procedures.

7.4.2 The AHJs shall determine the appropriate personnel to service the ASHER program.

Chapter 8 Incident Management

8.1 Administration.

8.1.1 Scope. This chapter provides requirements for incident management on a command level to ensure that incidents are managed in a unified and organized manner in accordance with all local, state, and federal requirements.

8.1.2 Purpose. This chapter addresses incident management requirements for the safe, effective response to ASHER incidents.

8.2 Application of Unified Command.

8.2.1* The Incident Command System and Unified Command shall be utilized at all cross-functional emergency incidents.

8.2.2 Unified Command shall be applied to drills, exercises, pre-planned events, and other situations that involve hazards similar to those encountered at actual emergency incidents and to simulated incidents that are conducted for training and familiarization purposes.

8.2.3 At an emergency incident involving an active shooter/hostile event, Unified Command shall be responsible for the overall management of the incident and the safety of all members involved at the scene.
8.2.3.1* The command structure shall be set up so that all agency representatives shall share responsibilities to command their resources in a coordinated effort through a common strategy and shared objectives.

8.2.3.2 The goals of Unified Command shall be the following:
(1) Provide for the safety of citizens and responders
(2) Perform situation evaluation that includes risk assessment
(3) Initiate, maintain, and control incident communications
(4) Develop an overall strategy and incident action plan, which includes managing resources, maintaining an effective span of control, maintaining direct supervision over the entire incident, and designating supervisors in charge of specific areas or functions
(5) Ensure personnel and resource accountability
(6) Review, evaluate, and revise the incident action plan as required
(7) Coordinate public information
(8) Maintain, transfer, and terminate command

8.3 Incident Size-Up. A size-up shall be conducted initially and ongoing throughout the incident until such time as the incident is determined to be under control by Unified Command.

8.3.1 The elements of size-up shall include but not be limited to the following:
(1) Major incident notification as classified by the AHJ in the ASHER program
(2)* Specific location and characteristics
(3) Type of incident
(4) Known hazards and the number of potential assailants and their location
(5) Access and staging for incoming units
(6) Approximate number of victims
(7) Additional resources needed

8.4 Establishing Unified Command. The AHJ for those agencies responsible for ASHER mitigation shall establish practices to ensure early integration within the Unified Command process.

8.4.1* Unified Command shall meet the requirements of NFPA 1561 and shall be established with written standard operating procedures applying to all members involved in emergency operations within the AHJ.

8.4.2 Unified Command shall be comprised of the following essential disciplines, if applicable:
(1) Fire
(2) EMS
(3) Law enforcement
(4) Emergency management

(5)* Additional participating or coordinating agencies as dictated by the needs of the incident

8.4.3 The Unified Command shall remain co-located until the incident is concluded, if applicable.

8.4.4* Each discipline shall evaluate the incident from their perspective, and these independent evaluations shall be combined to form an incident action plan (IAP).

8.4.4.1 This coordinated response shall include each discipline and shall be an ongoing process until such time as the incident is concluded.

8.4.5 As incidents evolve in size and complexity, the Unified Command shall divide the incident into geographical or functional level components, or both, as necessary.

8.5 Transfer of Command. The transfer of command shall not eliminate the need for Unified Command to remain co-located for the duration of the incident.

8.6* Incident Stabilization. It is understood that the need for a Unified Command shall extend past the emergency phase of the incident, which shall be dictated by the incident objectives and personnel responsibilities.

8.6.1 After incident stabilization, long-term incident management shall transition to recovery phases as detailed in Chapter 20.

8.6.2 All ASHER incidents shall be considered crime scenes.

8.6.2.1 All personnel shall refrain from unnecessarily disrupting any part of the incident scene.

8.6.2.2 Evidence preservation, witness identification, and overall scene preservation shall be primary considerations after life safety objectives have been met.

8.8 After Action Reports. AHJs that have experienced an ASHER incident shall complete an after action review (AAR) of the event.

8.8.1* The completed AAR shall be shared with all parties involved with the response to the ASHER incident.

8.8.2 Special consideration shall be given to updating ASHER operational training policies and documents to reflect post-incident analysis.

Chapter 9 Facility Preparedness

9.1 Administration.

9.1.1* Scope. The scope of this chapter provides requirements for facility preparedness for onsite ASHER incidents.

9.1.2* Application. This chapter shall apply to facilities at risk for an ASHER incident as determined by the AHJ.

9.2 Facility and Occupancy Characteristics.
9.2.1* Facility preparedness shall consider the following attributes:

1. The number of occupants
2. The ability of the occupants to evacuate, relocate, or secure in place
3. Internal staff response and assistance to include threat recognition and threat reaction procedures and training
4. Notification of occupants
5. The number, location, and contents of bleeding control kits

9.2.2* The mobility characteristics of the occupants shall be evaluated as part of the facility response plan.

9.3* Emergency Action Plans.

9.3.1 Emergency action plans shall include evacuation, relocation, and secure-in-place procedures appropriate to the building, its occupancy, and risk.

9.3.2 The plan for active shooter/hostile events shall include the location and identification of lockable spaces and rooms as well as the locations of exit doors that lead directly to the outside or to a stairwell.

9.3.3 The plan for active shooter/hostile events shall include procedures for locking of doors from inside of the designated areas.

9.3.3.1 Plans and procedures for doors for areas designated in 9.3.3 shall comply with locking and unlocking and unlatching requirements of NFPA 101.

9.3.3.2 The procedures for unlocking doors from outside the designated areas shall be included in the plan.

9.3.4 The plan for active shooter/hostile events shall include identification of doors designated as a means of egress or escape.

9.3.5 Doors in the means of egress shall comply with NFPA 101 requirements for doors in the means of egress.

9.3.6 Facilities shall make emergency action plans available to the AHJ.

9.3.7* Facility emergency action plans shall include the following criteria specific to an ASHER program:

1. Facility assessment to support preparedness, protective actions, and communications
2. Communications plan
3. Alert and warning plans
4. Personal emergency preparedness training for protective and medical actions for individuals to take before, during, and after an ASHER incident.
9.4 Notification. Notification procedures shall be designed to ensure that occupant notification is made in a timely manner.

9.4.1 The notification process or procedure shall be designed so as not to confuse it with the building fire alarm signal.

9.5 Exercise.

9.5.1 Building owners and operators shall annually exercise ASHER plans.

9.5.2 Facilities with multiple buildings in a contiguous location shall annually exercise ASHER plans.

Chapter 10 Financial Management

10.1 Administration.

10.1.1 Scope. This chapter applies to those organizations or jurisdictions responsible for organizing, managing, and sustaining an ASHER program and provides guidance for managing financial elements of the program.

10.1.2 Purpose. This chapter addresses revenue sources, program costs, inventory control, and cost recovery issues to underscore the importance of funding an ASHER program.

10.2 Documentation and Management Policy.

10.2.1 The ASHER program shall have a comprehensive, documented, and consistently maintained financial management policy.

10.2.1.1 The AHJ shall ensure MOUs are in place and address the ASHER program.

10.3 Revenue Sources. Revenue to support the program shall be derived from a number of sources.

10.3.1 Operating Budgets. AHJs with management responsibility for an ASHER program shall ensure they are aware of the applicable financial management policy in accordance with Section 10.2.

10.4 Program Costs. An ASHER program budget shall be categorized by applicable cost centers.

Chapter 11 Communications Center Support

11.1 Administration.

11.1.1 Scope. Communications centers support, manage, and receive emergency requests for services and gather and relay information as appropriate during an ASHER incident.
11.1.2 Purpose. This chapter provides requirements in order for communications centers to be able to meet the mission of supporting, managing, gathering, and relaying information during ASHER incidents.

11.2 Communication Center Coordination.

11.2.1 Communication centers shall incorporate first responder ASHER incident goals and objectives into center operations.

11.2.2 Communications personnel shall participate in ASHER program training not less than annually.

11.3 Communication Relationships. The comprehensive communication plan shall describe and define the communication relationships between all AHJs.

11.4 Communication and Dispatch Systems. Communications and dispatch systems shall follow NFPA 1221.

11.4.1 In planning and preparing for ASHER incidents, AHJs shall ensure they plan for sufficient emergency communications and dispatch capabilities to manage the ASHER incident.

11.4.2 Communications personnel handling an ASHER incident shall follow Chapter 6 of NFPA 1061 regardless of their physical location.


11.6 Operability.

11.6.1 The communications system shall allow for radio communications between all public safety personnel within the confines of SOP and SOG.

11.6.2 If communication system interoperability is not immediately available, the communication center shall ensure that the locations for incident command and other functional elements — staging, tactical, or triage — are relayed to all responding resources.

11.7 High Incident Response Levels. High incident response levels (HIRL) consisting of the appropriate effective response force (ERF) shall be dispatched to suspected ASHER incidents.

11.7.1 Communications centers shall be guided by incident command and SOPs or SOGs regarding the assignment of additional resources to ASHER incidents.

11.7.2 Communication centers shall ensure appropriate levels of coverage and response for other calls for service occurring outside of the active ASHER incident.

Chapter 12 Competencies for Law Enforcement Officers

12.1 Administration.
12.1.1 **Scope.** This chapter applies to all law enforcement officers who in the course of their duties could find themselves responding to an ASHER incident.

12.1.2 **Purpose.** The purpose of the competencies in this chapter is to provide law enforcement officers who, in the course of duties, could encounter ASHER incidents with the knowledge and skills to respond effectively and efficiently in an integrated manner.

12.1.3 **Competencies and Tasks.**

12.1.3.1 Law enforcement officers shall be trained in ASHER in accordance with an established agency policy, including, but is not limited to, the following:

   (1) Tasks
   (2) Competencies

12.1.3.2 Law enforcement officers shall receive training to meet applicable governmental regulations according to federal, state, and local standards.

12.1.3.3 Law enforcement officers shall have knowledge of a threat-based system of medical care that is consistent with the AHJ’s policies and procedures.

Chapter 13 Competencies for Fire and EMS Responders

13.1 **Administration.**

13.1.1.1 **Scope.** This chapter shall apply to all fire and EMS responders who in course of their duties could find themselves responding to an ASHER incident.

13.1.2 **Purpose.** The purpose of the competencies in this chapter is to provide fire and EMS personnel who in the course of duties could encounter ASHER incidents with the knowledge and skills to respond effectively and efficiently in an integrated manner.

13.1.3 **Introduction.**

13.1.3.1 Fire and EMS responders shall be defined as persons who, in the course of their duties, encounter an emergency involving an ASHER incident and who are expected to protect themselves, call for trained personnel, and provide triage, rapid medical intervention, and/or transport of the sick and injured.

13.1.3.2 Fire and EMS responders shall be trained to meet all competencies defined in Section 13.3.

13.1.3.3 Fire and EMS responders shall receive additional training to meet applicable federal, state, local, tribal, and provincial occupational health and safety regulations, scope of practice, and protocol.

13.1.4 **Goal.**
13.1.4.1 The goal of the competencies in Section 13.3 shall be to provide fire and EMS personnel who, in the course of duties, encounter ASHER incidents with the knowledge and skills to respond effectively and efficiently in an integrated manner with law enforcement.  
13.1.4.2 All responders, as part of their minimum competencies, shall understand the concepts and requirements of the hot, warm, and cold zones.  
13.2 Threat-Based Care.  
13.2.1 Fire and EMS providers shall have knowledge of a system where the medical care provided is determined by the hazard or risk that is present.  
13.2.2* The system of care that is used to provide medical aid to self and others, including emergency patient care, shall be in accordance with the guidelines of *Tactical Emergency Casualty Care (TECC) Guidelines for First Responders with a Duty to Act* and *Tactical Emergency Casualty Care (TECC) Guidelines for BLS/ALS Medical Providers*.  
13.3 Tasks.  
13.3.1 Hot Zone Tasks.  
13.3.1.1* No personnel shall operate in the hot zone without the proper training and equipment to address the hazards that they could encounter.  
13.3.1.2 Fire and EMS personnel who are not part of a specialized team, who find themselves unexpectedly in a hot zone, shall be able to perform the following tasks:  
(1) Recognize the zone(s) delineation has changed and communicate  
(2) Take measures to defend or engage in order to minimize injury and harm  
(3) Provide threat-based care  
13.3.2 Warm Zone Tasks. Fire and EMS personnel who are not part of a specialized team, who are assigned to operate in a warm zone, shall be able to perform the following tasks:  
(1) Communicate the following:  
   (a) Determine the potential number and location of casualties.  
   (b) Locate a casualty collection point(s).  
   (c) Identify additional resources required.  
(2) Constantly evaluate the scene for emerging or re-emerging threats.  
(3) Provide threat-based care.  
(4) Recognize conditions that cause the zone to change from warm to hot, conduct an evaluation, and take measures to ensure personal safety as listed in 13.2.1.2.  
13.3.3 Cold Zone Tasks. Fire and EMS personnel who are assigned to operate in a cold zone shall be able to perform the following tasks:  
(1) Establish command and control as detailed in Chapter 8.
(a) This includes operating within the Unified Command structure.
(b) This includes operating as a component within the fire rescue and/or medical branch within the Incident Command System.

(2) Constantly evaluate the scene for emerging or re-emerging threats.
(3) Provide threat-based care.
(4) Triage, treat, and transport victims.
(5) Recognize conditions that cause the zone to change from cold to warm or hot, conduct an evaluation, and take measures to ensure personal safety as listed in 13.2.1.2.

13.3.4 Associated Off-Site Operations. Fire and EMS personnel who are assigned to operate in areas of associated off-site operations shall be able to perform the following tasks:
(1) Provide services as requested by Unified Command that are within their scope of practice and training
(2) Respond to off-site locations for any fire and EMS needs
(3) Participate in Unified Command
(4) Support recovery efforts, victim assistance, and family reunification/notification
(5) Recognize conditions that cause the zone to change to hot, conduct an evaluation, and take measures to ensure personal safety as listed in 13.2.1.2

13.4 Competencies.
13.4.1 Competencies for Fire and EMS Responders when Operating at an Active Shooter/Hostile Event Incident.
13.4.1.1 Fire and EMS responders shall receive training commensurate with the tasks listed in Section 13.3.
13.4.1.2 Fire and EMS responders shall have knowledge of local/regional plans, policies, and procedures, including, but not limited to, the following:
(1) Major incident notification procedures
(2) Available resources
(3) Procedures for activating the local ASHER plan
(4) Communications plan and procedures
(5) Hospital interface communications and procedures
(6) “Mayday” and/or emergency assist procedure
(7) Procedures for checking into the incident with Unified Command for accountability and assignment
(8) Procedures on threat-based care
(9) Procedures for designating zones
(10) Patient distribution plans and procedures
(11) Available medical supplies and resources and their appropriate and prescribed uses within the adopted scope of practice
(12) PPE and ballistic protective equipment (BPE) and their appropriate and prescribed uses
(13) Local policies and procedures for operating with responders from partner agencies and jurisdictions
(14) Warm zone care and rescue concepts, including, but not limited to, the following:
   (a) Rescue task force
   (b) Law enforcement rescue teams
   (c) Protected island operations
   (d) Protected corridor operations
(15) Local law enforcement interface procedures and techniques
(16) Proper vehicle positioning and staging plan
(17) Identification methods to identify responders and roles
(18) Local policies and procedures for the transition to recovery operations
(19) Recognize improvised incendiary devices (IID), explosive devices (IED), unexploded ordnance (UXO), and chemical, biological, radiological, nuclear (CBRN) weapons as single or multiple devices
(20) Understanding of relevant associated off-site operations, including the following:
   (a) Family information centers
   (b) Public information distribution
   (c) Hospitals
   (d) Witness interview and debrief locations
   (e) Transport zones
   (f) Mobile communications support
   (g) Security for these off-site operations
(21) Transition to recovery procedures

13.4.2 Competencies for Fire and EMS Responders when Operating at Vehicle as a Weapon Incidents. Fire and EMS responders shall have knowledge of the following in addition to Section 13.2:
(1) Potential vehicle-borne improvised explosive device (VBIED) identification
(2) Chemical, biological, radiological, nuclear, and explosive (CBRNE) operations and awareness
(3) Building and vehicle stabilization
(4) Vehicle extrication and casualty removal

13.4.3* Competencies for Fire and EMS Responders when Operating at an IED(s) Incident. Fire and EMS responders shall have knowledge of the following in addition to Sections 13.2 and 13.3:

1. Local integrated response procedures necessary to efficiently and effectively mitigate this threat
2. Blast effects and associated injuries
3. Recognition and awareness of multiple devices
4. Local procedures for positioning vehicles
5. Evacuation distance using the DOT Emergency Response Guidebook for IED safe stand-off distance and/or the DHS stand-off chart
6. Local post-blast transition to fire event/structural collapse response procedures

13.4.4 Competencies for Fire and EMS Responders when Operating at Fire and Smoke as a Weapon Incidents. Fire and EMS responders shall have knowledge of the following in addition to Sections 13.2 and 13.3:

1. Fireground operations consistent with NFPA 1710 and NFPA 1720 depending on role (fire vs. EMS only responders)
2. Local integrated response capabilities necessary to efficiently and effectively mitigate this threat
3. Recognize improvised incendiary device (IID), explosive devices (IED), unexploded ordnance (UXO), and chemical, biological, radiological, nuclear (CBRN) weapons as single or multiple devices
4. AHJ's requirements for incidents with fire and smoke as a weapon

13.4.5 Competencies for Fire and EMS Providers when Operating within Immediately Dangerous to Life and Health (IDLH) Atmospheres. Fire and EMS personnel shall have knowledge of the following in addition to Sections 13.2 and 13.3:

1. Proper use of personal protective equipment, to include respiratory protection, for the hazard that will be encountered
2. "Mayday" procedures
3. Rapid intervention crew procedures
4. The hazardous atmosphere and the characteristics of the chemical
5. Sign and symptoms of exposure
6. Decontamination procedures
13.4.5.1 When operating in an IDLH atmosphere, personnel shall have the proper knowledge, skills, abilities, and be equipped with the appropriate personnel protective equipment.

Chapter 14 Personal Protective Equipment (PPE)

14.1 Administration.

14.1.1 Scope. This chapter applies to the AHJ responsible for deploying emergency responders as part of an ASHER program.

14.1.2 Purpose. This chapter provides guidance for acquisition, use, and maintenance of responder PPE.

14.2 General Requirements.

14.2.1 The AHJ shall provide appropriate PPE to personnel exposed to ballistic risks or other hostile threats in accordance with expected duties.

14.2.2 Zones of operation are subject to dynamic and immediate change; therefore, Unified Command shall conduct continuous size-up and threat assessment during an incident. (See Chapter 8.)

14.2.3* Personnel shall be provided and don PPE according to the following zones of operation:

(1) Hot zone. PPE shall include body armor, means of communication, and an identifying garment.

(2) Warm zone. PPE shall include body armor, means of communication, and an identifying garment.

(3) Cold zone. An identifying garment or visible identification shall be required. Additional PPE shall be required as determined by the Unified Command.

14.2.4 All responders expected to operate in the warm and/or hot zones shall have PPE that is readily available for use.

14.2.4.1* The PPE deployment model shall be determined by the AHJ.

14.3 Specification and Type.

14.3.1* Body armor provided shall be at minimum a Level III-A ballistic vest as defined by the National Institute of Justice (NIJ) Standard-0101.06, *Ballistic Resistance of Body Armor*.

14.3.1.1* Body armor shall be NIJ certified, and the model shall be on the NIJ compliant products list.

14.3.2* Personnel assigned to an integrated response team shall be equipped at a minimum with Level III-A body armor tested to NIJ, FBI, and Drug Enforcement Administration (DEA) standards, means of communication, and an identifying garment.
14.3.2.1 RTF shall consider a ballistic helmet, a flash light, medical exam gloves, an individual first-aid kit (IFAK), a radio with shoulder strap, and remote microphones with earpieces for communication.

14.4* Markings. PPE worn externally shall be identified with the agency and/or responder role.

14.5* Ballistic Protective Equipment (BPE) Care, Maintenance, and Replacement. BPE care, maintenance, and replacement shall be done in accordance with NIJ Guide-0101.06, Selection and Application Guide to Ballistic-Resistant Body Armor for Law Enforcement, Corrections and Public Safety, or manufacturer instructions.

14.6 Deviations. Any deviation from this standard where immediate actions could prevent the loss of life and personnel are deployed without BPE into an area where BPE is required by this standard shall require a post-incident analysis and justification of the decision to the AHJ.

Chapter 15 Training

15.1 Administration.

15.1.1 Scope. This chapter applies to those organizations, departments, agencies, and jurisdictions (regardless of size) who are responsible for response to emergency incidents and who develop, plan, and train for an integrated response to active shooter/hostile events.

15.1.1.1* All public safety responders shall receive training to meet applicable governmental regulations according to federal, state, and local standards.

15.1.2 Purpose. This chapter addresses training requirements, training program development, and training records management in support of an ASHER program.

15.2 Scope of Active Shooter/Hostile Events Training. The AHJ shall determine the scope of training needed for the program and its support elements.

15.2.1 Training shall be conducted jointly between all anticipated responding entities and communications personnel.

15.2.2* Training shall be based on risks assessed by the AHJ, tasks to be performed, time available for training, and financial commitment from the AHJ.

15.2.3 The AHJ shall provide initial and periodic joint training for public safety responders for zone operations based on the competencies outlined in Chapters 12 and 13.

15.3* Training Sites. Whenever possible, the AHJ shall arrange for training and exercises at sites within the response jurisdiction in order to increase responder familiarization.

15.4 Training Records Management.
15.4.1 The ASHER program manager shall ensure all training sessions and exercises are documented.

15.4.2 Each training session shall be documented to include the following information:
(1) Date, time(s), and duration of the training
(2) Where the training was conducted
(3) Name, background, and qualifications of training instructor(s)
(4) Training topic or exercise title
(5) Overview of course content
(6) Students who attended
(7) Competencies that were demonstrated

15.4.3 All training records shall be kept in accordance with the agency’s record retention policy.

Chapter 16 Public Education

16.1 Administration.

16.1.1 Scope. This chapter establishes a common set of criteria for considerations related to improving the public's knowledge for preparing and responding to an ASHER incident.

16.1.2 Purpose. This chapter provides the following public education information:
(1) Ways to improve preparedness of the community apart from professional responders to assist in the mitigation, response, and recovery of ASHER incidents
(2) Assistance with terminology, expectations, and appropriate actions to increase the effectiveness of public information

16.2 Community Training and Education. Community education training curriculum shall be developed based on risk assessments conducted in accordance with Chapter 5.

16.2.1 Training shall be divided into the following categories:
(1) Discussion-based training — for public education on terminology and response
(2) Operations-based training — for public education on response
(3)* Self-study training — prepackaged materials intended for self-study by the public.

16.3* Public Education. The public education program shall be implemented to communicate the following:
(1) Different hazards (violence, fire as weapon, explosive, weapons of mass destruction, future threats)
(2) The potential impacts of a hazard
(3) Preparedness information, including the following:
   (a)* Survival strategies and actions
Bleeding control and other interventions aimed at preventable causes of death due to trauma

(c) Recommended equipment

(4) Information needed to develop a preparedness plan

(5) Identification and communication of site/location emergency action plans

(6) Identification of ASHER incidents warning signs and how to report them

(7) What to expect from interactions with emergency communication centers and first responders

16.4 Goal of Curriculum. The goal of the curriculum shall be to create awareness and enhance the knowledge, skills, and abilities of the public to prevent, respond and take protective measures in an active shooter/hostile event.

16.5 Scope and Frequency of Instruction. The scope of the curriculum and the frequency of instruction shall be identified by the AHJ.

Chapter 17 Public Information

17.1* Administration.

17.1.1* Scope. This chapter establishes a common set of criteria for public information during and after an ASHER incident.

17.1.2 Purpose. This chapter provides requirements for ASHER officials acting as the AHJ public information officer (PIO) and/or as part of the communications or media relations team with assigned duties to assist and/or facilitate the appropriate dissemination of information to the public and stakeholders as part of a joint information center (JIC) and joint information system (JIS).

17.2 JIC and JIS Activities. JIC and JIS activities shall include the following:

1. Informing and educating the public through various media in adequate and appropriate means to protect public health and safety, for the duration of the ASHER incident including the appropriate response to inquiries and misinformation

2. Information on action to take to reduce risk and improve safety

3. Assistance with family reunification

4. Identification of official communications paths (central contact for all media) for coordinating and authorizing the release of information, including, but not limited to, the following:

   (a) All activities outlined in Chapter 4 of this standard

   (b) All CRA activities outlined in Chapter 5 of this standard

   (c) Planning and coordination activities outlined in Chapter 6 of this standard
(5) Identification of official communications path for incoming informational inquiries from public in order to ensure that emergency communication centers (e.g., 911) are not overwhelmed
(6)* Reduction or elimination of communication that jeopardizes operations
(7) Leveraging the use of information gained through public sources such as social media

17.3 Warning, Notification, and Crisis Communications. Organizations and the AHJ shall evaluate the need for a mass notification system.

17.3.1 Organizations shall evaluate and plan for people who are not regularly on mass notification systems or who don’t have access to mass notification devices/conduits or vulnerable populations.

17.3.2 Organizations shall develop pre-scripted mass warning messaging that display preparedness measures and protective actions.

17.3.2.1 Pre-scripted mass warning messaging shall include the following:
(1) Who is sending the alert?
(2) What is happening?
(3) Who is affected?
(4) What action should be taken?
(5) Time and date stamp

17.3.3 Organizations shall develop plans with the ability to communicate internally and externally.

17.3.4* Organizations shall test and exercise notification systems and plans on at least an annual basis.

17.3.5* Organizations shall identify specific needs within communities with regulatory or legal obligation for notification and plan for them.

17.4 JIC. Organizations shall have plans to establish a joint information center based on the needs of the incident.

17.4.1 The JIC shall be an early consideration for Unified Command based on the needs and escalation of the incident.

17.4.2 The JIC shall be established away from primary incident operations at an associated off-site operation area.

17.4.3* The PIO shall create, vet, and finalize all forms of communication for the JIC.

17.4.4 The PIO shall coordinate the logistics of a press conference or other public address.

17.4.5 The PIO shall be responsible for ensuring an all clear is communicated across all notification systems.
17.5* Social Media. Social media shall be permitted to serve as an information and intelligence platform for Unified Command.

17.5.1* The PIO shall coordinate the flow of pertinent information for operations and operational security from external sources back to the JIC, if one is established, or to the unified command.

17.5.2* Social media used for the purposes of sharing of information shall be coordinated through the JIC if one has been established or through Unified Command if the JIC has not been established.

17.5.3* AHJs shall have a comprehensive social media and information sharing policy.

17.6 Establishing and Managing a Media Area.

17.6.1 The PIO or their designee shall establish an on-location media area in a cold zone so that the area provides for the safety of all media, and enables the flow of approved communications through the official path.

17.6.2* The PIO or their designee shall manage the media area participants and coordinate the flow of information through the officially established central media contact for the ASHER incident

Chapter 18 Continuity of Operation

18.1 Administration.

18.1.1 Scope. This chapter establishes a common set of criteria for management and restoration of business continuity and continuity of operations of mission-critical services after ASHER incidents.

18.1.2 Purpose. This chapter provides the fundamental criteria for continuity of operation including the planning, implementation, assessment, and maintenance of programs for continuity.

18.2 Continuity.

18.2.1 Continuity plans shall include strategies to continue critical and time-sensitive processes.

18.2.1.1* Continuity plans shall identify and document the following:

(1) Stakeholders that need to be notified
(2) Processes that must be maintained
(3) Roles and responsibilities of the individuals implementing the continuity strategies
(4) Procedures for activating the plan, including the authority for plan activation
(5) Critical and time-sensitive technology, application systems, and information
(6) Security of information
(7) Alternative work sites
(8) Workaround procedures
(9) Vital records
(10) Contact lists
(11) Required personnel
(12) Vendors and contractors supporting continuity
(13) Resources for continued operations
(14) Mutual aid or partnership agreements
(15) Activities to return critical and time-sensitive processes to the original state

[1600:6.9.1.2]
18.2.1.2 Continuity plans shall address supply chain disruption.

Chapter 19 Hospital Preparedness and Response for Out-of-Hospital ASHER Incidents

19.1* Administration.
19.1.1* Scope. This chapter applies to hospitals with the expectations and capabilities to receive patients from an offsite ASHER incident.
19.1.2* Purpose. This chapter provides information and processes necessary to quickly and efficiently utilize a systematic approach to receiving of patients from an ASHER incident.
19.1.2.1* The processes required within Chapter 19 shall be scalable.
19.2* Preparedness and Emergency Management. Hospitals shall plan and exercise with AHJs that have the potential to disburse patients to them in the event of an ASHER incident.
19.2.1 Exercises shall test the components outlined in this chapter.
19.2.2 Hospitals shall have emergency management plans and annexes that are made to integrate with the local AHJ's ASHER incident plans for ASHER incidents in which they are the primary receivers of patients.
19.2.3 Hospitals shall plan to receive spontaneous arrivals as part of their ASHER plan.
19.2.4* Patient distribution shall be exercised based on mass casualty incident plans.
19.3* Patient Distribution. Patient distribution shall be exercised by the AHJ and hospitals based on local mass casualty plans.
19.4* Communications. Hospitals shall have at least two means of communication with public safety entities responsible for patient disbursement in ASHER incidents as determined by the communications plan for the community.
19.4.1 Written procedures for the activation and use of communication systems shall be developed in conjunction with the AHJs responsible for public safety.
19.4.2 Communications systems shall be tested on a monthly basis to ensure functionality.
19.4.3* Hospitals shall assign a dedicated staff member to communicate with patient distribution coordinators and emergency responders throughout the operational period.

19.5* Victim Identification. Medical facilities shall work within applicable laws and regulations to identify victims and share this information with the AHJ based on prescribed practice and procedure.

19.6* Facility Security. Restricted access protocols shall include provisions for existing physical security measures, on-duty staff members, additional first responders, and the availability of supplemental staff from external resources.

19.6.1* Restricted access protocols shall address the following:
(1)* How to limit access for the entire facility
(2) The persons authorized to activate and deactivate restricted access processes
(3) A situational risk assessment and implementation or measures

19.6.2* A protocol for rapid screening of the facility for devices and weapons upon notification of an ASHER incident within or near the facility shall be developed.

19.7 Hospital Command Center/Hospital Incident Command System (HICS).

19.7.1 Hospitals shall activate and utilize an HICS to manage their response to the incident.

19.7.2 Hospitals shall activate their hospital command center to manage the incident if one is available and capable.

Chapter 20 Recovery

20.1 Administration.

20.1.1 Scope. This chapter applies to those organizations and jurisdictions responsible for the execution of recovery operations following an active shooter/hostile event incident.

20.1.1.1* Recovery is organized sequentially into three major subcategories including the following:
(1) Immediate recovery
(2) Early recovery
(3) Continued recovery

20.1.1.1.1 Planning for the transition from response through each recovery stage to steady-state shall be included in ASHER program preparedness and operational plans.

20.1.1.2 Each organization identified in the execution of recovery operations plan shall maintain SOPs and checklists that detail the logistical and administrative support arrangements internal to its organization in support of the ASHER program tasks, including current contact lists for key people within the organizations.
20.1.1.2.1 Organizations shall decide a schedule for planning, training, and exercising recovery operations, as well as updating and distribution of plans.

20.1.2 Purpose. This chapter provides processes necessary to respond to quickly changing priorities and conditions following the ASHER incident.

20.2 Immediate Recovery. Immediate recovery shall be the operational period immediately following the mitigation of threat following the initial ASHER incident.

20.2.1 Immediate recovery operation plans shall include, but are not limited to, the following:

1. Operational security
2. Coordination of primary agencies
3. Utilization of a committee meeting protocol
4. Accountability
5. Damage assessment
6. Primary victim notification and reunification
7. Victim assistance
8. Media and public information coordination

20.2.2* Coordination of primary agencies recovery strategies shall occur immediately following an ASHER incident in order to quickly determine processes, communication lines, and roles of primary agencies.

20.2.2.1 Primary agencies recovery strategies shall include, but are not limited to, the following:

1. Immediate children/victim reunification
2. Crime scene preservation
3. Activation of an assistance center to facilitate reunification and notification

20.2.2.2* Responding organizations shall conduct joint meetings and establish protocols to ensure rapid and effective strategic level planning, sharing, and communication of critical facts.

20.2.2.3* Meetings shall provide for an orderly and controlled multi-directional communication system consistent with practices defined by Unified Command and the JIC.

20.2.2.4 Information from meetings shall be immediately reported to unified command.

20.2.4 Unified Command shall be responsible for the following:

1. Accountability of responders
2. Building occupants
3. Victims
4. Bystanders
5. Communications
6. Employees utilizing various plans or systems, including rally points
(6) Public safety accountability processes
(7) Employee or organizational rosters or lists
(8) Data from security or controlled access points
(9) Joint information and resource sharing

20.2.2.4.1* The need for a state disaster recovery coordinator (SDRC) shall be determined and, if activated, placed inside Unified Command until Unified Command is disbanded.

20.2.2.4.1.1 The SDRC shall have authority over all recovery support activities, initiating and terminating as necessary.

20.2.2.4.1.2 The SDRC shall organize state, federal, and non-governmental organizations (NGO) actions and coordinate requests for assistance from recovering communities.

20.2.2.4.1.3 The SDRC shall help direct state, federal, and other resources while staying in contact with Unified Command.

20.2.2.5 Preliminary damage assessment shall include the following:

(1) Civilian and responder casualties
(2) Bystander and witness effects
(3) Damage to infrastructure
(4) Damage to responding organizations
(5) Geographical area closures
(6) Business impact
(7) Victim and functional needs populations

20.2.2.5.1 The damage assessment shall characterize the overall impact the event had on the organization/jurisdiction.

20.2.2.5.2 Preservation of personal effects shall be considered.

20.2.2.6* Notification and reunification shall be coordinated using an accountability system to determine which victims have been safely evacuated from the incident, building, or area.

20.2.2.7 Implementation of notification and reunification processes shall be incident dependent.

20.2.2.7.1* Command shall consider establishing a reunification location remote from the incident and be included as part of associated off-site operations.

20.2.2.8* Death notifications shall be coordinated and implemented as early as practical by qualified individuals or teams who are familiar with laws regarding the protection of personal identifiable information.

20.2.2.8.1 Death notifications shall be coordinated with the law enforcement agency having jurisdiction and the medical examiner.
20.2.2.8.2 Entities other than law enforcement, the medical examiner, and other trained entities shall not release death notification.

20.2.2.9 Injured victim notification shall be coordinated through the Unified Command via an identified branch or group in coordination with the victim assistance liaison.

20.2.2.10 The plan shall include a provision that organizations responsible for victim services shall be contacted immediately to deploy assistance in the event of an emergency as defined in the emergency response, as well as to maintain a current contact list for those organizations.

20.2.2.11* Access and functional needs populations shall be considered in recovery plans.

20.2.2.12 Considerations shall be given to groups of people who qualify for special protection by law, policy or similar authority.

20.3 Early Recovery. Early recovery shall be the operational period after immediate recovery where processes for agency coordination, meeting protocols, accountability, initial damage assessment, and primary victim assistance including reunification and notifications are actively and proactively being managed.

20.3.1 Early recovery operations shall consider the following:

- Operational security
- Damage assessment
- Public information coordination
- Resource needs analysis
- Analysis of consequences of the event
- Cascading events
- Volunteer management
- Donations management
- Victim advocacy, assistance, and services
- Federal emergency funding opportunities and grants

20.3.2 Resource Needs Analysis.

20.3.2.1 The analysis process shall begin to estimate the impact the ASHER incident has on the organization/jurisdiction, region, state, and/or nation in terms of the following:

- Potential deaths and injuries
- Business impact
- Mental and emotional requirements
- Property damage
- System or geographical area disruptions
- Investigation and scene control management
20.3.2.2 The analysis of consequences of an ASHER incident within an organization/jurisdiction shall include the process of evaluating the likely events that could follow such an event.

20.3.2.2.1 This analysis shall include real and potential mental health and emotional needs of first responders, victims, families of victims, bystanders and witnesses, community members, businesses, and the general public.

20.3.2.2.2 This analysis shall focus on short-term consequences of the events until medium- and long-term consequences analysis can be conducted.

20.3.2.3* Organizations/jurisdictions shall consider that cascading incidents can compound the effects of an event of an ASHER incident by further taxing already stretched resources as additional incidents are triggered by the initial incident.

20.3.2.3.1 These secondary incidents shall require additional resources, management, security, and attention from the organizational/jurisdictional leaders with little or no advance notice.

20.3.2.3.2 Organizations/jurisdictions shall anticipate and maintain heightened awareness of these incidents so that an appropriate and measured response can be executed.

20.3.2.4 Security shall be considered for post-incident operations at locations including, but not limited to, the following:

(1) Crime scene
(2) Investigation areas
(3) Areas closed to public as a result of incident
(4) Associated off-site operational areas such as the following:
   (a) Emergency operations center
   (b) Public or administrative buildings
   (c) Critical transportation access hubs or points
   (d) Hospitals and health care facilities
   (e) Joint information center
   (f) Other areas as determined
   (g) Assistance centers

20.3.2.4.1* Healthcare facilities shall be included in post-incident security plans.

20.3.2.5 Early recovery communications within the Unified Command structure shall provide a framework for collecting, sharing, and disseminating necessary information in coordination with, but not limited to, the following:

(1) Other law enforcement organizations
(2) Prosecutors’ office
(3) Healthcare facilities
(4) Mutual aid organizations
(5) ESF functional units and state authorities

21.3.2.6 Information disseminated shall be vetted, approved, and communicated from one single source.

20.3.2.7 Volunteer and Donation Management.
20.3.2.7.1 The organization/jurisdiction shall plan for the management, screening (which includes criminal background checks), and oversight of volunteers.
20.3.2.7.2* The AHJ shall consider implementing a volunteer reception center that can receive, organize, and direct volunteers.
20.3.2.7.3 A volunteer management system shall properly credential and deploy approved volunteers who have been identified, screened, and trained in advance.
20.3.2.7.4 When a need for utilizing volunteers who have not been previously identified, screened, or trained in advance arises, the ASHER program shall have a plan for a process to approve these volunteers at a designated location.
20.3.2.7.5* Donations.
20.3.2.7.5.1 The AHJ shall plan for the acceptance, control, receipt, storage, distribution, shipping, and disposal of any donations, including monetary and other donor requests.
20.3.2.7.5.2 The coordinating of donation disbursements should be done with the victim advocates who are assigned to the victims and their families.
20.3.2.7.6* A donation management strategy shall be established during emergency planning and prior to the incident occurring.
20.3.2.7.7* Where possible, a central donation system and site shall be established and run by an appropriate agency.
20.3.2.7.8* Volunteer and donation management shall extend into the continued recovery phase.
20.3.2.7.9* Unified Command shall coordinate with the JIC regarding messaging about those wishing to donate, how that can best be accomplished, and what is or is not acceptable.

20.4 Continued Recovery.
20.4.1 Continued recovery shall be the operational period following early recovery when early recovery efforts have been stabilized.
20.4.1.1 There shall be a transition period between early recovery and continued recovery, which shall include regular meetings of the primary agencies and other key individuals, as necessary.
20.4.1.2 The need for the establishment of a long-term recovery committee shall be considered.
20.4.1.3 Continued recovery shall include, but is not limited to, the following:

1. Business impact evaluation
2. Coordination of the restoration, rebuilding, and replacement of facilities, infrastructure, materials, equipment, tools, vendors, and suppliers
3. Restoration of the supply chain
4. Reopening or relocation of vital facilities such as schools, grocery stores, and day cares that allow a community to return to their day-to-day schedule
5. Continuation of communications with stakeholders
6. Roles and responsibilities of the individuals implementing the recovery strategies
7. Internal and external (vendors and contractors) personnel who can support the implementation of recovery strategies and contractual needs
8. Adequate controls to prevent the corruption or unlawful access to the entity’s data during recovery
9. Investigation of fraud associated with disaster assistance and assurances of consumer protection
10. Maintenance of pre-incident controls
11. Long-term victim services
12. Long-term community resiliency
13. Volunteer and donation management
14. Identification of gaps that could require supplemental state or federal assistance

20.4.2 Victim Assistance. Continued victim assistance shall provide for ongoing assessment and services for victims and their families, first responders, and community members.

20.4.2.1* If utilized, a trained victim services liaison, case manager, or advocate shall assist victims and families, including hospitalized victims and those who are not present.

20.4.2.2* Organizations shall ensure that victim services liaisons receive the necessary training and support to meet the comprehensive short and long-term needs of victims and family members.

20.4.2.2.1 This training shall include the emotional and psychological needs by providing mental health support, counseling, screening, and treatment.

20.4.2.2.2 This training shall include atypical victim service providers who meet the unique needs of the population.

20.4.2.3 Continued victim assistance shall require coordination in order to assure the emotional and mental health needs are adequately assessed and served by facilitating timely notification and reunification and providing ongoing screening, counseling, and treatment.
20.4.2.4* Medical and mental health surveillance shall include evaluating, documenting, recordkeeping, and engagement of the physical and mental needs of first responders, victims, families, bystanders, and other community members.

20.4.2.5 Establishment of a family assistance center shall be for the purpose of coordinating long-term assistance.

20.4.2.5.1 The family assistance center shall provide the necessary services and information, including, but not limited to, the following:

(1) Mental health counseling
(2) Health care
(3) Childcare
(4) Crime victim compensation
(5) Assistance with legal matters
(6) Travel
(7) Financial planning to victims, family members, and first responders

20.4.2.5.2* The family assistance center shall organize memorial events, as needed.

20.4.2.5.3* The family assistance center shall be permitted to transition to a community resiliency center (CRC) that provides ongoing services and assistance to victims, family members, first responders, and community members.

20.4.2.5.3.1 A process for the transition from a family assistance center to a CRC shall be established.

20.4.2.5.5 The CRC shall consider access and functional needs populations in recovery. (See A.20.2.2.11.)

20.4.2.5.6 The CRC shall ensure that victims receive the necessary support and services to address symptoms of secondary/vicarious trauma.

20.4.3 Response and Recovery Personnel Emotional, Psychological, and Behavioral Needs. The program shall consider public safety personnel, including first responders, law enforcement, fire, and EMS, as well as mental health providers, medical examiners, prosecutors, funeral directors, 911 operators and telecommunicators, and other response and recovery personnel when developing ongoing support systems.

20.4.3.1 Mental health restoration services shall include the following:

(1) Identifying needs for mental health and emotional/psychological care
(2) Emotional/psychological first aid for first responders, bystanders/witnesses, victims, and families
20.4.3.2* In collaboration with local behavioral boards, community providers and state hospitals and facilities shall coordinate the activities and services necessary to address the behavioral health needs of persons impacted by the incident.

20.4.3.2.1 Coordination shall include representatives and/or other resources to assist local mental health and/or joint alcohol, drug addiction, and behavioral health services in the provision of support services and treatment of victims.

20.4.4 Volunteer and Donation Management. Volunteer and donation management policies shall extend into the recovery phase.

20.4.4.1 The dispersing agency shall coordinate, but is not limited to, the following:

1. The funding process
2. Goods and services

20.4.4.2 Specific donor requests are likely, and a protocol to manage those shall be established.

20.4.4.3 Coordination between the primary agencies and the organization(s) designated to service the centralized collection, disbursement, and proper disposal entity for monetary donations and for the donation of goods and services shall continue.

20.4.5 Criminal Justice System and Victim Support. Criminal justice system and victim support shall be coordinated to assist with victim impact statements, media management, and other victim needs.

20.4.5.1* If there is a trial, then the criminal justice system or primary agency shall provide victims and family members with access to and updates on incident hearings, criminal justice proceedings, and their rights as victims.

20.4.6 Additional Grant Funding. The impacted area and relevant agencies shall identify funding that could be available through local, county, or state/territory government, as well as national nonprofit organizations and corporations.

20.4.6.1 As necessary, funding shall be applied for through the established channels.

20.4.6.2 State Victims of Crime Act compensation and assistance administrators shall coordinate with all other emergency assistance providers in the state to avoid duplication of services.

20.4.7* Unmet Needs. Unmet needs and unique issues in the community that need to be addressed shall be identified, along with the appropriate agencies or funding mechanisms to address these.

20.4.8 Lessons Learned. At various post-response and recovery points, action items and lessons learned shall be captured in the after action report.
20.4.8.1 Baring security concerns, these lessons shall be shared among relevant stakeholders and emergency planners.

20.4.9* Restoring Critical Infrastructure. In order to coordinate the restoration, rebuilding, and replacement of facilities, infrastructure, materials, equipment, tools, vendors, and suppliers, AHJs shall utilize information and analysis of the data from damage assessment and business impact analysis.

20.4.9.1 The AHJ shall coordinate assignment of necessary temporary or permanent repairs to facilities and infrastructure and facilitate coordination of continued supply chain elements.

20.4.10* Communications Plan. AHJs shall develop and execute a communications plan that extends into the continued recovery phase of the active shooter/hostile event incident.

20.4.10.1 This communications plan shall include, but is not limited to, the following:

(1) Consideration for extended victim services
(2) Services for first responders
(3) Funeral and memorial services
(4) Recovery elements
(5) Continuity of operations efforts

20.4.10.2 AHJs shall assure all major elements of continued recovery have been accounted for and have been delegated to qualified organizations, individuals, or authorities.

20.4.10.2.1 These continued recovery elements shall each have a lead authority, an action plan, and a communications plan.

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.1.4 The number and types of agencies and individuals involved is wide and varied. Individuals and agencies can have multiple roles in the process. Those roles can, at the same time, range from being the AHJ in certain elements to a participant or cooperating agency in others.

Application of the standard, and a cornerstone of its development, is collaboration, cooperation, and shared understanding among all participants.

A.1.4.1 Application of this standard cannot occur in an environment of isolation. ASHER incidents are generally not simple, geographically constrained, or effectively manageable without prior planning.
A.1.4.2 Prevention falls under other disciplines that are outside the scope of this standard. For more information on prevention, see www.fbi.gov/file-repository/making-prevention-a-reality.pdf/view.

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.

The AHJ can also include entities such as law enforcement, emergency medical services (EMS), hospitals, educational facilities, or any other organization that has legal responsibility for the safety of the jurisdiction or facility. The AHJ will be determined by the specific context of the requirements set forth in this standard.

A.3.2.3 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 Active Assailant(s) (AA). This could include, but is not limited to, explosives, toxic substances, vehicles, edged weapons, fire, or a combination thereof.
A.3.3.6 After Action Report (AAR). Documentation should be supported with the operational plan, related reports, and any other written or photographic material associated with the operation.

A.3.3.8 Associated Offsite Operations. These sites typically require physical protection and responder and emergency management support. Some examples of areas that are associated offsite operations points include victim assistance center, joint information center, emergency operations center, hospitals, witness and evidence collection centers, and family notification/reunification center.

A.3.3.9 Ballistic Protective Equipment (BPE). BPE can include equipment such as ballistic vest, helmet, and/or shield. These items come in varying degrees of protective levels and design.

A.3.3.12 Casualty Collection Point (CCP). Casualties can be transferred to an ambulance exchange point and/or loading zone from these locations.

A.3.3.17 Complex Coordinated Attack. Frequently this is done using multiple asymmetric attack modes, such as firearms, explosives, fire and smoke as weapon and/or vehicle assaults. It will also often involve coordinated and concurrent attacks on multiple locations, which will usually require multiple attackers.

A.3.3.22 Control Zones. Examples of control zones are hot, warm, and cold zones.

A.3.3.32 Hazardous Device. A hazardous device can also be known as an improvised explosive device (IED) and incorporate vehicles, military weapons, or components, but it is normally devised from non-military components.

A.3.3.33 Hospital. Freestanding emergency departments units should be included in the planning efforts because of the likeliness of receiving patients.

A.3.3.49 Rescue Task Force (RTF). The law enforcement officers (LEO) are assigned as force protection for this team and should not separate from the fire and/or EMS personnel. There could be instances where the warm zone suddenly becomes a hot zone and the LEO must immediately respond to that threat to ensure the safety of the team. Based on the scene, number of victims, and available emergency personnel, there could be more than one RTF assigned. RTFs can operate in the warm zone. Once triage and treatment is complete, the RTF can assist with victim movement.

A.3.3.52 Secured. Secondary clear is a slow methodical, systematic search by law enforcement of the entire affected area ensuring no hostile hazards or threats exist.

A.3.3.58 Unified Command Post. Also known as a location within the cold zone where command and tactical objectives are set.
**A.3.3.59 Victim.** This is a broader term than *casualty* is because it extends beyond just those that are injured or killed. This can also include first responders.

**A.3.3.60 Victim Advocate.** Advocates offer victims information, emotional support, and help finding resources and filling out paperwork. Sometimes, advocates go to court with victims. Advocates might also contact organizations, such as criminal justice or social service agencies, to get help or information for victims. Some advocates staff crisis hotlines, run support groups, or provide in-person counseling. Victim advocates could also be called victim service providers, victim/witness coordinators, or victim/witness specialists.

**A.3.3.61 Victim Navigator.** A victim navigator's role can vary, depending on the nature and scope of the incident, but generally they provide victims, family members, and groups with the psychosocial support needed in the aftermath of mass violence or terrorism. Services include advising family caregivers, providing education and counseling, making referrals for other services, creating plans for treatment or recovery, and following client progress with treatment plans.

**A.3.3.64.1 Hot Zone.** A hot zone is any uncontrolled area where an active shooter/hostile threat could directly engage responders.

**A.3.3.64.2 Warm Zone.** A warm zone is an area where law enforcement has cleared or secured or is geographically isolated from the threat. This zone is clear of an obvious threat, but a threat could emerge or re-emerge.

**A.3.3.64.3 Cold Zone.** Some items that should be located in the cold zone are triage, treatment and transport, patient loading, Unified Command post, and staging.

**A.5.1.1 A risk assessment is the determination of quantitative or qualitative estimate of risk related to a well-defined situation and a recognized threat (also called hazard). Risk assessment requires calculations of two components of risk: the magnitude of the potential loss and the probability that the loss will occur.**

**A.5.2.1 Identifying threats, which is the first step in risk assessment, is a process of collecting information regarding the locations and types of targets within the organization/jurisdiction.**

**A.5.2.2 Examples of at-risk locations include, but are not limited to, sporting events, concert venues, community festivals, public gatherings, religious facilities, protests/demonstrations, educational facilities, schools, and military installations.**

**A.5.2.2.1(2) Examples of critical facilities include homes, schools, hospitals, businesses, and offices. Examples of critical infrastructures include power, communication, and medical.**

**A.5.2.2.1(3) Examples of positions that would provide a tactical advantage include, but are not limited to, elevated viewing positions, underground garages, hiding positions, and nearby rooftops.**
A.5.3 Estimated outcomes should be based on realistic worst-case scenarios, especially for high-frequency, high-risk events.

A.5.4 Operational performance is a function of three considerations: resource availability/reliability, agency capability, and overall operational effectiveness. Resource availability/reliability is the degree to which the resources are ready and available to respond. Department capability is the ability of the resources deployed to manage an incident. Operational effectiveness is the product of availability and capability. It is the outcome achieved by the deployed resources or a measure of the ability to match resources deployed to the risk level to which they are responding. The resources (personnel and equipment) needed for the response must consider the potential outcomes including civilian injury and death, responder injury and death, and property loss. See Figure A.5.4.

Figure A.5.4 Probability/Consequence Resource Distribution Chart.

A.5.4.1 The community risk assessment should be reviewed annually or when changes take place that affect the original assessment. Verifiable resources should be consulted to determine the most common types of active shooter/assaulter attacks in other incidents. This data should then be compared to the sites identified within the AHJ to determine if there is a high or low probability of an incident occurring.

Information on target locations and types can be found from the following sources:

1. Homeland Security Intelligence Network (HSIN)
2. Fusion centers
3. Local emergency management agency personnel
4. Joint counter-terrorism assessment teams
5. Joint terrorism task force
6. National organizations
7. The Federal Bureau of Investigation (FBI)
8. Historical records
9. Local public safety agencies

A.5.4.1.1 An example of property loss is building damage or collapse.

A.5.4.2 Examples of occupant/attendee preparedness measures include, but are not limited to, bleeding control kits, bleeding control training, “run, hide, fight,” and an emergency action plan. More information can be found at [www.dhs.gov/stopthebleed](http://www.dhs.gov/stopthebleed), [www.bleedingcontrol.org](http://www.bleedingcontrol.org), and [www.dhs.gov/sites/default/files/publications/active-shooter-pamphlet-2017-508.pdf](http://www.dhs.gov/sites/default/files/publications/active-shooter-pamphlet-2017-508.pdf).

Facilities identified as needing an individual facility risk assessment should follow a prescribed risk assessment methodology such as, but not limited to, the following:
(1) NFPA 99
(2) Chapter 5 of NFPA 730, which includes guidelines for conducting a facility security vulnerability assessment (SVA), recommends qualifications of the SVA provider, discusses development of a security plan, and addresses planning for acts of intimidation and violence
(3) NFPA 1600
(4) ISO/IEC 31010:2009
(5) CFAI Risk Assessment Manual
(6) ASIS Standard for Risk Assessments
(7) PASS, Guidelines — Risk and Risk Exposure
(8) FEMA CPG 201

A.5.4.2(6) Examples of security capabilities of the venue include, but are not limited to, cameras, security, security guards, and electronic premises security systems.

A.5.4.2(20) Examples of emergency responder accessibility include, but are not limited to, key lock box location, a gated community, secure compound, and access to keys.

A.5.4.4 Geographic threat assessments utilize GISs that allow the user to better visualize, question, analyze, interpret, and understand interdependencies, patterns, and trends.

A.6.2 Plans are not a scripting process to dictate specific actions but rather to scope the multi-agency coordination theme of the plan. The plan can be a component of a comprehensive all-hazards plan. Plans should identify goals, functions, and desired outcomes.

A.6.2.1 Multi-agency and multidiscipline relationships should provide a starting point for planning, training, exercising, and on-scene operations. This will improve integration and response capabilities.

A.6.2.5 Developing relationships between agencies as well as interdisciplinary emergency and nonemergency operations is vital to the success of an organized mission-oriented response.

A.6.3 Plans should mirror the National Response Framework (NRF) and use emergency support functions (ESFs) in annexes. Every state should have an EOP that complements the NRF and that works in concert with FEMA.

A.6.4 SOPs should consider the following items:

(1) Introduction
(2) Scope
(3) Purpose
(4) Definitions
(5) Health and safety of responders
(6) Planning
(7) Training
(8) Exercises
(9) Response information and mutual aid
(10) Operations
(11) Community recovery
(12) Annex
(13) Glossary
(14) Equipment
(15) Documentation
(16) Unique site-specific information
(17) Business continuity during crime scene operations
(18) Mental health support and recovery

A.6.4.2 SOPs enable personnel to operate at an active shooter/hostile event incident where hazards are identified, risks are assessed, and response options are chosen based on the AHJ's concept of operations, available resources and capabilities, and the responder's level of training. NFPA 101 also has requirements for SOPs that should be taken into consideration.

A.6.5.2 The after action report should at least consider the following:
(1) Post-incident debriefing
(2) Interviews
(3) Evidentiary collection
(4) Demobilization
(5) Victim and survivor assistance
(6) Family notification and reunification
(7) Mortuary services
(8) Post-incident recovery and rehab
(9) Social media review
(10) Incident documentation and reporting
(11) Injury/exposure reporting
(12) Peer support debriefing as well as long-term behavioral and mental health interventions
(13) Continuity of operations
(14) Return to normal business

A.6.7 It is possible that additional hazards could be present.

A.6.7.2 The guidelines should focus on ensuring that an entire jurisdiction can respond to any threat or hazard, including those with cascading effects. Emphasis should be on saving and
sustaining lives. Significant incidents demand a much broader set of atypical partners to meet the demands of the incident.

A.6.8 SOGs, SOPs, EOPs and other response program documents can contain critical and sensitive information that can be used by adversaries against emergency responders.

A.7.1 Resource and team typing categories (such as those in NIMS) should describe resources by capacity and capability. Team and resource typing should provide AHJs and on-scene incident management with the following:

1. Enhanced emergency readiness
2. Guidance for equipment purchasing and subsequent training
3. Ease in identifying, requesting, and tracking resources by type

A.7.2 Mutual aid resources should be another source of relief for on-scene personnel.

Some mutual aid relationships might require advance agreements outlining the provision and sharing of services prior to deploying to incidents. An example of this is NIMS on the local, state, and national levels.

A.7.3 Proper documentation of inventory and use is an important aspect of supply management.

An example of prestaging essential supplies for a mass casualty incident might include implementing a free-standing mobile care platform that contains all necessary supplies for treatment, PPE devices, and oxygen delivery. Pre-positioning of these supplies will allow flexibility of deployment from a single location where all aspects of care and safety are already assembled and ready to go. These carts can be positioned in hospitals, schools that are pre-designated as shelters, and public venues such as sports stadiums and convention centers that can be used for evacuation locations.

NIMS also includes information on resource management.

A.8.2.1 While it is acknowledged that many incidents are primarily managed by one agency or type of service (police, fire, EMS) based on the needs of the incident, it should also be understood that at most incidents there is overlap and the continued use of Unified Command at even the most minor of incident will set a framework and existing practice for its use at a major cross-functional incident such as an active shooter/hostile event.

A.8.2.3.1 The Unified Command should be co-located to maintain constant communications and share pertinent information, whenever safe and practical.

A.8.3.1(2) Examples of specific characteristics include whether it is an open area and the structure or facility type.

A.8.4.1 These practices should ensure a face-to-face Unified Command with their functional counterpart(s), whenever possible.
A.8.4.2(5) Examples of this include, but are not limited to, facility managers, school principals, hospital administration, and special event planners.

A.8.4.4 Essential to a successful outcome is the focus on shared information.

A.8.6 As an incident evolves, the disciplines essential for a Unified Command could also evolve.

A.8.8.1 Potential elements of the AAR include the following areas:

1. Post-incident resource analysis
2. Emergency communications center performance
3. Success of mutual aid plan operations and implementation
4. Operations of radio communication equipment
5. Critical incident stress debriefing
6. Media relations and information sharing
7. Adherence to NIMS and other applicable operational standards

For additional considerations reference the ASHER Organizational Statement (Chapter 4)

A.9.1.1 Requirements in building, fire, and life safety codes are intended to establish, among other things, a reasonable level of safety for occupants from fire, explosion, and other hazards, and to provide a reasonable level of safety to fire fighters and emergency responders during emergency operations. Providing protection against ASHER incidents could require protection methods in addition to those required by building, fire, and life safety codes. The additional ASHER incident protection measures should complement, and not conflict with, protection measures in the legally adopted building, fire, and life safety codes. A comprehensive risk assessment is beneficial to ensure each potential hazard is addressed through an all-hazard approach that does not improve risk mitigation for one hazard while reducing the risk mitigation for other hazards.

A.9.1.2 It is ultimately the responsibility of the facility, the stakeholders, and the AHJ to determine that a facility is at risk for an ASHER incident.

A.9.2.1 The plan should consider the nature and character of the occupants. The capability of the occupants has a direct effect on the plan requirements of the building owner and manager. School children (K–12) will need more faculty/staff guidance on the procedures and actions to take. Occupants in a business occupancy, however, are likely to act more independently based on the plan. Responses in a health care/ supervised care occupancy would involve staff assistance to aid patients.

A.9.2.2 Mobility for this discussion is defined as the ability of an individual occupant to mentally comprehend and physically address the efforts required to evacuate, shelter, or defend in place.
in the case of an active shooter/hostile event. The following guidelines can be used for evaluating this characteristic:

(1) **Limited mobility:** Individuals who possess access or functional disabilities who would require the assistance of another individual to evacuate, shelter, or defend in place

(2) **Mobile:** Individuals who possess the capability to evacuate, shelter, or defend in place on their own

**A.9.3** Emergency action plans for hospitals should follow NFPA 99. Other facilities should follow guidelines specific to their occupancy.

**A.9.3.7** Facilities should implement a public access bleeding control kit program that addresses all of the preventable causes of death from bleeding. Emergency action plans are specified in NFPA 101.

**A.9.4.1** Facilities should consider adding new technology to increase their preparedness for active shooter/hostile event incidents. This could include, but is not limited to, the following:

(1) Increased surveillance, including video

(2) Shooter detection systems

(3) Mass notification software

(4) Increased radio frequency identification badging

(5) Access control software

For example, facilities should explore systems that can enhance detection and response capabilities in order to address threats faster and move people to safer locations. NFPA 730 describes construction, protection, and practices intended to reduce security vulnerabilities to life and property. Among other things it covers administrative controls, security perimeters, accessory property and occupancy specific protection. Where provided the electronic premises security systems should be installed tested and maintained in accordance with NFPA 731.

**A.9.5** Exercises can include any of the following:

(1) Discussion-based exercises including the following:
   (a) Seminars
   (b) Workshops
   (c) Tabletop exercises (TTXs)
   (d) Games

(2) Operations-based exercises including the following:
   (a) Drills
   (b) Functional exercises (FEs)
   (c) Full-scale exercises (FSEs)
This information was taken from The Homeland Security Exercise and Evaluation Program (HSEEP).

A.9.5.2 Examples of facilities with multiple buildings in a contiguous location include, but are not limited to, schools, college campuses, hospitals, and military installations. Effective exercises should involve different scenarios and portions of the facility or different buildings.

A.10.1.2 Financial management elements can vary based on the type of organization. Financial management elements encompass funding sources and processes, budgetary processes and procedures, capital and operations budgets, program costs, and cost recovery. A critical challenge for an ASHER program is to ensure adequate funding for assigned missions, tasks, training, and equipment.

A.10.3 Revenue sources can include, but are not limited to, response agency or organization budgets, state or federal grants, cooperative agreements, donations, fees, and cost recovery associated with events. Fiscal responsibilities for organizations participating in a multi-agency program agreement should be well defined and agreed on in advance. ASHER program managers should be aware of alternative revenue sources that might be available.

There could be federal funding available to assist the AHJ in supporting the costs of equipment, staffing, and training. The exact eligibility rules and funding provisions can vary depending on the agency, program, and fiscal year appropriation. Federal agencies such as the Department of Homeland Security and the Department of Justice could also offer technical assistance and training to first responder agencies at the state, local, and tribal levels that address the competencies outlined in Chapters 13 and 14.

The Catalog of Federal Domestic Assistance (CFDA) provides a listing of all federal programs that provide assistance or benefits available to state and local governments, federally recognized Indian tribal governments, and territories (and possessions) of the United States. State and local grant programs vary from jurisdiction to jurisdiction. Some grant programs are supported by private industry and others come from government agencies. Local agency and industry stakeholders should be contacted to determine what grants are available.

A.10.4 These cost centers might include initial and on-going costs related to supplies and equipment, training and exercises, personnel, education and outreach programs, administrative support and services, and fixed asset and capital item maintenance and replacement.

The AHJ can have ordinances or rules that allow for cost recovery where the responsible party provides reimbursement for certain supplies.

A.11.2 911 public safety answering points (PSAPs) are the first point of contact for victims experiencing or fleeing an active shooter/hostile event. Calls can be received by voice or text or
from a third party. In addition to 911 services, communication centers dispatch initial resources and make police, fire, EMS, mutual aid, and administrative notifications.

A.11.2.2 Training for communications center personnel can include exercises, scenarios, formal classes, and online training programs. AHJs are encouraged to include communications center personnel in tabletop exercises, drills, and any other multiagency training.

A.11.3 Such relationships should include managing emergency information, providing a unified communication control system, transmitting safe scene information cross agency with priority, transferring or handling (without duplicating) event information, and ensuring compatibility of communication devices.

A.11.4 Many systems and AHJs are currently utilizing computer-aided dispatch (CAD) systems. The requirements, qualifications, and training referenced in NFPA 1221 regarding incident/tactical dispatch are appropriate for any public safety telecommunicator managing an ASHER incident, even if that dispatcher does not physically respond to the scene.

A.11.4.1 Considerations should include the following:

(1) Implementation and support of text to 911
(2) Implementation and support of NG911
(3) Resiliency and continuity of operations
(4) Incident/tactical dispatch needs
(5) Increased volume of emergency and nonemergency calls
(6) Staffing of emergency communications center
(7) Robust and comprehensive backup and rollover process potentially to a larger center with greater ability to handle a large call volume that meets the standard.
(8) Relief of communications personnel

A.11.4.2 Chapter 6 of NFPA 1061 is being referenced here rather than extracting entire sections of the document.

A.11.5 All systems utilized for emergency incident communications management and support should be configured and enabled to facilitate sharing of incident data and related information.

A.11.6.1 This is where interoperability is important. Preplanning/testing the use and capability of radio communications amongst local and regional responding agencies is important, as is the ability for all (treatment, triage, transport, hospital, etc.) to talk on the radio to each other when they have shared responsibilities.

A.12.1.3.1 Hot Zone Tasks. Law enforcement personnel who are not part of a specialized team and who operate in a hot zone should be able to perform the following tasks:

(1) Recognize the presence of the incident, conduct an evaluation, and respond and appropriately address the threat(s)
(2) Provide incident information to other responding personnel, which can include the following:
   (a) Size-up
   (b) Make a major incident notification
   (c) Identify the exact location of the incident (to reduce multi-incident confusion)
   (d) Identify the type of attack or incident
   (e) Announce the presence of known hazards
   (f) Provide access for incoming responders
   (g) Identify the potential number and location of casualties
   (h) Identify additional resources required
(3) Take measures to ensure their personal safety including donning appropriate PPE and identifiable garments
(4) Provide appropriate direction to victims while gathering information
(5) Establish a hot zone(s) perimeter.
(6) Be prepared to provide self-medical aid or buddy medical aid
   Emphasis should be given to establishing an incident commander until command and control is established as detailed in Chapter 8.

**Warm Zone Tasks.** Law enforcement personnel who are not part of a specialized team and who operate in a warm zone should be able to perform the following tasks:
(1) Establish command and control as detailed in Chapter 8, including the following:
   (a) Operate within in the Unified Command structure.
   (b) Assemble contact teams and/or operate as part of the law enforcement branch within the Incident Command System.
(2) Constantly evaluate the scene for emerging or re-emerging threats
(3) Be able to complete mission-specific tasks for each type of hazard and participate in mission-specific teams
(4) Be able to conduct casualty extraction techniques according to agency policies and procedures
(5) Be able to act as force protection for fire and EMS personnel (rescue task force)
(6) Provide security to a perimeter, corridor(s), or protected island(s) to facilitate emergency medical and fire operations
(7) Provide appropriate direction to victims — egress vs. shelter in place
(8) Communicate with and update Unified Command
(9) Be able to support evidence and witness preservation
**Cold Zone Tasks.** Law enforcement personnel who are not part of a specialized team and who operate in a cold zone should be able to perform the following tasks:

1. Establish command and control as detailed in Chapter 8, including the following:
   a. Operate within the Unified Command structure.
   b. Operate as a component within the law enforcement branch within the Incident Command System.
2. Constantly evaluate the scene for emerging or re-emerging threats.
3. Be able to conduct casualty extraction techniques according to agency policies and procedures.
4. Provide security to a perimeter and to the unified command post.
5. Coordinate emergency vehicular ingress/egress.
6. Be able to support evidence and witness preservation.
7. Be able to screen individuals present for additional threats.
8. Provide security for personal possessions left behind by fleeing victims.
9. Gather victim information and provide support.

**Recommended Associated Off-Site Operations Tasks.** Law enforcement personnel who are not part of a specialized team, who operate in operational areas that are associated but off-site, should be able to perform the following tasks:

1. Operate as a functional position within the Unified Command center.
2. Be able to provide information to the media as prescribed by Unified Command.
3. Be able to provide information to the public as prescribed by Unified Command.
4. Be able to assist with family notification.
5. Be able to conduct witness interviews.
6. Participate in evidence collection.
7. Provide security support to associated sites such as media areas and witness interview areas.
8. Be able to support emotional and behavioral support missions.

**Recommended Competencies.**

**Recommended Competencies for Law Enforcement Personnel When Operating at an ASHER incident.** Law enforcement officers should receive training to be able to conduct tasks in the hot zone. Officers should be knowledgeable of all local plans, policies, and procedures, including the following:

1. Major incident notification procedures.
(2) Available resources
(3) Procedures for activating the local ASHER incident response plan
(4) Communications plan and procedures
(5) “Officer Down” procedure, or equivalent, based on local policy, protocol, and procedure
(6) Knowledge of appropriate local procedures for clearing areas and designating zones
(7) Knowledge of local procedures for establishing perimeters and providing security to other responders
(8) Knowledge of available medical supplies and resources and their appropriate and prescribed uses within the adopted scope of practice
(9) Knowledge of available PPE and their appropriate and prescribed uses
(10) Local policies and procedures for operating with responders from partner agencies and jurisdictions
(11) Warm zone care and rescue concepts, including, but not limited to, the following:
   (a) Rescue task force
   (b) Law enforcement rescue teams
   (c) Protected island operations
   (d) Protected corridor operations
(12) Principles of the law enforcement branch, including the following:
   (a) Contact teams (including solo and multi-officer response)
   (b) Security/rescue teams
   (c) Perimeter protection
   (d) Evidence collection
   (e) Witness identification and interviews
(13) Basic breaching techniques
(14) Local responder identification plans in order to differentiate responders from other parties
(15) Ability to clear traffic and roadways to support movement of victims and possible evacuations
(16) Local policies and procedures for the transition of active to recovery operations
(17) Basic improvised explosive devices (IED) recognition and considerations
(18) Basic recognition of perpetrator use of chemical munitions and protective measures
(19) Procedures for checking into the incident with Unified Command for accountability and assignment (no self-deployment without notification)
(20) Understanding of relevant associated off-site operations and providing security for these off-site operations, including the following:
Recommended Competencies for Law Enforcement Officers When Operating at Vehicle as a Weapon Incidents. Law enforcement officers should have knowledge of local policies for vehicle as a weapon engagement. This should include the following:

1. Knowledge of vehicle immobilization techniques
2. Knowledge of potential vehicle-borne IED (VBIED) identification

Recommended Competencies for Law Enforcement Officers When Operating at an Active IED Incident. Law enforcement officers should have knowledge of local IED response policy. This should include the following:

1. Time, distance, and shielding, using the Department of Homeland Security (DHS) stand-off chart
2. Post-blast transition to fire event/structural collapse

For more information, see http://regulationspolicies.usf.edu/policies-and-procedures/pdfs/policy-6-002-bomb-threat-stand-off-chart-a.pdf.

Recommended Competencies for Law Enforcement Officers When Operating at Fire as a Weapon Incidents. Law enforcement officers should have knowledge of basic fire-fighting operations, which should include the following:

1. Immediately dangerous to life and health (IDLH) situations as pertains to respiratory and thermal protection
2. Co-occurrence threats (fire as a weapon often occurs in tandem with a second hostile event)
3. Basic fire attack operations
4. AHJ’s requirements for fire as a weapon incidents
5. Knowledge of movement techniques in a smoke environment
6. Knowledge of how to drop to the floor where there could be breathable air and how to move along the walls in order to find an exit
7. Partnering with the local fire department to obtain basic fire-fighting training and instruction on how to properly use fire extinguishers to put out small fires
(8) “Cross-training” to make sure law enforcement are trained and equipped to respond to injuries that include burns, smoke inhalation, respiratory distress, and trauma
(9) Knowledge of self-contained breathing apparatus (SCBA) operation
(10) Knowledge of thermal imaging camera operations
(11) Knowledge of training to operate tactically while wearing flight gloves, which offer more thermal protection than most gloves. Structural fire-fighting gloves could impede handling of firearms.
(12) Knowledge of marksmanship while wearing SCBA

A.12.1.3.3 At a minimum this medical care knowledge should include the following:

1. Hemorrhage control
2. Basic airway
3. Respiratory management
4. Casualty extraction
5. Hypothermia management

Examples of threat-based systems of care include, but are not limited to, the following:

1. The system of care that is used to provide medical aid to self and others, including emergency patient care for the civilian environment, should be in accordance with the guidelines of Tactical Emergency Casualty Care (TECC) Guidelines for First Responders with a Duty to Act and Tactical Emergency Casualty Care (TECC) Guidelines for BLS/ALS Medical Providers.

2. The military equivalent is Tactical Combat Casualty Care (TCCC).

A.13.1.1 The intent of this section is to define competencies for both fire and EMS functions regardless of agency configuration. It is understood that some agencies provide dual services that are comprised of both traditional fire and medical service delivery while others are provided by separate entities with different command structures. It is important for agencies to apply the sections of this chapter that relate to the services delivered.

A.13.2.2 For more information, go to www.c-tecc.org.

A.13.3.1.1 Fire and EMS do not typically operate in a hot zone. It is understood that different municipalities and jurisdictions could have the ability to do so as part of a specialized team.

A.13.3.3(4) The federal government recommends using the Model Uniformed Core Criteria/Sort-Assess-Lifesaving Interventions-Treatment/Triage (MUCC/SALT) system.


A.13.4.3 For more information, see http://regulationspolicies.usf.edu/policies-and-procedures/pdfs/policy-6-002-bomb-threat-stand-off-chart-a.pdf.
A.14.2.3 Zone definitions follow the general location of the threat(s). Hot zone operations should also consider a ballistic helmet, a radio with shoulder strap, and remote microphones with earpieces, flashlight, and individual first-aid kit (IFAK). See Chapters 8, 12, and 13 for warm zone operation (RTF).

A.14.2.4.1 Deployment models can include, but are not limited to, the following:

1. Individually issued
2. Issued to each applicable responder or responder position on the vehicle
3. Command and/or supervisory vehicles

A.14.3.1 The NIJ establishes minimum performance standards for body armor and administers a program to test armor for compliance. Type III-A ballistic panels provide ballistic penetration protection for most all standard handgun and shotgun ammunition.

A.14.3.1.1 For more information on NIJ compliant products list go to https://www.nij.gov/topics/technology/body-armor/Pages/compliant-ballistic-armor.aspx.

A.14.3.2 Integrated response teams can consist of a rescue task force, protected corridor, and so forth.

A.14.4 For PPE worn externally, additional marking can be used to designate rank officers and should be based on operational functions.

A.14.5 NIJ provides an explanatory video on care and maintenance at http://youtube/R85mWoCBR50.

A.15.1.1.1 Examples of available training can include, but are not limited to, Advanced Law Enforcement Rapid Response Training (ALERRT), Tactical Emergency Casualty Care (TECC), and Tactical Combat Casualty Care (TCCC).

A.15.2.2 Training can include scheduled or no notice sessions.

A.15.3 This training should be based on the risk assessment and partnerships formed with facility managers as outlined in Chapters 5 and 9.

A.16.2.1(3) These materials can include videos, handouts, papers, and other similar educational material.

A.16.3 More information can be found at www.bleedingcontrol.org and https://www.dhs.gov/sites/default/files/publications/active-shooter-pamphlet-2017-508.pdf. Bleeding control kits should include the following:

1. Instructional booklet on bleeding control
2. Tourniquets
3. Bleeding control dressing
4. Marker
Public involvement is vital to provide additional support to response personnel and can often be the primary source of response in the first hours or days after a catastrophic event. As such, the public shall be encouraged to train, exercise, and partner with each other and emergency management officials.

**A.16.3(3)(a)** An example of a survival strategy is “Run, Hide, Fight.” The federal government recommends teaching the public to run, hide, and then fight.

**A.16.3(3)(b)** Other interventions include civilian treatment for airway, respiratory, hypothermia, and extraction. The federal government also encourages teaching the public bleeding control measures via the “Stop the Bleed” campaign.

**A.16.3(4)** Information specific to people with disabilities and others with access and functional needs should be included. For people who might have a physical and/or mental disability or language access issue, the following should be included in prepress plans:

1. Communication needs (not able to hear verbal announcements or alerts, see directional signage, communicate with respondents)
2. Maintaining health (acute medical needs requiring support or trained medical professionals, medications, access)
3. Independence (providing physical and programmatic access, durable medical equipment needs/service animal)
4. Support and safety (loss of support of personal assistants, children and supervision)

**A.17.1** Users of NFPA 3000 are encouraged to review the information in NIMS, specifically FEMA 517, *Basic Guidance for Public Information Officers (PIOs)*; Job Aid: Public Information Staffing and Skills Checklist; and FEMA Lesson 5: Public Information During the Incident.

**A.17.1.1** Organizations should coordinate their public information messaging with their AHJ.

**A.17.2(3)** Providing assistance with family reunification helps to reduce overwhelming resources at the scene with information requests and to provide for a secure and accessible gathering place in a cold zone where potential witnesses can be identified and interviewed to advance an ASHER incident investigation.

**A.17.2(4)(a)** The PIO should be involved in assisting in the creation of messaging appropriate to communicate the essential and timely information on the ASHER plan.

**A.17.2(4)(b)** The PIO should be involved in the risk planning and coordination so as to acquire the appropriate communications contacts and familiarity with agencies and partners who could
be resources for mutual aid as well as all SOGs and SOPs developed as part of the planning process and post-incident procedures.

A.17.2(4)(c) The PIO should be involved in the risk assessment so as to acquire the appropriate communications contacts and familiarity for assessed organizations for information sharing, preparedness planning, analyzing consequences, and seamless information flow in the event of an ASHER incident.

A.17.2(6) Operational security could be put in jeopardy by things such as the following:

(1) Media helicopters divulging response team location and movements

(2) Misinformation on the current status of the ASHER incident

(3) Number of casualties

(4) Number of perpetrators

A.17.3.4 Test notifications should be appropriate and should not create undo panic. An example of this would be live social media posting of test events where they could be misunderstood as actual events.

A.17.3.5 The Clery Act provides timely warning and crime notification requirements. See www.clerycenter.org.

A.17.4.3 This communication includes press alerts and media advisories, press releases, and talking points.

A.17.5 Social media is valuable for refuting or verifying incident information. It should be monitored as much as possible by the JIC if one has been established.

A.17.5.1 External sources include social media and news reports.

A.17.5.2 Appropriate and trending social media hashtags should be used to ensure the consistent delivery of approved messaging and information.

A.17.5.3 This includes sharing operational information and data (e.g. pictures, video) that are not approved for release outside of the scene.

A.17.6.2 Managing the media area includes maintaining a general understanding of who is there, giving timely updates, and not letting them interfere with operations.

A.18.2.1.1 Figure A.18.2.1.1 shows an example of continuity of operation.

Figure A.18.2.1.1 Continuity of Care and Business Operations Decision Flow Chart.

[1616:Figure A.6.5.1]

A.19.1 NFPA 99 contains dedicated chapters that provide the requirements for emergency and security management in health care organizations. The emergency management provisions require the development of an emergency operations plan based on an all-hazards approach, including mass casualty events that can greatly increase the demand for services. The security
management requirements state that facilities must conduct a security vulnerability assessment that evaluates potential security risks to all individuals in the facility, and, as part of the plan, procedures must be identified for a number of incidents, including ASHER incidents. The requirements of NFPA 3000 are intended to supplement these overall plans by providing some of the specific things hospitals must do in order to best support the integrated response to ASHER incidents.

A.19.1.1 Some hospitals are not expected to receive victims from such events because the nature of care typically provided does not require the capabilities to treat victims from an ASHER incident. Behavioral health hospitals are one example.

A.19.1.2 Rapid categorization of patients during ASHER situations is vital to reduce preventable loss of life.

A.19.1.2.1 Scalability allows facilities to adjust their response to meet the objectives of this standard.

A.19.2 Exercises should be scalable in nature and conducted once per calendar year. Exercises should follow FEMA or facility-specific guidance for exercises.

A.19.2.4 Mass casualty incident plans can be local, regional, or state-based.

A.19.3 While it is ideal that patient distribution take place in an organized and coordinated manner, it is known that most frequently this is not the case.

A.19.4 These means of communication can include the following:

(1) Phone
(2) Dedicated radio frequency
(3) Separate dispatcher
(4) Satellite phones
(5) Electronic patient management systems

A.19.4.3 This assignment should consist of at least one staff member who is singularly assigned to the role, but facilities should be prepared to add additional staff as needed based on the scale of the incident.

A.19.5 Use of electronic, web-based systems for patient tracking, family reunification, and hospital capabilities (i.e., numbers of patients per category that can be managed as the incident progresses) should be considered.

A.19.6 Existing physical security measures include electronic access control and traffic barriers. On-duty staff members include security and facility staff.

A.19.6.1 Measures for restricting access should include the following:

(1) Controlling access to security sensitive areas and high-risk departments
(2) The process for identifying health care facility (HCF) staff and others (fire, law enforcement, public health) that require access
(3) Communicating with on-duty and supplemental personnel
(4) Managing internal and external communications
(5) Establishing and maintaining perimeters and related visitor protocols
(6) Obtaining additional security and/or law enforcement staff
(7) Establishing secure passage routes and transportation for HCF staff
(8) Managing the internal environment during access restrictions
(9) Reversing the restricted access and opening areas
(10) Testing and evaluating controlled access plans during emergency exercises with other HCFs and community agencies

A.19.6.1(1) This can be accomplished in progressive stages and can involve the facility incident command structure.

A.19.6.2 The required screening is meant to detect weapons and devices that have been staged for secondary attacks.

A.20.1.1.1 The Mass Violence Toolkit, created by the Office for Victims of Crime, U.S. Department of Justice, was developed to help communities prepare for and respond to victims of mass violence and terrorism — to include active shooters — in the most timely, effective, and compassionate manner possible. It is comprised of checklists, a compendium of resources, and other pertinent victim-related materials derived from operational procedures, best practices, and lessons learned throughout the victim services community.

A.20.2.2 This coordination includes the establishment of how all parties, both primary and supporting, can effectively accomplish the necessary common strategy while coordinating and supporting each other’s missions.

In cases where multiple primary agencies share complementary capacities at the statewide level, a facilitating team can be constituted to serve the role of the facilitating agency.

A.20.2.2.2 All participating organizations are encouraged to sign a Memorandum of Understanding or Memorandum of Agreement prior to any ASHER incident.

A.20.2.2.2.1 Initial communication meetings should be conducted early following the event so that all organizations have consistent up-to-date information.

A.20.2.2.4.1 Possible individuals should be previously vetted and part of emergency planning prior to the incident.

A.20.2.2.6 Establishment, use, and communication regarding the immediate use of a notification and reunification center, also referred to as a family assistance center, should be considered.
The creation of a center should have a process to identify possible victims and witnesses during intake who might need to provide incident-related information to law enforcement. The center should have a security plan and credentialing process. The establishment of a uniform statistical data collection process, in coordination with the primary agencies, should be considered to track outreach and services delivered. This data is often useful after the incident when conducting needs assessments and applying for grant funding.

Establishing timely implementation and messaging and use of social media could expedite reunification center utilization and prevent additional family members and loved ones from traveling into the immediate area surrounding the scene. This temporary center might not be appropriate as a permanent location, and long-term alternatives should be considered.

For more information, see the FBI Mass Fatality Incident Family Assistance Operations Recommended Strategies for Local and State Agencies at https://www.ntsb.gov/tda/TDADocuments/Mass%20Fatality%20Incident%20Family%20Assistance%20Operations.pdf.

A.20.2.2.7.1 This will allow for family members to be staged in a location removed from operations in order to receive timely and accurate information regarding casualties and location of casualties if sent to a medical facility and to be reunified quickly with the uninjured who are delivered to the reunification and notification center. The location should also take into consideration the media that will arrive and the possible need to shield victims and victim families from the cameras. Command should consider preparing separate areas for victims to stage out of view from the public gathering at these locations.

A.20.2.2.8 A team might additionally include victim advocates, mental health professionals, crisis counselors, and faith or spiritual leaders whose members are trained in notification.

A.20.2.2.11 Individuals could have additional needs before, during, and after an incident in functional areas, including, but not limited to, the following:

(1) Maintaining independence
(2) Communication
(3) Transportation
(4) Supervision
(5) Medical care

The following list is a group of individuals who should not be overlooked and could have unique needs following an ASHER incident:

(1) Children and youth
(2) First responders
(3) Tribal communities
(4) Elder populations
(5) Individuals with disabilities
(6) Individuals who are deaf or hard of hearing
(7) Individuals with limited English proficiency
(8) High-risk populations
(9) Lesbian, gay, bisexual, transgender, and questioning (LGBTQ) populations
(10) Military veterans
(11) Underserved and socially isolated populations including, but not limited to, those historically underserved due to race, socio-economic status, disability, or sexual orientation
(12) Undocumented populations
(13) Other specialized populations

A.20.3.1(9) Victim advocacy, assistance, and services, can including the following:
(1) Temporary housing and infrastructure repairs
(2) Area re-entry and belongings recovery
(3) Personal property replacement
(4) Transportation or vehicle replacement assistance
(5) Replacement of job-related tools and specialized/protective clothing
(6) Moving and storage assistance
(7) Legal assistance
(8) Insurance claims assistance
(9) Employment-related assistance
(10) Food replacement
(11) Assistance to mitigate against the effects, including vicarious, of future events
(12) Medical, dental, and mental health services
(13) Information regarding additional near- and long-term victim services

A.20.3.2.3 These could include planned or spontaneous protests, rallies, vigils, and dignitary visits.

A.20.3.2.4.1 Post-incident security plans should provide guidance for threat security, victim security, and hospital facility and infrastructure security.

A.20.3.2.7.2 If there is a need to separate volunteers, including spontaneous, from the victims initially, then the volunteer reception center might need to be located outside of the notification and reunification center.
A.20.3.2.7.5 Input from the victims and their families should be elicited prior to the designation and distribution of funding and during the decision-making process.

A.20.3.2.7.6 This strategy could include the creation of a donations management database to help collect, track, disburse, and acknowledge monetary and non-monetary donations. This strategy should be reviewed during the response phase to identify any necessary modifications arising from emerging and unanticipated needs, including community and victim needs.

A.20.3.2.7.7 Multiple sites could be necessary to receive, store, stage, and distribute donations. Donations, especially monetary, should be broadly dedicated toward victim services and recovery efforts rather than narrow and specific.

Often a charity or NGO is a preferred entity to receive monetary donations, rather than a local or state agency. Cash donations should not be accepted at Unified Command.

If a warehouse(s) is necessary, then state-level and/or private sector contract hauler transportation resources should be identified in order to secure appropriate cargo vehicles and drivers.

A.20.3.2.7.8 For more information, see the FEMA toolkit at https://www.fema.gov/media-library/assets/documents/32282.

Samples of volunteer and donation agreements can be found at the following web sites:


A.20.3.2.7.9 Communications and messaging on donations should reflect the diverse ways that funds and items can be used.

A.20.4.2 This could require a victim assistance liaison or advocate.

A.20.4.2.1 In some instances, a law enforcement officer has been assigned to each affected family to serve as the single point of contact for victim service information and media requests. Victims and families should be notified as to their rights with the media, which should be publically posted as well.

For a sample victim liaison job description go to the OVC victim toolkit: https://www.ovc.gov/pubs/mvt-toolkit/Sample_SampleVictimLiaisonJobDescription.pdf.

A.20.4.2.2 This can include assistance with death certificates, autopsy reports and information, and other documentation for legal needs and benefits.
A.20.4.2.4 This process should be proactive and managed by individuals or organizations that have a strong understanding and experience in managing post-incident recovery systems.

A.20.4.2.5.2 The discussion about memorial events should consider the community’s needs, its desire for annual memorial services, and the potential impacts of media coverage. The needs and desires of victims versus those of the community should be determined. Organizers should be aware that a spontaneous memorial event could emerge in the community even if a formal, organized memorial service is not planned. A memorial plan might not preclude a spontaneous event.

A.20.4.2.5.3 The family assistance center can transition to a CRC depending on the nature/scope of the event. CRC leaders should be aware that not all direct victims might want to participate.

The CRC can engage a holistic approach, which can include diverse faith or spiritual healing practices, to support survivors and surviving family members in the long term. It should be remembered that not all victims are religious or spiritual. The emotional and psychological needs of the community should be met by providing mental health support, counseling, screening, and treatment. The potential for increased risk of substance, physical, sexual, and emotional abuse should be addressed.

A.20.4.3.2 Those who have experienced trauma directly or vicariously are likely to have recovery needs.

A.20.4.5.1 This could additionally include adjudication and prisoner status (e.g., prisoner location post-conviction, parole-related issues), victim’s right to be present at trial, victim’s right to be heard, victim’s right to swift and fair resolution, victim’s right to be informed, and victim’s right to safety and protection of privacy. Information should be provided in lieu of trial if a trial does not occur.

Next of kin during medicolegal death investigations will have special needs. For more information, see “Principles for Communicating with Next of Kin during Medicolegal Death Investigations” from the Scientific Working Group for Medicolegal Death Investigation.

A.20.4.7 Affected populations might need specialized resources and/or case management assistance. This can be part of a victim assistance response plan assessment by primary agencies.

A.20.4.9 Examples of infrastructure and facilities include, but are not limited to, the following:

(1) Health, medical, and dental
(2) Logistics
(3) Sanitary
(4) Human resources to continue operations and support continued recovery efforts
(5) Replacement and repair of facilities damaged by the event
(6) Restoration of the supply chain
(7) Provision of temporary housing/interim housing
(8) Repairing property
(9) Natural and cultural resources

A.20.4.10 Continued recovery can take months to years to complete.

Annex B Laws, Regulations, Consensus Standards, and Guidance Documents

This annex is not a part of the requirements of this NFPA document but is included for informational purposes only.

B.1 Scope. This annex applies to those organizations and jurisdictions responsible for organizing, managing, and sustaining an ASHER program.

B.1.1 Laws are enacted by legislative action of governmental bodies such as Congress, individual states, and local government. Laws typically provide broad goals and objectives, set mandatory dates for compliance, and establish penalties for noncompliance.

B.1.2 Regulations are official rules created by government agencies that detail how something should be done.

B.1.3 A consensus standard is a standard that has been adopted and promulgated by a nationally recognized standards-producing organization under procedures whereby it can be determined that persons interested and affected by the scope or provisions of the standard have reached substantial agreement on its adoption, it was formulated in a manner that afforded an opportunity for diverse views to be considered, and it has been designated as such.

B.2 Purpose. This annex is provided as a law and regulation reference point for programs that are developing an ASHER Program.

B.3 Laws. The following federal laws are applicable to the management of active shooter/hostile events:

(1) Public Law 81-920, as amended, the Federal Civil Defense Act of 1950
(2) Public Law 83-703, as amended, the Atomic Energy Act of 1954
(3) Public Law 93-288, as amended, the Robert T. Stafford Disaster Relief and Emergency Assistance Act
(5) Public Law 99-499, the Superfund Amendments and Reauthorization Act of 1986
(6) Public Law 106-390, the Disaster Mitigation Act of 2000
(7) Public Law 107-56, the USA Patriot Act of 2001
(8) Public Law 107-188, the Public Health Security and Bioterrorism Preparedness and Response Act of 2002
(9) Public Law 107-296, the Homeland Security Act of 2002
(11) The National Oil and Hazardous Substance Pollution Contingency Plan (NCP), 40 CFR § 300, of 2006
(13) Public Law 109-295, Post Katrina Emergency Management Reform Act (PKEMRA) of 2006
(14) Public Law 84-99, Flood Control and Coastal Emergencies Act of 2007
(22) 41 CFR 102-74.230 through 102-74.260
(23) Title 34/Subtitle I/Chapter 101/Subchapter XVI/§ 10381
(25) Americans with Disabilities Act (ADA), 42 U.S.C. §§ 12101

B.4 NFPA Standards. This subsection contains a partial list of NFPA standards. To determine if other NFPA standards apply, review the complete list of NFPA standards at nfpa.org/codes-and-standards.

B.4.1 NFPA 99 addresses emergency management for health care facilities and Chapter 13 addresses security management for health care facilities.

B.4.2 NFPA 101 establishes the construction and design requirements for facility’s preparedness.

B.4.3 NFPA 472 provides a framework by which an organization can meet the requirements of the OSHA HAZWHOPER regulation. By meeting this standard, compliance with OSHA 1910.120 is met or exceeded.
B.4.4 NFPA 473 identifies the levels of competence required of EMS personnel who respond to incidents involving hazardous materials or weapons of mass destruction (WMD).

B.4.5 NFPA 1500 contains minimum requirements for a fire service–related safety and health program. Items covered include PPE, staffing, medical requirements, and physical requirements.

B.4.6 NFPA 1561 contains minimum requirements for the Incident Command System.

B.4.7 NFPA 1582 provides guidance on annual physicals for fire fighters and members of hazardous materials response teams.

B.4.8 NFPA 1600 contains the requirements for continuity of operations

B.5 Guidance Documents.

B.5.1 General. Guidance documents are publications typically prepared by regulatory agencies that provide instructions to establish the agencies’ expectations.

B.5.2 National Response Framework (NRF). The NRF is a comprehensive how-to guide that spells out how the nation should conduct an all-hazard response. It is intended to capture all levels of government and all incident levels. Local plans feed into state plans, which feed into the NRF. Its use during a federally declared disaster is required by the Stafford Act.

B.5.2.1 Resource typing is the categorization and description of resources that are exchanged in disasters via mutual aid, by capacity and/or capability, for the purpose of ordering and tracking resources.

B.5.3 Presidential Directives. The following directives relate to the federal preparedness and response expectations for ASHER incidents:

Annex C Informational References

C.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.

C.1.1 NFPA Publications. National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471.


C.1.2 Other Publications.

Catalog of Federal Domestic Assistance (CFDA).
FEMA Lesson 5: Public Information During the Incident, National Incident Management System.
Job Aid: Public Information Staffing and Skills Checklist, National Incident Management System.
“Principles for Communicating with Next of Kin during Medicolegal Death Investigations” from the Scientific Working Group for Medicolegal Death Investigation.

**C.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.

C-TECC *Tactical Emergency Casualty Care (TECC) Guidelines for First Care Providers*, 2016.

C.3 References for Extracts in Informational Sections.
Linda:

With the approval of the Chair and the FAE-ELS TC, the committee is requesting that the new document (NFPA 1802) be entered in the Fall 2020 cycle, with a Public Input closing date of January 3, 2019.

Thank you for your consideration.

Dave

David Trebisacci
Sr. Specialist, Emergency Services
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www.nfpa.org

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MEMORANDUM

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

FROM: Yvonne Smith, Project Administrator

DATE: April 2, 2018

SUBJECT: Ballot to Release NFPA Preliminary Draft - Final Results

According to the final ballot results, the ballot did receive the necessary affirmative votes to pass ballot. Please see the attached report for results and any comments received.

31 Eligible to Vote
6 Not Returned (Farley, Legendre, McKenna, Really, Stull, Varner)

The criteria necessary to pass ballot is a simple majority of the Technical Committee and Correlating Committee. See Section 4.3.2.1(b) of the Regulations Governing the Development of NFPA Standards.
**Election:** 1802_FAE_AAC_DraftRelease_Ballot

Results by Revision

**Per Section 4.3.2.1(b) of the NFPA Regs., prior to entering a Revision Cycle, and approval for Public review, a Ballot of the Committees is required by at least, a simple majority. This ballot is for formally voting on whether or not you agree with the Technical Committee to release the Draft of NFPA 1802.**

**Eligible to Vote:** 31

**Not Returned:** 6

Jack E. Reall, Jeff Legendre, Michael F. McKenna, Jeffrey O. Stull, Bruce H. Varner, Edmund Farley

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**Total Voted:** 25

For Simple majority, the affirmative votes needed are 16
MEMORANDUM

TO: Technical Committee on Electronic Safety Equipment
FROM: Yvonne Smith, Project Administrator
DATE: March 27, 2018
SUBJECT: Ballot to Release NFPA Preliminary Draft - Final Results

According to the final ballot results, the ballot did receive the necessary affirmative votes to pass ballot. Please see the attached report for results and any comments received.

36 Eligible to Vote
6 Not Returned (Agi, Athanas, Helvin, Little, Townsend, Varner)

The criteria necessary to pass ballot is a simple majority of the Technical Committee and Correlating Committee. See Section 4.3.2.1(b) of the Regulations Governing the Development of NFPA Standards.

With the approval of the Chair and the FAE-ELS Technical Committee, the committee is requesting that the new document (NFPA 1802) be entered in the Fall 2020 cycle.
Per section 4.3.2.1 (b) of the Regs, prior to entering a Revision Cycle and approval for public review, a Ballot of the Committee is required to pass by at least, a simple majority. NOTE: This ballot is for formally voting on whether or not you are in agreement with the release of the draft of NFPA 1802.

Eligible to Vote: 36
Not Returned: 6

Bruce H. Varner, Robert J. Athanas, Steven D. Townsend, David A. Little, Kamil Agi, Jeff Helvin

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Louis Chavez

- 3.3.27 – Reference should be to 3.3.26 not 3.3.24. This term is even shown in parenthesis in 3.3.26. • 3.3.63 and 3.3.64 – Both of these should be deleted, unless a definition is provided for the organizations referenced in the standard, such as “UL”, “ASTM”, “ASA”, “ISO”, “IEC”, etc. • Table 7.1.5.1.2 – The detail beneath the table that is preceded by an asterisk “*” should appear above the Note beneath the table, as this asterisked details are part of the table, while the Note is additional explanatory content. • A.7.1.5 – Revise the first paragraph to clarify that there are not multiple levels of “IS”. There are multiple levels of “explosion protection”, with “IS” being just one of them... For decades, the standard for intrinsic safety (IS) for land mobile portable radios has traditionally been derived from sections of the NFPA 70, which provided for fixed electrical power installations in hazardous locations such as refineries and grain elevators. The use-case for fire service portable radios is different in many ways from fixed electrical installations. In addition, recently some changes were made in how testing organizations test portable radios for IS. These changes provide an opportunity to revisit what exact level of explosion protection (e.g. IS, Nonincendive, etc.) is really required for portable radios used in the fire service. The committee has spent a significant amount of time looking at the various issues, reviewing the past history of incidents, and talking to industry experts. This standard in regards to explosion protection IS reflects that extensive analysis and the resulting decision. The information following is an explanation of some of the many issues and tradeoffs that were considered during this process.

John A. Facella

While there are a number of areas that we will edit/revise in future, it should be noted that section 8.14 has some vestige wording "PASS" which was likely taken from the 1982 PASS standard. It might be recommended to edit that out before passing up to NFPA review.

Michelle Donnelly

I am not completely satisfied with all aspects of this document, but would like it to advance for review at this time.
Brian A. Martens

Section 1.1.3 is too generic and should be limited to NFPA content.

6.16.7.2 Suggestion - maybe helpful in cases where more than optional component is connected. It is permissible for the RF Device to replace the words "OPTIONAL COMPONENT" with a product or programmed friendly name.

6.17.2 Battery red backlight - Lowest priority indicator - others like emergency supercede.

7.2.1.1 5W assumes UHF/VHF capable, 7/800 not permitted to Tx more than 3W

---

**Negative**  
0

**Abstain**  
0

Total Voted : 30

For Simple majority, the affirmative votes needed are 19
Chapter 1  Administration

1.1 Scope. This standard shall identify the operating environment parameters, as well as the minimum requirements for the design, performance, testing, and certification of portable RF voice communications devices (RF devices) and remote speaker microphones (RSMs) for use by emergency services personnel (ESP) within the hazard zone during emergency incident operations without compromising compatibility with field emergency services communications networks.

1.1.1 *This standard shall specify requirements for RF devices and RSMs used by ESP in the hazard zone as the primary voice communications link.

1.1.2 Certification.

1.1.2.1 RF devices and RSMs shall be permitted to be certified individually or as a combination of an RF device and an RSM.

1.1.2.2 Certified devices, both RF devices and RSMs, shall remain certified when connected to any other RSM certified to this standard.
1.1.3 Except where referenced by this standard, requirements of other standards shall not apply.

1.1.4 Any accessories or enhancements built into, attached to, or sold with an RF device or RSM shall be tested with those accessories and enhancements installed or attached to the RF device or RSM, as specified in Table 4.3.9, to ensure the performance and functions of the RF device or RSM.

1.1.5 Safety.

1.1.5.1 This standard shall not be construed as addressing all of the safety concerns, if any, associated with the use of this standard by testing facilities.

1.1.5.2 It shall be the responsibility of the persons and organizations that use this standard to establish safety and health practices and to determine the applicability of regulatory limitations prior to use of this standard for designing, manufacturing, and testing.

1.1.6 Nothing herein shall restrict any jurisdiction or manufacturer from exceeding these minimum requirements.

1.2 Purpose.

1.2.1 The purpose of this standard shall be to establish minimum requirements for RF devices and RSMs manufactured for emergency services use in the hazard zone.

1.2.2 Controlled laboratory tests used to determine compliance with the performance requirements of this standard shall not be deemed as establishing performance levels for all situations, environments, and conditions to which RF devices and RSMs could be exposed.

1.2.3 This standard shall not be interpreted or used as a detailed manufacturing or purchase specification, but it shall be permitted to be referenced in purchase specifications as minimum requirements.

1.3 Application.

1.3.1 This standard shall apply to all RF devices and RSMs for use by ESP in the hazard zone.

1.3.2 This standard shall also apply to RSMs not supplied with an RF device.

1.3.3 This standard shall apply to the design, performance, manufacturing, testing, and certification of new equipment for use by ESP.

1.3.4 Reserved.
1.3.5* This standard shall not apply to compatible devices and accessories that could be built into or attached to a certified RF device or RSM before or after purchase, but that are not necessary for the RF device or RSM to meet the requirements of this standard.

1.3.6 This standard shall not apply to criteria for use of an RF device or RSM by ESP in the hazard zone.

1.4 Units.

1.4.1 In this standard, values for measurement are followed by an equivalent in parentheses, but only the first stated value shall be regarded as the requirement.

1.4.2 Equivalent values in parentheses shall not be considered as the requirement because those values are approximate.

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 APCO Publications.
Association Public Safety Communications Officials, 351 N. Williamson Blvd, Daytona Beach, FL 32114-1112.


2.3.2 ASA Publications.
Acoustical Society of America, 1305 Walt Whitman Road, #300, Melville, NY 11747.


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


2.3.4 Bluetooth Publications.

Bluetooth Core Specification version 2.1.

2.3.56 ISO/IEC Publications.
International Organization for Standardization, ISO Central Secretariat, BIBC II, Chemin de Blandonnet 8, CP401, 1214 Vernier, Geneva, Switzerland.

ISO Guide 27, Guidelines for corrective action to be taken by a certification body in the event of misuse of its mark of conformity, 1983.

ISO 9001, Quality management systems — Requirements, 2008.

ISO 9001, Quality management systems — Requirements, 2015.


IEC 60529, *Degrees of protection provided by enclosures (IP Code), Ed 2.2b, 2013.*

2.3.6 ITU Publications.
International Telecommunication Union (ITU), Place des Nations, 1211 Geneva 20, Switzerland.


2.3.7 JEDEC Publications.


2.3.8 TIA Publications.
Telecommunications Industry Association, 1320 North Courthouse Road, Suite 200, Arlington, VA 22201.


2.3.9 UL Publications.
UL LLC, 333 Pfingsten Road, Northbrook, IL 60062.


2.3.10 USB Publications.


2.4 References for Extracts in Mandatory Sections. (Reserved)

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 phrase “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 Acceptable. Considered by the authority having jurisdiction (AHJ) as adequate for satisfying goals, performance objectives, or performance criteria.

3.3.2 Accessory. An item, or items, that could be attached to a certified product, but are not necessary for the certified product to meet the requirements of this standard.

3.3.4 Alarm Signal. An audible warning that is identifiable as an indication that an emergency services person (ESP) is in need of assistance.

3.3.5 Alias. A unique sequence of alphanumeric characters, specifically identifying an RF device assigned by the AHJ.

3.3.6* Bluetooth. A wireless technology that allows data communications between devices over short ranges (i.e., 1 m to 100 m).
3.3.7 Certification/Certified. A system whereby a certification organization determines that a manufacturer has demonstrated the ability to produce a product that complies with the requirements of this standard, authorizes the manufacturer to use a label on listed products that comply with the requirements of this standard, and establishes a follow-up program conducted by the certification organization as a check on the methods the manufacturer uses to determine continued compliance of labeled and listed products with the requirements of this standard.

3.3.8 Certification Organization. An independent third-party organization that determines product compliance with the requirements of this standard using product testing and evaluation and that administers a labeling, listing, and follow-up program.

3.3.9 Channel. An assigned operation range of frequencies; or a user-selectable frequency pair used for radio communications.

3.3.10* Compatible Device. Any electronic device that connects to the RF device or RSM and that participates in the exchange of a signal.

3.3.11 Compliance/Compliant. Meeting or exceeding all applicable requirements of this standard.

3.3.12 Compliant Product. Equipment that is certified to the applicable NFPA standard.

3.3.13 Component. Any material, part, or subassembly used in the construction of the compliant product.

3.3.14 Drip. To run or fall in drops or blobs.

3.3.15 EAB. See 3.3.16.

3.3.16 Emergency Alert Button (EAB). Electronic device button to assist in alerting of an emergency.

3.3.17 Emergency ID. Unit Identification of a radio in an emergency state.

3.3.18 Emergency State/Mode. State of an RF device after a user has declared an emergency condition, usually characterized by a particular set of behaviors, displays, or audible alerts.

3.3.19 Failure Mode and Effects Analysis (FMEA). A risk assessment technique for systematically identifying potential failures in a system or a process.

3.3.20 FMEA. See 3.3.19.
3.3.21 **Follow-Up Inspection Program.** The sampling, inspections, tests, or other measures conducted by the certification organization on a periodic basis to determine the continued compliance of labeled and listed products that are being produced by the manufacturer to the requirements of this standard.

3.3.22. **HATS.** See 3.3.28.

3.3.23 **Hazard Zone.** The area where members might be exposed to a hazard or hazardous atmosphere; or a particular substance, device, event, circumstance, or condition that presents a danger to members of the fire department.

3.3.24* **Hazard Zone Mode.** A mode of operation of the device when in the hazard zone.

3.3.25 **Hazardous Area.** An area of a structure or building that poses a degree of hazard greater than that normal to the general occupancy of the building or structure.

3.3.26 **Hazardous (Classified) Location (HazLoc).** A location where fire or explosion hazards might exist due to flammable gases, flammable liquid-produced vapors, combustible liquid-produced vapors, combustible dusts, or ignitible fibers/flyings.

3.3.27 **HazLoc.** See 3.3.24.

3.3.28 **Head and Torso Simulator (HATS).** A mannequin with built-in ear and mouth simulators that provides a realistic reproduction of the acoustic properties of an average adult human head and torso.

3.3.29 **Icon.** A symbol that represents an option, program, or system status.

3.3.30 **Interoperability.** The capability of components to exchange data or information, or mechanically interface, with other components.

3.3.31* **Intrinsic Safety (IS).** Type of protection where any spark or thermal effect is incapable of causing ignition of a mixture of flammable or combustible material in air under prescribed test conditions.

3.3.32 **Intrinsically Safe Circuit.** A circuit in which any spark or thermal effect is incapable of causing ignition of a mixture of flammable or combustible material in air under prescribed test conditions.

3.3.33 **Intrinsically Safe System.** An assembly of interconnected intrinsically safe apparatus, associated apparatus, and interconnecting cables, in that those parts of the system that are used in hazardous (i.e., classified) locations are intrinsically safe circuits.

3.3.x **IS.** See 3.3.31.
3.3.34 **Logical ID.** A unique sequence of numeric characters identifying an RF device.

3.3.35 **Manufacturer.** The entity that directs and controls any of the following: compliant product design, compliant product manufacturing, or compliant product quality assurance; or the entity that assumes liability for the compliant product or provides the warranty for the compliant product.

3.3.36 **MDC.** An early form of digital signaling that used audio frequency shift keying.

3.3.37 **Melt.** A response to heat by a material resulting in evidence of flowing or dripping.

3.3.38* **Mode.** A means of categorizing a collection of features used in a specific operational situation.

3.3.39 **Model.** The collective term used to identify a group of individual elements or items of the same basic design and components from a single manufacturer produced by the same manufacturing and quality assurance procedures that are covered by the same certification.

3.3.40 **Nonhazard Zone Mode.** A mode of operation of the device, as defined by the AHJ, which has different operational features than the hazard zone mode of operation.

3.3.41 **Nonincendive Equipment.** Equipment having electrical/electronic circuitry that is incapable, under normal operating conditions, of causing ignition of a specified flammable gas-air, vapor-air, or dust-air mixture due to arcing or thermal means.

3.3.42* **Out-of-Range Indication.** An audible signal that is initiated automatically when the communication between a system and RF device is lost.

3.3.43 **Perceptual Evaluation of Speech Quality (PESQ).** A subjective test process for speech quality on telecommunications equipment that can be automated.

3.3.44 **PESQ.** See 3.3.43.

3.3.45 **Pink Noise.** Noise that contains constant energy per octave band.

3.3.46 **Portable Radio.** A two-way, portable voice communications device using radio frequencies that is either carried by an individual or worn on the body (*see* 3.3.51, **RF Device**).

3.3.47 **Product.** See 3.3.12, Compliant Product.
3.3.48* Product Label. A marking provided by the manufacturer for each compliant product containing compliance statements, certification statements, manufacturer and model information, or similar data.

3.3.49 Programmable Features. A feature or function that can be enabled or disabled by configuring the RF device or RSM prior to operation.

3.3.50 Radio Licensing Authority. The government authority in a country that issues licenses for use of radio frequencies by authorized agencies and individuals.

3.3.51 Remote Speaker Device/Microphone (RSD/RSM). A device that places the RF device microphone and speaker remotely from the RF device and near the face of the user.

3.3.52* RF Device. A radio system capable of both transmitting and receiving a modulated radio-frequency (RF) signal that is then converted to an audio or data signal, or both; used to transmit and receive signals.

3.3.53 RSD/RSM. See 3.3.52.

3.3.54 Safety Alert. The procedure by which a manufacturer notifies users, the marketplace, and distributors of potential safety concerns regarding a product.

3.3.55 Sample. The ensemble, element, component, or composite that is conditioned for testing; or ensembles, elements, items, or components that are randomly selected from the manufacturer’s production line, from the manufacturer’s inventory, or from the open market.

3.3.56 Sensitivity. The degree of response of a receiver or instrument to an incoming signal or to a change in the incoming signal.

3.3.57 Service Life. The period for which a compliant product might be useful before retirement.

3.3.58 Sound Pressure Level (SPL). The local pressure deviation from the ambient (i.e., average or equilibrium) atmospheric pressure caused by a sound wave.

3.3.59 Specimen. Taken from samples, the conditioned ensemble, element, item, or component that is tested.

3.3.60 SPL. See 3.3.58.

3.3.61 Talk Path. The specific channel, consisting of transmitting and receiving radio frequencies, chosen for field users to communicate on.
3.3.62* Talkgroup. A working group of users who communicate as a team and to whom it is important that every team member hear every transmission from any other team member, and every team member be able to initiate a transmission to the other team members.

3.3.63* Telecommunications Industry Association (TIA). The leading trade association representing the global information and communications technology industry through standards development, policy initiatives, business opportunities, market intelligence, and networking events.

3.3.64. TIA. See 3.3.63.

3.3.65* Trunking Signaling Block (TSBK). A form of signaling that uses P25 digital protocol for ID, emergency, and similar messages.

3.3.66 TSBK. See 3.3.66.

3.3.67 User ID. A unique sequence of numeric characters (i.e., a logical ID) or alphanumeric characters assigned to the RF device as determined by the AHJ.

3.3.68* Voltage Standing Wave Ratio (VSWR)*. A measure of how efficiently radio-frequency power is transmitted from a power source.

3.3.69 VSWR. See 3.3.68.

3.3.70* Zone. A geographically defined area where communications are transmitted and received; or a collection of channels, talkgroups, or talk paths.

Chapter 4 Certification

4.1 General.

4.1.1 For the process of certification of RF voice communications devices (RF devices) and remote speaker microphones (RSMs) as being compliant with this standard, all RF devices and RSMs shall meet the requirements of Sections 4.1 through 4.8.

4.1.2 Certification and Accreditation.

4.1.2.1 All certification shall be performed by a certification organization that meets the requirements specified in Section 4.2 and that is accredited for personal protective equipment (PPE) in accordance with ISO 17065, Conformity assessment — Requirements for bodies certifying products, processes and services.
4.1.2.2 The accreditation shall be issued by an accreditation body operating in accordance with ISO 17011, *Conformity assessment — General requirements for accreditation bodies accrediting conformity assessment bodies*.

4.1.3 Manufacturers shall not claim compliance with portions or segments of the requirements of this standard and shall not use the NFPA name or the name or identification of this standard in any statements about their respective product(s) unless the product(s) is certified as compliant with all applicable requirements of this standard.

4.1.4 Where RF devices or RSMs are compliant, the product shall be labeled and listed.

4.1.5 Where RF devices or RSMs are compliant, the product shall also have a product label that meets the requirements specified in Section 5.1.

4.1.6 The certification organization’s label, symbol, or identifying mark shall be one of the following:
   1. Attached to the product label
   2. Part of the product label
   3. Immediately adjacent to the product label

4.2 Certification Program.

4.2.1 The certification organization shall not be owned or controlled by the manufacturers or vendors of the product being certified.

4.2.2 The certification organization shall be primarily engaged in certification work and shall not have a monetary interest in the product’s ultimate profitability.

4.2.3 Accreditation.

4.2.3.1 The certification organization shall be accredited for PPE in accordance with ISO 17065, *Requirements for bodies certifying products, processes and services*.

4.2.3.2 The accreditation shall be issued by an accreditation body operating in accordance with ISO 17011, *Conformity assessment — General requirements for accreditation bodies accrediting conformity assessment bodies*.

4.2.4 The certification organization shall refuse to certify products to this standard that do not comply with all applicable requirements of this standard.
4.2.5 The contractual provisions between the certification organization and the manufacturer shall specify that certification is contingent on compliance with all applicable requirements of this standard.

4.2.5.1 The certification organization shall not offer or confer any conditional, temporary, or partial certifications.

4.2.5.2 Manufacturers shall not be authorized to use any label or reference to the certification organization on products that are not compliant with all applicable requirements of this standard.

4.2.6 The certification organization shall have laboratory facilities and equipment available for conducting required tests to determine product compliance.

4.2.6.1 The certification organization laboratory facilities shall have a program in place and functioning for calibration of all instruments, and procedures shall be in use to ensure accurate control of all testing.

4.2.6.2 The certification organization laboratory facilities shall follow best practices regarding the use of laboratory manuals, form data sheets, documented calibration and calibration routines, performance verification, proficiency testing, and staff qualification and training programs.

4.2.7 The certification organization shall require the manufacturer to establish and maintain a quality assurance program that meets the requirements of Section 4.5.

4.2.7.1 The certification organization shall require the manufacturer to have a product recall system as specified in Section 4.8 as part of the manufacturers’ quality assurance program.

4.2.7.2 The certification organization shall audit the manufacturer’s quality assurance program to ensure that the quality assurance program provides continued product compliance with this standard.

4.2.8 The certification organization and the manufacturer shall evaluate any changes affecting the form, fit, or function of the compliant product to determine its continued certification to this standard.

4.2.9 The certification organization shall have a follow-up inspection program of the manufacturer’s facilities of the compliant product with at least two random and unannounced visits per 12-month period to verify the product’s continued compliance.

4.2.9.1 As part of the follow-up inspection program, the certification organization shall select samples of the compliant product at random from the manufacturer’s production line, from the manufacturer’s in-house stock, or from the open market.
4.2.9.2 Samples shall be evaluated by the certification organization to verify the product’s continued compliance to ensure that the materials, components, and manufacturing quality assurance systems are consistent with the materials, components, and manufacturing quality assurance that were inspected and tested by the certification organization during initial certification and recertification.

4.2.9.3 The certification organization shall be permitted to conduct specific testing to verify the product’s continued compliance.

4.2.9.4 For products, components, and materials where prior testing, judgment, and experience of the certification organization have shown results to be in jeopardy of not complying with this standard, the certification organization shall conduct more frequent testing of sample product, components, and materials acquired in accordance with 4.2.9.1 against the applicable requirements of this standard.

4.2.10 The certification organization shall have in place a series of procedures, as specified in Section 4.6, that address reports of situations in which a compliant product is subsequently found to be hazardous.

4.2.11 Appeals.

4.2.11.1 The certification organization’s operating procedures shall provide a mechanism for the manufacturer to appeal decisions.

4.2.11.2 The procedures shall include the presentation of information from both sides of a controversy to a designated appeals panel.

4.2.12 Name and Label Protection.

4.2.12.1 The certification organization shall be in a position to use legal means to protect the integrity of its name and label.

4.2.12.2 The name and label shall be registered and legally defended.

4.3 Inspection and Testing.

4.3.1 For both initial certification and recertification of compliant products, the certification organization shall conduct both inspection and testing as specified in Section 4.3.

4.3.2 All inspections, evaluations, conditioning, and testing for certification or for recertification shall be conducted by a certification organization’s testing laboratory that is accredited in accordance with the requirements of ISO 17025, General requirements for the competence of testing and calibration laboratories.
4.3.2.1 The certification organization’s testing laboratory’s scope of accreditation to ISO 17025, *General requirements for the competence of testing and calibration laboratories*, shall encompass testing of RF devices.

4.3.2.2 The accreditation of a certification organization’s testing laboratory shall be issued by an accreditation body operating in accordance with ISO 17011, *Conformity assessment—General requirements for accreditation bodies accrediting conformity assessment bodies*.

4.3.3 A certification organization shall be permitted to utilize conditioning and testing results conducted by a product or component manufacturer for certification or recertification, provided the manufacturer’s testing laboratory meets the requirements specified in 4.3.3.1 through 4.3.3.5.

4.3.3.1 The manufacturer’s testing laboratory shall be accredited in accordance with the requirements of ISO 17025, *General requirements for the competence of testing and calibration laboratories*.

4.3.3.2 The manufacturer’s testing laboratory’s scope of accreditation to ISO 17025, *General requirements for the competence of testing and calibration laboratories*, shall encompass testing of RF devices.

4.3.3.3 The accreditation of a manufacturer’s testing laboratory shall be issued by an accreditation body operating in accordance with ISO 17011, *Conformity assessment — General requirements for accreditation bodies accrediting conformity assessment bodies*.

4.3.3.4 The certification organization shall approve the manufacturer’s testing laboratory.

4.3.3.5 The certification organization shall determine the level of supervision and witnessing of the conditioning and testing for certification or recertification conducted at the manufacturer’s testing laboratory.

4.3.4 Sampling levels for testing and inspection shall be established by the certification organization and the manufacturer to ensure that products certified to this standard are compliant, unless such sampling levels are specified herein.

4.3.5 Inspection and evaluation by the certification organization shall include a review of all product labels to ensure that all required label attachments, compliance statements, certification statements, and other product information are at least as specified for RF devices in Section 5.1.

4.3.6 Inspection and evaluation by the certification organization shall include an evaluation of any symbols and pictorial graphic representations used on product labels or in user
information, as permitted in 5.1.5, to ensure that the symbols are explained in the product’s user information package.

4.3.7 Inspection and evaluation by the certification organization shall include a review of the user information required by Section 5.2 to ensure that the information has been developed and is available.

4.3.8 Inspection and evaluation by the certification organization for determining compliance with the design requirements specified in Chapter 6 shall be performed on whole or complete products.

4.3.9 Testing to determine compliance of the RF device with the performance requirements specified in Chapter 7 shall be conducted by the certification organization in accordance with the specified testing requirements of Chapter 8 and in the order as specified in Table 4.3.9(a).

<table>
<thead>
<tr>
<th>Specimen 1–3</th>
<th>Specimen 4–6</th>
<th>Specimen 7–9</th>
<th>Specimen 10–12</th>
<th>Specimen 13–15</th>
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<td>PESQ (Section 8.2)</td>
<td>PESQ (Section 8.2)</td>
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<td>Corrosion Resistance Test (Section 8.6)</td>
<td>PESQ (Section 8.2)</td>
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<td>Label Durability and Legibility (Section 8.10)</td>
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<td>PESQ (Section 8.2)</td>
<td>Label Durability and Legibility (Section 8.10)</td>
<td>Label Durability and Legibility (Section 8.10)</td>
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<td>PESQ (Section 8.2)</td>
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</table>

4.3.9.1 Testing to determine compliance of RSMs with the performance requirements specified in Chapter 7 that can be connected to the RF device shall be conducted by the certification organization in accordance with the specified testing requirements of Chapter 8 and in the order as specified in Table 4.3.9.1.
### Table 4.3.9.1 Test Matrix Table

<table>
<thead>
<tr>
<th>Specimen 1–3</th>
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<td>PESQ (Section 8.2)</td>
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</tr>
</tbody>
</table>

### 4.3.9.2 Testing shall be performed on new RF devices or RSMs.

### 4.3.9.3 Testing shall be performed on specimens representative of materials and components used in the actual construction of the compliant product.

### 4.3.9.4 The certification organization also shall be permitted to use sample materials cut from a representative product.

### 4.3.9.5 Where any manufacturer-supplied accessories or enhancements are built into, attached to, or detachable from the RF devices or RSMs for use in the hazard zone, the certification organization shall do the following:

1. Inspect and evaluate the RF devices and RSMs as specified in Chapter 6
2. Test the RF devices and RSMs as specified in Chapter 8

### 4.3.9.6 The RF devices and RSMs shall meet all the performance requirements specified in Chapter 7 with those accessories and enhancements installed or attached to ensure that the performance and functions of the RF devices and RSMs are not reduced or otherwise negatively
affected.

4.3.10 For evaluation and testing for certification purposes, the certification organization shall accept from the manufacturer only product or product components that are the same in every respect as the actual final product or product component.

4.3.11 The certification organization shall not allow any modifications, pretreatment, conditioning, or other such special processes of the product or any product component prior to the product’s submission for evaluation and testing by the certification organization.

4.3.12 The certification organization shall not allow the substitution, repair, or modification — other than as specifically permitted herein — of any product or any product component during testing.

4.3.13 The certification organization shall not allow test specimens that have been conditioned and tested for one method to be reconditioned and tested for another test method unless specifically permitted in the test method.

4.3.14 Certification of Changes.

4.3.14.1 Material changes in the form, fit, or function of a compliant product shall necessitate new inspection and testing to verify compliance to all applicable requirements of this standard that the certification organization determines can be affected by such change.

4.3.14.2 This recertification shall be conducted before labeling the modified product as being compliant with this standard.

4.3.15 Certification Data.

4.3.15.1 The manufacturer shall maintain all design, performance, inspection, and test data from the certification organization used in the certification of the manufacturer’s compliant product.

4.3.15.2 The manufacturer shall provide such data, upon request, to the purchaser or authority having jurisdiction (AHJ).

4.3.16 Accessory Certification.

4.3.16.1 Where an RF device submitted for certification to this standard is also submitted with an accessory or compatible device that is built into or attached to the RF device, or sold for later attachment to the RF device, and an NFPA standard exists for the product performance associated with the accessory or compatible device, the accessory or compatible device shall be certified to the standard associated with the accessory or compatible device.
4.3.16.2 In all cases, such accessories or compatible devices shall not degrade the performance of the RF device.

4.4 Annual Verification of Product Compliance.

4.4.1 Recertification.

4.4.1.1 All RF devices and RSMs that are certified as compliant with this standard shall undergo recertification on an annual basis.

4.4.1.2 This recertification shall include the following:

(1) Inspection and evaluation to all design requirements as required by this standard on all manufacturer’s models and components
(2) Testing to all performance requirements as required by this standard on all manufacturer’s models and components within the following protocols:
   (a) Where a test method incorporates testing both before and after preconditioning and the test generates quantitative results, recertification testing shall be limited to the conditioning that yielded the worst-case test result during the initial certification for the model or component.
   (b) Where a test method requires testing of three specimens, a minimum of one specimen shall be tested for annual recertification.
   (c) Where a test method requires testing of five or more specimens, a minimum of two specimens shall be tested for annual recertification.

4.4.2 Samples of manufacturer’s models and components for recertification acquired from the manufacturer or a component supplier during random and unannounced visits as part of the follow-up inspection program in accordance with 4.2.9 shall be permitted to be used toward annual recertification.

4.4.3 Certification Data.

4.4.3.1 The manufacturer shall maintain all design, performance inspections, and test data from the certification organization used in the recertification of manufacturer’s models and components.

4.4.3.2 The manufacturer shall provide such data, upon request, to the purchaser or AHJ.

4.5 Manufacturers’ Quality Assurance Program.

4.5.1 The manufacturer shall provide and operate a quality assurance program that meets the requirements of Section 4.5, including a product recall system as specified in 4.2.7.1 and Section 4.8.
4.5.2 The operation of the quality assurance program shall evaluate and test compliant product production to the requirements of this standard to ensure that production remains in compliance.

4.5.3 The manufacturer shall be registered to ISO 9001, *Quality management systems — Requirements*.

4.5.3.1 Registration to the requirements of ISO 9001, *Quality management systems — Requirements*, shall be conducted by a registrar that is accredited for PPE in accordance with ISO/IEC 17021, *Conformity assessment — Requirements for bodies providing audit and certification of management systems*.

4.5.3.2 The scope of the ISO registration shall include at least the design and manufacturing systems management for the PPE being certified.

4.5.3.3 The registrar shall affix the accreditation mark on the ISO registration certificate.

4.5.4 Any entity that meets the definition of *manufacturer* as specified in 3.3.35 and therefore is considered to be the “manufacturer,” but does not manufacture or assemble the compliant product, shall meet the requirements specified in Section 4.5.

4.5.5 Where the manufacturer uses subcontractors in the construction or assembly of the compliant product, the locations and names of all subcontractor facilities shall be documented and provided to the manufacturer’s ISO registrar and the certification organization.

4.6 Failure Mode and Effects Analysis (FMEA) for RF Devices and RSMs.

4.6.1* An FMEA shall be applied throughout the development process.

4.6.2 The FMEA shall do the following:

1. Address RF devices or RSMs
2. Identify and prioritize those critical failures that could have a serious effect on the safety and reliability of a device in the anticipated operating environments

4.6.3 Failure Mode.

4.6.3.1 The FMEA shall tabulate potential failure modes and their effects on the performance of an RF device or RSM.

4.6.3.2 The failure mode shall describe how the system might fail.

4.6.4* FEMA Use.
4.6.4.1 The device manufacturer shall use FMEA to address the reduction of risk of random and systematic failures of the RF device or RSM by using as low as reasonably practical (ALARP) region activities, as shown in Figure 4.6.4.1.

![Image of ALARP Region Activities]

**Figure 4.6.4.1 ALARP Region Activities.**

4.6.4.2 The device manufacturer shall include the risk priority number (RPN) corresponding to the upper limit of the ALARP region in the FMEA report.

4.6.5 ALARP Limits.

4.6.5.1 Where a device system RPN is above the upper limit of the ALARP region, as determined by the manufacturer, one or more of the practices specified in 4.6.5.2 shall be permitted.

4.6.5.2 Verification of the manufacturers' design and testing practices shall include documentation of at least temperature, vibration, and wetness exposure data; hours of operation; and management of change information.

4.6.6 The FMEA report shall be provided to the certification organization.

4.7 Hazards Involving Compliant Product.

4.7.1 Hazardous Product Reporting Procedure.

4.7.1.1 The certification organization shall establish procedures for where a compliant product is reported as hazardous.

4.7.1.2 These procedures shall comply with the provisions of ISO 27, *Guidelines for corrective action to be taken by a certification body in the event of misuse of its mark of conformity*, and as modified herein.

4.7.2 Where a report of a hazard involved with a compliant product is received by the certification organization, the validity of the report shall be investigated.
4.7.3 With respect to a compliant product, a hazard shall be a condition, or create a situation, that results in exposing life, limb, or property to a dangerous or imminently dangerous condition.

4.7.4 Where a specific hazard is identified, the determination of action for the certification organization and the manufacturer to undertake shall take into consideration the severity of the hazard and its consequences to the safety and health of users.

4.7.5 Where it is established that a hazard is involved with a compliant product, the certification organization shall determine the scope of the hazard, including products, model numbers, serial numbers, factory production facilities, production runs, and quantities involved.

4.7.6 The certification organization’s investigation shall include, but not be limited to, the extent and scope of the problem as it might apply to other compliant product or compliant product components manufactured by other manufacturers or certified by other certification organizations.

4.7.7 The certification organization shall also investigate reports of a hazard where compliant product is gaining widespread use in applications not foreseen when the standard was written, such applications in turn being ones for which the product was not certified, and no specific scope of application has been provided in the standard, and no limiting scope of application was provided by the manufacturer in written material accompanying the compliant product at the point of sale.

4.7.8 The certification organization shall require the manufacturer of the compliant product or the manufacturer of the compliant product component, if applicable, to assist the certification organization in the investigation and to conduct its own investigation as specified in Section 4.8.

4.7.9 Where the facts indicating a need for corrective action are conclusive and the certification organization’s appeal procedures referenced in 4.2.11 have been followed, the certification organization shall initiate corrective action immediately, provided there is a manufacturer to be held responsible for such action.

4.7.10 Where the facts are conclusive and corrective action is indicated, but there is no manufacturer to be held responsible, such as when the manufacturer is out of business or the manufacturer is bankrupt, the certification organization shall immediately notify relevant governmental and regulatory agencies and issue a notice to the user community about the hazard.

4.7.11 Where the facts are conclusive and corrective action is indicated, the certification organization shall take one or more of the following corrective actions:

(1) Parties authorized and responsible for issuing a safety alert shall be notified when, in the opinion of the certification organization, such a safety alert is necessary to inform the users.
(2) Parties authorized and responsible for issuing a product recall shall be notified when, in the opinion of the certification organization, such a recall is necessary to protect the users.
(3) The mark of certification shall be removed from the product.
(4) Where a hazardous condition exists and it is not practical to implement the corrective actions in 4.7.11(1), 4.7.11(2), or 4.7.11(3) or where the responsible parties refuse to take corrective action, the certification organization shall notify relevant governmental and regulatory agencies and issue a notice to the user community about the hazard.

4.7.12 The certification organization shall provide a report to the organization or individual identifying the reported hazardous condition and notify that organization or individual of the corrective action indicated or that no corrective action is indicated.

4.8 Manufacturers’ Investigation of Complaints and Returns.

4.8.1 Manufacturers shall provide corrective action in accordance with ISO 9001, *Quality management systems — Requirements*, for investigating written complaints and returned products.

4.8.2 Manufacturers’ records of returns and complaints related to safety issues shall be retained for at least 5 years.

4.8.3 Where the manufacturer discovers, during the review of specific returns or complaints, that a compliant product or compliant product component can constitute a potential safety risk to end users and is possibly subject to a safety alert or product recall, the manufacturer shall immediately contact the certification organization and provide all information about its review to assist the certification organization with the investigation.


4.9.1 Manufacturers shall establish a written safety alert system and a written product recall system that describes the procedures to be used in the event that they decide or are directed by the certification organization to either issue a safety alert or conduct a product recall.

4.9.2 The manufacturers’ safety alert and product recall systems shall provide the following:

(1) The establishment of a coordinator and responsibilities by the manufacturer for the handling of safety alerts and product recalls.
(2) A method of notifying all dealers, distributors, purchasers, users, and the NFPA about the safety alert or product recall that can be initiated within 1 week following the manufacturer’s decision to issue a safety alert or to conduct a product recall or after the manufacturer has been directed by the certification organization to issue a safety alert or conduct a product recall.
(3) Techniques for communicating the nature of the safety alert or product recall and, in particular, the specific hazard or safety issue found to exist.
(4) Procedures for removing product that is recalled and for documenting the effectiveness of the product recall
(5) A plan for repairing or replacing product or for compensating purchasers for returned product

Chapter 5 Product Labeling and Information

5.1 Product Label Requirements.

5.1.1 Each compliant RF voice communications device (RF device) shall have a product label permanently attached to the complete assembled product.

5.1.2 Multiple label pieces shall be permitted to carry all statements and information required to be on the product label; however, all label pieces that the product label comprises shall be located adjacent to each other.

5.1.3 Labels and Lettering.

5.1.3.1 The certification organization’s label, symbol, or identifying mark shall be attached to the product label or be part of the product label.

5.1.3.2 The label, symbol, or identifying mark shall be at least 6 mm (1/4 in.) in height.

5.1.3.3 All letters shall be at least 1.5 mm (1/32 in.) in height.

5.1.3.4 Arial font in capital letters shall be used for all label lettering.

5.1.4 All worded portions of the required product label shall be at least in English.

5.1.5 Symbols and other pictorial graphic representations shall be permitted to be used to supplement worded statements on the product label(s).

5.1.6 The compliance image as shown in Figure 5.1.6 shall be printed on the RF device label, all certified accessory labels, and all remote speaker microphone (RSM) labels.

Figure 5.1.6 Compliance Label.
Note: replace “certification company here” with blank box, and “certification organization logo to be placed here” outside the box with arrow pointing to the box, and add DO NOT REMOVE THIS LABEL! Under (1802-2021.

5.1.7 Each RF device, rechargeable power source, accessory, and RSM shall be marked directly with the serial number and the year and month of manufacture.

5.2 User Information.

5.2.1 The manufacturer shall provide with each product at least the informational material and user instructions specified in Section 5.2.

5.2.2 At the time of purchase, the manufacturer shall provide to the purchaser an information sheet with each product that documents at least the following:

(1) Date of manufacture
(2) Model number
(3) Serial number
(4) Lot number, if applicable

5.2.3* Information and materials intended for the end user in the field regarding use shall be provided on at least the following topics:

(1) Safety considerations
(2) Recommended preuse (daily/shift) and periodic (monthly, quarterly, annually as recommended by the manufacturer) inspections, including connections to RSMs and...
attachment of accessories
(3) Limitations of use
(4) Power source requirements, type, and brand
(5) Estimated operation time on fully charged power source in each available mode
(6) Low-power source visual indicator and power supply replacement/recharging procedures, as applicable
(7) Location and description of device features, controls, knobs, buttons, displays, sounds, and their operational use, including any features that are programmable and can be defined by the AHJ
(8) Device/feature/RSM failure and fallback indications and operations
(9) Marking recommendations and restrictions to prevent damage to the case or impairment of operation
(10) Recommended storage practices
(11) Cleaning instructions and precautions for a typical firefighting environment
(12) Disinfecting procedures if exposed to chemical or biological hazards
(13) Periodic maintenance frequency and details
(14) Guidelines for requesting service and repair

5.2.4 Information and operational materials intended for RF communications systems administrators shall be provided on at least the following topics:
(1) Information and training regarding the availability, selection, and programming of RF device or RSM programmable features and options
(2) Information and training regarding design and implementation of the RF device or RSM
(3) Information regarding periodic maintenance, warranty, service, repair, and unit replacement and retirement considerations for the RF devices or RSM
(4) Maximum rated volume and associated volume control setting
(5) Maximum RF transmit power in all bands and modes of operation

5.2.5 The following statement shall appear on the first page of all operating manuals provided as specified in 5.2.3 and 5.2.4:

THIS DEVICE MEETS THE REQUIREMENTS OF NFPA 1802, STANDARD ON TWO-WAY, PORTABLE VOICE COMMUNICATIONS DEVICES FOR USE BY EMERGENCY SERVICES PERSONNEL IN THE HAZARD ZONE, 2021 EDITION.

Chapter 6 Design Requirements

6.1 General Design Requirements.

6.1.1 All RF voice communications devices (RF devices) and remote speaker microphones (RSM) shall meet the applicable design requirements specified in Section 9.3.6 of NFPA 1221.
6.1.2 Interoperability.

6.1.2.1 All certified RF devices shall be interoperable with all certified RSMs.

6.1.2.2 The RF device shall be capable of being interoperable with wired and wireless certified RSMs.

6.1.3 All RF devices and RSMs shall have at least the applicable design requirements specified in this chapter when inspected and evaluated by the certification organization as specified in Section 4.3.

6.1.4* Transmission modes shall include, at a minimum, analog conventional FM and, when required by the AHJ, P25 conventional transmission modes.

6.1.4.1 All RF devices shall have a visual indicator that displays the remaining capacity of the power source when the RF device is powered on.

6.1.4.2 The power source visual indicator shall display the state of the available capacity from full to nearly depleted as follows and as shown in Figure 6.1.4.2:

(1) Four segments displayed — 76 to 100 percent available power source.
(2) Three segments displayed — 51 to 75 percent available power source.
(3) Two segments displayed — 26 to 50 percent available power source.
(4) One segment displayed — 0 to 25 percent available power source.
(5) The power source visual indicator flashes when less than 25 percent capacity remains.
(6) The RF device emits an audible alert recurring every two minutes when less than 25 percent capacity remains.

Figure 6.1.4.2 Power Source Visual Indicator.

<table>
<thead>
<tr>
<th>Power Level</th>
<th>Display</th>
</tr>
</thead>
<tbody>
<tr>
<td>76-100%</td>
<td>📦 📦 📦 📦 📦</td>
</tr>
<tr>
<td>51-75%</td>
<td>📦 📦 📦 📦</td>
</tr>
<tr>
<td>26-50%</td>
<td>📦 📦 📦</td>
</tr>
<tr>
<td>0-25%</td>
<td>📦 📦</td>
</tr>
<tr>
<td>Flashing</td>
<td>📦 📦 📦 📦 📦 📦 📦</td>
</tr>
</tbody>
</table>

6.1.5 Service Life.
6.1.5.1 Unless otherwise specified, all operational controls, including, but not limited to, switches, buttons, and keys, shall be rated for a service life of not less than 50,000 cycles.

6.1.5.2 Rotary knobs shall be rated for a service life of not less than 10,000 cycles.

6.1.6 All controls shall be designed to prevent unintentional activation, deactivation, and change of operation.

6.1.7 All controls and connectors shall be capable of being operated by a gloved hand.

6.1.7.1 The gloves shall comply with the structural fire-fighting glove requirements of NFPA 1971.

6.1.7.2 The gloves shall meet the following additional requirements:

1. The gloves shall be in as-received condition.
2. The size shall be large.
3. The outer shell shall be a minimum of 3.25 oz/yd² American sourced and tanned cowhide.
4. The thermal liner system shall be a minimum of 7.5 oz/yd².

6.2 Hazard Zone Mode.

6.2.1* Capability.

6.2.1.1 All RF devices shall be capable of both the hazard zone mode and the nonhazard zone mode.

6.2.1.2 The minimum volume of the RF device in the hazard zone mode shall be 24 dB +0/−6 dB below the sound pressure level (SPL) as specified in 6.4.2.

6.2.2 All RF devices shall have the capability to enable the nonhazard zone mode via programmable switch activation, or by being preprogrammed to a channel talkgroup or talk path via use of the mode switch.

6.2.3 When initially powered on, the RF device shall default to the hazard zone mode.

6.2.4* The RF device in the hazard zone mode shall be capable of being programmed by the AHJ to be powered off with two separate actions.

6.3 Location of Controls and Features.

6.3.1 The RF device shall include the following:
(1) Speaker
(2) Microphone
(3) Minimum of one programmable side button capable of being programmed as required by the AHJ
(4)* Two-position programmable switch capable of being programmed as required by the AHJ
(5)* Three-position programmable switch capable of being programmed as required by the AHJ

6.3.2 The front of the RF device shall be the side facing the viewer when the push-to-talk (PTT) button is located on the left side.

6.3.3 The top of the RF device shall have following controls and features:

(1) Power/volume knob
(2) Selector knob
(3) EAB (emergency alert button)
(4) External antenna, if so equipped
(5) Display
(6) Transmit/receive indicator
(7) Two programmable selector switches, one capable of at least three positions and one capable of at least two positions, capable of being programmed as required by the AHJ

6.3.4 Any additional controls or features on the top of the RF device shall not interfere with any of the required controls.

6.3.5 Left Side.

6.3.5.1 The left side of the RF device shall include the following:

(1) PTT button
(2)* At least one programmable button

6.3.5.2 Any additional controls or features on the left side of the RF device shall not interfere with any of the required controls.

6.3.6* Time-Out Timer.
6.3.6.1 The RF device shall have a transmit time-out timer, which shall be set at the factory for 1 minute.

6.3.6.2 This time-out timer shall be capable of being set by programming by the AHJ to values between 30 seconds and 180 seconds.

6.4 Power/Volume Knob.

6.4.1 The RF device shall have a power/volume knob that rotates clockwise to power on the RF device.

6.4.1.1 The power/knob shall have an audible and tactile click during the transition from power off to power on and the transition from power on to power off.

6.4.1.2 The power/volume knob shall control the volume.

6.4.1.2.1 A clockwise rotation of the power/volume knob shall increase the volume.

6.4.1.2.2 A counterclockwise rotation of the power/volume knob shall decrease the volume.

6.4.2 The RF device, or an RSM containing a loudspeaker, shall be capable of producing a sound pressure level of no less than 88dBA with the volume control set to its maximum position when measured by the method specified in TIA 603E, Section 2.1.20.

6.4.3 When the RF device is powered off in the hazard mode, it shall have the following voice annunciation: “powering off.”

6.5 Selector Knob.

6.5.1 General.

6.5.1.1 The RF device shall have a programmable selector knob.

6.5.1.2 The selector knob shall be differentiated in size and shape from the power/volume knob.

6.5.2* The selector knob shall have the following functions and features:

(1) Minimum of 16 positions

(2) Detent at each position

(3) Hard stops at the minimum and maximum positions

(4) Turning resistance designed to minimize accidental rotation

(5) Ability to change channels, talkgroups, or talk paths
6.6 Display.

6.6.1 The RF device shall include a display of at least eight characters visible without scrolling, and additional characters visible with continuous scrolling.

6.6.2 Backlight Illumination.

6.6.2.1 The display shall be capable of being illuminated by means of backlighting when any RF device control is manipulated.

6.6.2.2 The display shall be capable of allowing the AHJ to program the backlight illumination time.

6.6.3 The display shall be backlit on the RF device that initiated the emergency mode, and be backlit on all RF devices that are receiving the emergency message, until reset in accordance with 6.8.9.

6.6.3.1 Both backlights shall meet the design requirements of 6.15.2.

6.6.3.2 The AHJ shall be allowed to determine the backlight illumination time for the non-initiator of the EAB.

6.6.4 Readability.

6.6.4.1 All displays shall be able to be read from a distance of 2 ft in all modes when backlit and in a completely dark room.

6.6.4.2 All displays shall be able to be read from a distance of 2 ft in all modes when backlit and in daylight.

6.7 Visual Indicators.

The RF device shall have visual indicators to inform the user of event conditions as specified in Section 6.15.

6.8 Emergency Alert Button (EAB).

6.8.1 The EAB shall be located adjacent to the base of the external antenna, if so equipped, or, if not so equipped, adjacent to a guiding feature on the top of the RF device.

6.8.2 The EAB shall be international orange in color.

6.8.3 The EAB shall comprise a minimum of 113 mm\(^2\) (0.175 in\(^2\)) of projected surface area.

6.8.4 The EAB shall be designed to minimize accidental activation.

6.8.5* Activation/Deactivation.

6.8.5.1 The EAB shall be activated after a continuous press of 1 second.
6.8.5.2 After EAB activation, the EAB shall be capable of being programmed to be deactivated after a subsequent continuous press of at least 2 seconds.

6.8.6 The activation of the alert button shall cause the RF device to transmit an emergency alert in accordance with TIA-102.AABD, *Project 25 Trunking Procedures*.

6.8.7 The RF device shall transmit the user ID at the highest RF power the RF device is capable of transmitting and in compliance with the licensing authority.

6.8.7.1 Subsequent emergency transmissions shall be at the highest RF power the RF device is capable of transmitting and in compliance with the radio licensing authority until emergency activation is cleared.

6.8.7.2 The emergency signal shall use the trunking signaling block (TSBK) protocol when operating in analog conventional mode as specified in TIA-5045, *Numeric Identifier for Conventional Analog Operation*.

6.8.7.2.1* The AHJ shall be permitted to select one of the following optional protocols in addition to the TSBK protocol, based on operational need:

   (1) MDC 1200
   (2) DTMF
   (3) P25
   (4) G-Star
   (5) Other closed proprietary signaling system

6.8.8 The RF device shall have one of the following capabilities for voice transmission upon activation of the emergency button:

   (1)* Remain on selected channels, talkgroups, or talk paths
   (2)* Revert to preprogrammed transmission channels, talkgroups, or talk paths

6.8.8.1 Voice transmission, as specified in 6.8.7.1, shall be at the highest RF power the RF device is capable of transmitting and in compliance with the radio licensing authority.

6.8.8.2 Subsequent voice transmissions from the RF device that initiated the emergency signal shall be at the highest RF power the RF device is capable of transmitting until emergency activation is cleared.

6.8.9 The displayed emergency indication shall remain activated until reset by the initiating user as determined by the AHJ.
6.8.9.1 The receiving RF device shall be capable of allowing the AHJ to:

(1) Configure it to emit a distinct audible tone for 3 seconds at maximum volume upon receipt of an emergency activation from another RF device
(2) Display user data by referring to an internally stored ID database
(3) Program the RF device to increase its audio output to maximum volume regardless of knob position

6.8.9.2 The receiving RF device shall display the user ID of the initiating RF device.

6.8.9.2.1 The user ID shall be permitted to be cleared from the display at the cessation of the emergency activation.

6.8.9.2.2* Additional emergency alarms received during an incident shall be displayed together with prior emergency alarms of the same incident that have not been cancelled.

6.8.9.3 ID Display.

6.8.9.3.1 The RF device shall have the capability of displaying the user ID of at least 20 active emergency alerts.

6.8.9.3.2 The RF device shall be capable of displaying an ID of a minimum of 14 alphanumeric characters.

6.9 Remote Speaker Microphone.

6.9.1 All voice announcements and audible notifications from the RF device shall also be audible through the connected RSM.

6.9.2 The RSM shall have at least one PTT button.

6.9.3 The RSM shall have an EAB that meets the requirements of Section 6.8.

6.9.3.1 The EAB shall be located at the top of the RSM.

6.9.3.2 The EAB shall activate the user ID on the RF device as specified in 6.8.9.2.

6.9.4 Visual Indicators.

6.9.4.1 The RSM shall be permitted to have visual indicators to inform the user of event conditions as specified in Section 6.15.

6.9.4.2 The RF Device shall specify visual indicator color and status for the RSM with the data commands as specified in Table 6.21.1.
6.9.5* Programmable Button.

6.9.5.1 The RSM shall be permitted to include at least one programmable option button.

6.9.5.2 The RSM shall be permitted to specify the state of the programmable button, pressed or released, with the data commands specified in Table 6.21.1.

6.9.6* The RSM shall be permitted to connect to compatible devices via a wired or wireless connection.

6.10 RF Device Connector (RFDC).

6.10.1 An RF device or RSM using a wired connection shall connect with a 10-pin miniature version of US MIL-DTL-55116 (M55116) or equivalent.

6.10.1.1 The RF device shall have an RFDC plug.

6.10.1.2 The RSM shall have an RFDC jack.
6.10.1.3 The RFDC pin assignments shall be as specified in Figure 6.10.1.3 with requirements as specified in 6.10.1.3.1 through 6.10.1.3.10.

Figure 6.10.1.3 RFDC Pin Assignments.

6.10.1.3.1 Power+

6.10.1.3.1.1 Pin B shall be Power+, a DC voltage capable of providing power for a connected RSM or compatible device.

6.10.1.3.1.2 Power+ shall meet the requirements in Table 6.10.2.

6.10.1.3.2 GND. Pin C shall be GND, also known as system ground, the Power+ current return path and the logic voltage signal reference.

6.10.1.3.3 D+

6.10.1.3.3.1 Pin D shall be reserved for D+, one of the digital signal lines required for USB over which relevant commands are exchanged between RF device and RSM or other compatible device.

6.10.1.3.3.2 D+ shall meet the requirements specified in the Universal Serial Bus Specification Revision 2.0.

6.10.1.3.4 D−

6.10.1.3.4.1 Pin E shall be D−, the digital signal line complementing D+ for USB.
6.10.1.3.4.2 D– shall meet the requirements specified in the Universal Serial Bus Specification Revision 2.0.

6.10.1.3.5 Speaker+.

6.10.1.3.5.1 Pin F shall be Speaker+, an RF device analog output capable of directly driving a loud speaker element.

6.10.1.3.5.2 Speaker+ shall meet the requirements in Table 6.10.2.

6.10.1.3.6 Speaker−.

6.10.1.3.6.1 Pin G shall be Speaker−, an RF device analog output complementary to Speaker+.

6.10.1.3.6.2 Speaker− shall meet the requirements in Table 6.10.2.

6.10.1.3.7 PTT.

6.10.1.3.7.1 Pin J shall be PTT, the logical state of an RSM or compatible device’s PTT.

6.10.1.3.7.2 Logic LOW (0) shall indicate PTT is activated (i.e., pressed).

6.10.1.3.7.3 Logic HIGH (1) shall indicate the PTT is deactivated (i.e., released).

6.10.1.3.7.4 PTT shall meet the requirements in Table 6.10.2.

6.10.1.3.8 Emergency.

6.10.1.3.8.1 Pin K shall be Emergency, the logical state of an RSM or compatible device’s EAB.

6.10.1.3.8.2 Logic LOW (0) shall indicate EAB is activated (i.e., pressed).

6.10.1.3.8.3 Logic HIGH (1) shall indicate the EAB is deactivated (i.e., released).

6.10.1.3.8.4 EAB shall meet the requirements in Table 6.10.2.

6.10.1.3.9 MIC+.

6.10.1.3.9.1 Pin A shall be Mic+, which shall be both a microphone element DC bias as well as the analog small signal output from the same microphone element.
6.10.1.3.9.2 Microphone element DC bias as well as the microphone small signal shall meet the requirements in Table 6.10.2.

6.10.1.3.10 MIC−. Pin H shall be Mic−, the analog ground return for Mic+.

6.10.2 Where the RF device, RSM, or compatible device is equipped with the wired connection as specified in Section 6.10, it shall meet the requirements as specified in Table 6.10.2.

Table 6.10.2 Minimum Interface Electrical Requirements

<table>
<thead>
<tr>
<th>Signal Name</th>
<th>RF Device</th>
<th>RSM or Compatible Device</th>
<th>Compatible Device</th>
<th>Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>INPUT</td>
<td>OUTPUT</td>
<td>INPUT</td>
<td>OUTPUT</td>
</tr>
<tr>
<td>POWER+(pin B)/GND(pin C)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supply voltage</td>
<td>5.25 vdc</td>
<td>– 4.75 vdc</td>
<td>5.25 vdc</td>
<td>– 4.75 vdc</td>
</tr>
<tr>
<td></td>
<td>measured at respective output, reference to GND</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supply current</td>
<td>500mA</td>
<td>minimum</td>
<td>100mA</td>
<td>minimum</td>
</tr>
<tr>
<td>Speaker+(pin F)/Speaker−(pin G)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Speaker drive power</td>
<td>1.5W</td>
<td>minimum</td>
<td></td>
<td>measured at respective input, BTL configuration</td>
</tr>
<tr>
<td>Speaker impedance</td>
<td>8 ohms</td>
<td>minimum</td>
<td>8 ohms</td>
<td>minimum</td>
</tr>
<tr>
<td>Peak-to-peak voltage</td>
<td>20v_P-P</td>
<td>maximum</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mic+(pin A) /Mic−(pin H)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Microphone signal</td>
<td>6.4 mV&lt;sub&gt;rms&lt;/sub&gt; – 10 mV&lt;sub&gt;rms&lt;/sub&gt;</td>
<td>6.4 mV&lt;sub&gt;rms&lt;/sub&gt; – 10 mV&lt;sub&gt;rms&lt;/sub&gt;</td>
<td>Microphone input stimulus 94dBSPL</td>
<td></td>
</tr>
<tr>
<td>-------------------</td>
<td>-----------------------------------</td>
<td>-----------------------------------</td>
<td>---------------------------------</td>
<td></td>
</tr>
<tr>
<td>9.0 vdc – 4.5 vdc</td>
<td>Open circuit</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.0 vdc – 2.3 vdc</td>
<td></td>
<td>1mA Mic+/Mic- load</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

PTT (pin J), Emergency Activation Button (pin K)

<table>
<thead>
<tr>
<th>R1</th>
<th>400kΩ ± 5%</th>
<th>400kΩ ± 5%</th>
<th>Reference Figure 6.10.2</th>
</tr>
</thead>
<tbody>
<tr>
<td>R2</td>
<td>100kΩ ± 5%</td>
<td>100kΩ ± 5%</td>
<td></td>
</tr>
</tbody>
</table>

Figure 6.10.3 PTT and EAB Circuit Topology.
6.10.3 The PTT and EAB circuit topology shall be as specified in Figure 6.10.3.

6.10.4 The RFDC shall be capable of being manipulated into its mate by a gloved hand as specified in 6.1.6.

6.11 Failure Detection of Connected RSMs.

6.11.1 The RF device shall detect a failure of an RSM or total loss of connection within 500 milliseconds ± 10 milliseconds of the failure in hazard zone mode.

6.11.2 When a failure as specified in 6.11.1 occurs, at a minimum, the RF device shall perform the following actions:

   (1) All functions of the RF device shall be enabled, including those functions that had been disabled by connection to the RSM.
   (2) An audible alert message, “Failed Accessory,” shall be broadcast through all available speakers at maximum volume.
   (3) A visual alert message, “FAIL ACCSRY,” shall appear on the RF device display.
   (4) A change to the backlight as specified in 6.15.1 shall occur.

6.11.3 Audible and visual alert messages specified in 6.11.2 shall be cancelled when the user completes any one of the following actions:

   (1) Reinitiating a pairing with a wireless RF device
   (2) Power cycling the RF device
   (3) Connecting a new or repaired cabled optional accessory

6.12 Voice Announcement.

6.12.1 Language.

6.12.1.1 The RF device shall be equipped with a voice announcement in English.

6.12.1.2 Voice announcements in additional languages shall be permitted.

6.12.2 The voice announcement shall be active by default.

6.12.2.1 Voice announcements shall commence within 0.5 seconds ± 0.1 seconds of switching channels, talkgroups, or talk paths.

6.12.2.2 Receive Audio.

6.12.2.2.1 Receive audio shall have priority over any voice announcements.

6.12.2.2.2 Receive audio shall override such announcements if they both occur simultaneously.
6.12.2.2.3 Any overridden voice annunciation shall follow within 5 seconds ± 1 seconds of detecting the last PTT or received audio.

6.12.3 Order of Announcement.

6.12.3.1 In the event of simultaneous events, announcements shall be made according to the following list of precedence:

(1) Zone
(2) Channels, talkgroups, or talk paths
(3) Emergency, as specified in Section 6.8
(4) Failure of an RSM as specified in Section 6.11
(5) Out of range, if applicable in accordance with Section 6.13
(6) Self-diagnostic failure as described in Section 6.17
(7) Power off

6.12.3.2 Prerecorded voice files, user-created or voice synthesis files, or any combination thereof, shall be permitted to be used for any voice announcement, as determined by the AHJ.

6.12.4 Channel, talkgroup, or talk path name announcements shall be required.

6.12.5 Channel, talkgroup, or talk path voice announcements in the hazard zone mode shall be at a minimum of 50 percent of the maximum volume specified in 6.4.2.

6.12.6 Voice announcement shall commence within 0.5 seconds of powering on or switching channels, talkgroups, or talk paths, unless superseded by higher priority voice announcements.


Where the RF device operates on a system that has an out-of-range capability, the RF device shall detect if it is out-of-range within 1.0 minute ± 10 seconds.

6.14* Audible and Visible Event Indications.


6.14.1.1 The RF device shall detect if it is in-range and connected to a system, or out-of-range and loss of connection to a system; where applicable to the system type.

6.14.1.2 The RF device shall, within one (1) minute of detecting out-of-range and loss of connection to a system, display the following indications:

(1) All displays shall be backlit-flashing red when the RF device is out of range.
(2) The RF device shall emit an audible tone every 15 seconds (+/- 1 seconds), and the tone shall last 1 second (+0.5/-0 seconds) at 70% of factory set max volume level.

**6.14.1.3** The AHJ shall have the ability to program the out of range volume level to no less than 50% of factory set max volume.

**6.14.1.4** The AHJ shall have the ability to program a hold off time of 0 to 120 seconds to eliminate nuisance warnings.

**6.14.1.5** The RF device shall return to normal display, and the sound shall cease when it detects it is no long out-of-range and has reestablished connection to the system

**6.15 Visible Event Indications**

*(See A.6.14.)*

**6.15.1 LEDs.**

**6.15.1.1** All LEDs and display backlights on the RF device and RSM shall illuminate during the following event conditions as follows:

1. **Emergency indication;** an emergency alarm signal is indicated by flashing orange and receiving an emergency alarm signal is indicated by flashing red
2. **Connected RSM failure indication;** within 500 ms of detecting a failure as specified in 6.11.1, indicated by solid (i.e., continuous) orange
3. **Over-temperature indication;** immediately upon detecting an internal over-temperature event as specified in 6.16, indicated by solid (i.e., continuous) orange
4. **Out-of-range indication;** within one (1) minute (±5 seconds) of detecting out of range as specified in Section 6.14, indicated by flashing yellow
5. **Transmit and receive indication;** receive, indicated by continuous green; transmit, indicated by continuous red

**6.15.1.2** LEDs shall have the following operational states:

1. **ON:** LED is continuously illuminated
2. **OFF:** LED is not illuminated
3. **FLASHING:** LED provides a continuous sequence of On/ Off illumination states at a 1Hz frequency and 50 percent duty cycle.

**6.15.1.2 Bluetooth.**

**6.15.1.2.1** Successful Bluetooth pairing shall be indicated by continuous blue.
6.15.1.2.2 After successful pairing, continuous blue shall indicate the Bluetooth link is active.

6.15.2 When simultaneous events occur the indications priority shall be in order as listed in 6.15.1.

6.16 Internal Over-Temperature Event Indications.

6.16.1* The RF device shall detect an internal over-temperature event.

6.16.1.1 An RSM or compatible device shall be permitted to detect an internal over-temperature event.

6.16.1.2 The over-temperature limit shall be designated by the RF device or compatible device manufacturer.

6.16.2 An over-temperature event shall occur any time internal temperature exceeds the manufacturer’s designated temperature for 30 seconds ± 5 seconds.

6.16.3 Detection and Reporting.

6.16.3.1 The RF device shall detect an over-temperature event in both the RF device itself and any RSM that is so equipped to detect an internal over-temperature event.

6.16.3.2 An RSM shall be permitted to report an internal over-temperature event with the internal temperature data command as specified in Table 6.21.1.

6.16.4 The over-temperature event shall be displayed as "OVER TEMP" on the primary RF device’s display as specified in 6.6.1.

6.16.5 The over-temperature event shall be audibly announced "Over Temp" at maximum volume.

6.16.5.1 The over-temperature announcement shall be repeated every 5 minutes until reset by the AHJ service shop.

6.16.5.2 The over-temperature audible announcement shall not occur more frequently than every 5 minutes to prevent repeating announcements in the event of multiple consecutive short-duration over-temperature exposures.

6.16.6 The over-temperature condition shall be recorded in the RF device’s memory.

6.16.6.1 The start time of the over-temperature event shall be recorded when the event starts.

6.16.6.2 The end time and maximum temperature of the over-temperature event shall be recorded when the event ends.

6.16.6.3* Each over-temperature record shall indicate if it occurred in the RF device or a connected capable RSM.
6.16.7 Exposure.

6.16.7.1 If the RF device has been exposed to more than 10 minutes ± 30 seconds of cumulative over-temperature conditions, an audible announcement shall be made that states, "RF DEVICE HAS HAD LONG EXPOSURE TO EXTREME TEMPERATURES."

6.16.7.2 If the capable RSM has been exposed to more than 10 minutes ± 30 seconds of cumulative over-temperature conditions, an audible announcement shall be made that states, "THE OPTIONAL COMPONENT HAS HAD LONG EXPOSURE TO EXTREME TEMPERATURES."

6.17 Device Self-Checks.

6.17.1 The RF device shall perform mandatory self-checks to verify operation when the unit is initially powered up, periodic self-checks while it remains powered up, and periodic self-diagnostics every 5 minutes, at a minimum.

6.17.1.1 The RF device shall display a visual indication when it has failed the self-check.

6.17.1.2 The display shall be backlit red when the RF device does not pass the self-check.

6.17.1.3 The RF device shall have a voice annunciation of radio failure if the self-diagnostic tests fail.

6.17.2 The following functions shall be tested in self-check:

(1)* RSM connectivity to the RF device
(2) Loss of antenna connection to the RF device
(3) Temperature exposure over manufacturer recommended overheat temperature
(4) Battery has at least 50 percent of the total capacity available

6.17.3 Upon connecting an RSM to an RF device that is turned on, the RSM check shall take place automatically and thereafter on the periodic self-checks.

6.18 Database Requirements.

6.18.1 The RF device shall contain a database to store information related to operations.

6.18.2 The database shall reside in nonvolatile, nonremovable memory.

6.18.3 ID Storage.

6.18.3.1 The database shall be capable of storing user ID information.

6.18.3.2 The database shall be capable of storing a minimum of 3,000 user ID entries.
6.18.3.3 The user ID entry shall include the signaling-specific logical ID as well as an alias, if available, of at least 14 alphanumeric characters.

6.18.4 The RF device shall be capable of storing a list of user ID entries containing a minimum of the last 20 emergency activations, as specified in 6.8.9.3.

6.18.5 The RF device shall be capable of storing data logs as specified in Section 6.19.

6.19 Data Logging.

6.19.1 Memory.

6.19.1.1 RF devices shall incorporate data logging in nonvolatile memory.

6.19.1.2 At a minimum, each of the following events shall be identified, recorded, and time stamped in the data log:

   (1) RF device is turned on
   (2) Emergency button activation
   (3) Activation of user input, button press or switch
   (4) When power source levels are at initial power on, and then at 75 percent, 50 percent, 25 percent, 10 percent, and 5 percent capacity
   (5) RF device is turned off
   (6) Selection of channel, talkgroup, talk path, zone, mode, deck, bank, or mission plan
   (7) Internal electronics temperature exceeded limit specified by the manufacturer

6.19.2 The data logging information shall be downloadable by the emergency services organization.

6.19.3 The data logging shall have a minimum capacity of logging 2000 events.

6.20 Wireless Interface.

6.20.1 The RF device shall be capable of operating with Bluetooth 2.1 RSMs.

6.20.1.1 The RF device shall support the Bluetooth headset profile (HSP) and the Hands-free profile (HFP).
6.20.1.2 The RF device shall exchange speaker and microphone audio with a wireless RSM via HSP or HFP.

6.20.1.3 The RF device shall be capable of supporting the Bluetooth serial port profile (SPP).

6.20.1.4 The RF device shall exchange the data command and data response sets specified in Table 6.21.1 and Table 6.21.2 with a wireless RSM via SPP.

6.20.1.5 The RF device shall be capable of Bluetooth 2.1 secure simple pairing using “Just Works” mode.

6.20.1.6 The RF device shall be Bluetooth certified.

6.20.2 The RF device shall meet the connectivity requirements specified in 6.20.2.1 through 6.20.2.5.

6.20.2.1 The RF device shall remain paired to the last RSM or compatible device.

6.20.2.2 Upon power up, the RF device shall attempt to reconnect to the last paired RSM or compatible device.

6.20.2.3 The RF device shall have a minimum effective range of 1 m.

6.20.2.4 The RF device shall operate in the presence of six Bluetooth audio devices within a 5 m spherical radius.

6.20.2.5 The RF device shall attempt to restore a lost Bluetooth connection.

6.20.3 A wireless RSM or compatible device shall be capable of the requirements specified in 6.20.3.1 through 6.20.3.8.

6.20.3.1 A wireless RSM or compatible device shall be Bluetooth certified.

6.20.3.2 A wireless RSM or compatible device shall support the HSP or the HFP.

6.20.3.3 A wireless RSM or compatible device shall support the SPP.

6.20.3.4 A wireless RSM or compatible device shall be permitted to support the functionality specified in Section 6.10.

6.20.3.5 Button, LED and control functionality specified in Section 6.9 shall be supported with the data commands and responses specified in Table 6.21.1 and Table 6.21.2 over SPP.

6.20.3.6 Failure Detection.

6.20.3.6.1 If capable, upon detecting failure of any minimum operational requirements outlined in Section 6.9, a wireless compatible device shall intentionally end the wireless link to an RF device without notice.
6.20.3.6.2 Such action shall generate the RF device failure response of Section 6.11.

6.20.3.7 A wireless RSM or compatible device shall be permitted to report an internal over-temperature event with the data command specified in Table 6.21.1 over SPP.

6.20.3.8 A wireless RSM or compatible device shall be permitted to indicate to the RF device an intentional power-off procedure has been activated with the closing connection data command specified in Table 6.21.1 over SPP.

6.20.4 An RF device shall be permitted to connect with more than one Bluetooth RSM or compatible device.

6.20.5 A wireless RSM or compatible device shall be permitted to stand alone or be integrated into other equipment.

6.21 Data Commands.

6.21.1 The RF device shall support the data command set specified in Table 6.21.1(a) and Table 6.21.1(b).

6.21.2 A wired or wireless RSM shall be permitted to support the data command set specified in Table 6.21.2(a) and Table 6.21.2(b).

Table 6.21.1(a) Data Response Set Requirements

<table>
<thead>
<tr>
<th>Command</th>
<th>Format</th>
<th>ACK Required</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>PTT - Press</td>
<td>+PTT=P</td>
<td>No</td>
<td>PTT button pressed</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>RSM -&gt; RF device</td>
</tr>
<tr>
<td>+PTT=P received</td>
<td>+PTT=P&lt;cr&gt;&lt;lf&gt;OK</td>
<td>No</td>
<td>+PTT=P received</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>RF device -&gt; RSM</td>
</tr>
<tr>
<td>PTT - Release</td>
<td>+PTT=R</td>
<td>No</td>
<td>PTT button released</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>RSM -&gt; RF device</td>
</tr>
<tr>
<td>+PTT=R received</td>
<td>+PTT=R&lt;cr&gt;&lt;lf&gt;OK</td>
<td>No</td>
<td>+PTT=R received</td>
</tr>
<tr>
<td>Event</td>
<td>Field(s)</td>
<td>Result</td>
<td>Description</td>
</tr>
<tr>
<td>---------------</td>
<td>-------------------</td>
<td>--------</td>
<td>-----------------------------------------------------------</td>
</tr>
<tr>
<td>EAB - Press</td>
<td>+EMER=P</td>
<td>No</td>
<td>EAB pressed</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>RSM -&gt; RF device</td>
</tr>
<tr>
<td>+EMER=P received</td>
<td>+EMER=P&lt;cr&gt;&lt;lf&gt;OK</td>
<td>No</td>
<td>+EMER=P received</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>RF device -&gt; RSM</td>
</tr>
<tr>
<td>EAB - Release</td>
<td>+EMER=R</td>
<td>No</td>
<td>EAB released</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>RSM -&gt; RF device</td>
</tr>
<tr>
<td>+EMER=R received</td>
<td>+EMER=R&lt;cr&gt;&lt;lf&gt;OK</td>
<td>No</td>
<td>+EMER=R received</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>RF device -&gt; RSM</td>
</tr>
<tr>
<td>Radio Volume</td>
<td>+VGM=#0–15</td>
<td>Yes</td>
<td>wireless RSM intentionally closing connection – not an error or lost link</td>
</tr>
<tr>
<td></td>
<td>+VGS=#0–15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Closing</td>
<td>+CLOSE</td>
<td>Yes</td>
<td>wireless RSM intentionally closing connection – not an error or lost link</td>
</tr>
<tr>
<td>Connection</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LED Control*</td>
<td>+LED:0xid:0xstate:0xRR GGBB</td>
<td>Yes</td>
<td>id: 8 bit representation of LED visual event, defined in Table 6.23.3.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>state: 8 bit representation of LED behavior, defined in Table 6.23.4.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>color: 24 bit RGB representation of color</td>
</tr>
<tr>
<td>Programmable Button - Press</td>
<td>+BTN1=P</td>
<td>No</td>
<td>Programmable button pressed</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>RSM -&gt; RF device</td>
</tr>
<tr>
<td>+BTN1=P received</td>
<td>+BTN1=P&lt;cr&gt;&lt;lf&gt;OK</td>
<td>No</td>
<td>+BTN1=P received</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>RF device -&gt; RSM</td>
</tr>
<tr>
<td>Programmable Button - Release</td>
<td>+BTN1=R</td>
<td>No</td>
<td>Programmable button released RSM -&gt; RF device</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>------------------------</td>
<td>----</td>
<td>----------------------------------------------</td>
</tr>
<tr>
<td>+BTN1=R received</td>
<td>+BTN1=R&lt;cr&gt;&lt;lf&gt;OK</td>
<td>No</td>
<td>+BTN1=R received RF Device -&gt; RSM</td>
</tr>
<tr>
<td>Internal Temperature</td>
<td>+TEMP=[NNN]</td>
<td>Yes</td>
<td>temperature in degrees Fahrenheit</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Command</th>
<th>Format</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACK</td>
<td>&lt;cr&gt;&lt;lf&gt;ACK&lt;cr&gt;&lt;lf&gt;</td>
<td>Command received successfully</td>
</tr>
<tr>
<td>NACK</td>
<td>&lt;cr&gt;&lt;lf&gt;NACK&lt;cr&gt;&lt;lf&gt;</td>
<td>Command not received, rebroadcast</td>
</tr>
</tbody>
</table>

Table 6.21.2(a) LED Command id Value Table

<table>
<thead>
<tr>
<th>id</th>
<th>Indicator Type</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Emergency</td>
<td>Reference 6.18.2.2</td>
</tr>
<tr>
<td>1</td>
<td>Compatible device failure</td>
<td>Reference 6.18.2.3</td>
</tr>
<tr>
<td>2</td>
<td>Over temperature</td>
<td>Reference 6.18.2.4</td>
</tr>
<tr>
<td>3</td>
<td>Out of range</td>
<td>Reference 6.18.2.6</td>
</tr>
<tr>
<td>4</td>
<td>TX/RX</td>
<td>Reference 6.18.2.7</td>
</tr>
<tr>
<td>5</td>
<td>Bluetooth pairing</td>
<td>Reference 6.18.2.8</td>
</tr>
<tr>
<td>6 and greater</td>
<td>reserved</td>
<td></td>
</tr>
</tbody>
</table>

Table 6.21.2(b) LED Command State Value Table

<table>
<thead>
<tr>
<th>State</th>
<th>LED behavior</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>OFF</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Steady ON</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Flashing</td>
<td>Reference 6.18.2.1.1(3)</td>
</tr>
<tr>
<td>3 and greater</td>
<td>Reserved</td>
<td></td>
</tr>
</tbody>
</table>
Chapter 7 Performance Requirements

7.1 RF Device and RSM Requirements.

7.1.1 The RF device shall be tested for Perceptual Evaluation of Speech Quality (PESQ) in the analog mode as specified in Section 8.2.

7.1.1.1 If equipped with digital mode, the RF device shall be tested in the analog mode in addition to any digital modes as specified in Section 8.2.

7.1.1.2* The RF device or RSM shall have a minimum PESQ of 2.5.

7.1.2 Viewing Surface.

7.1.2.1 RF device and RSM viewing surfaces shall be tested for abrasion resistance as specified in Section 8.7.

7.1.2.2 RF device and RSM viewing surfaces shall not exhibit an average delta haze greater than 14 percent.

7.1.3 Vibration Resistance.

7.1.3.1 The RF device and RSM shall be tested for resistance to vibration as specified in Section 8.4.

7.1.3.2 The RF device and RSM shall be evaluated for functionality as specified in 7.1.1.

7.1.3.3 The RF device and RSM shall have a minimum PESQ value of 2.5.

7.1.3.4 The RF device shall be evaluated for functioning of data logging as specified in Section 6.21.

7.1.4 Heat and Immersion Leakage.

7.1.4.1 The RF device and RSM shall be tested for heat and immersion leakage resistance as specified in Section 8.3.

7.1.4.2 The RF device and RSM shall have no water leakage inside the electronics compartment(s) and the power source compartment(s).

7.1.4.3 The RF device and RSM shall have a minimum PESQ of 2.5.
7.1.4.4 Portable, hand-held communication RF devices and RSMs shall be evaluated per 8.3.5 and 8.3.6.

7.1.4.5 The RF device shall be evaluated for proper functioning of data logging as specified in Section 6.21.

7.1.5* The RF device and RSM shall be suitable for use in Class I, Division 2, Groups A, B, C, and D; Class II, Division 2, Groups F and G; and Class III, Divisions 1 and 2 hazardous (i.e., classified) locations as demonstrated by being certified as nonincendive equipment in accordance with ANSI/UL 121201, Non-Incendive Electric Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations.

7.1.5.1 Interconnection.

7.1.5.1.1 Interconnection of this nonincendive equipment (i.e., RF devices and RSMs) shall be by means of a plug and jack that complies with the requirements as specified in Section 6.10.

7.1.5.1.2 The electrical parameters for this interconnection shall be in accordance with Table 7.1.5.1.2.

**Table 7.1.5.1.2 Electrical Parameters for Nonincendive Equipment**

<table>
<thead>
<tr>
<th>RF device or RSMs</th>
<th>Requirement</th>
<th>RSMs as sink</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uo = 8 V</td>
<td>Uo ≤ Ui</td>
<td>Uo = 8 V</td>
</tr>
<tr>
<td>Io = 500 mA</td>
<td>Io ≤ li</td>
<td>Io = 500 mA</td>
</tr>
<tr>
<td>Co = 69 µF</td>
<td>Co ≥ Ci + Ccable*</td>
<td>Co = 69 µF</td>
</tr>
<tr>
<td>Lo = 320 µH</td>
<td>Lo ≥ Li + Lcable*</td>
<td>Lo = 320 µH</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>RF device or RSMs</th>
<th>Requirement</th>
<th>RSMs as sink</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uo = 8 V</td>
<td>Uo ≤ Ui</td>
<td>Uo = 8 V</td>
</tr>
<tr>
<td>Io = 500 mA</td>
<td>Io ≤ li</td>
<td>Io = 500 mA</td>
</tr>
<tr>
<td>Co = 69 µF</td>
<td>Co ≥ Ci + Ccable*</td>
<td>Co = 69 µF</td>
</tr>
<tr>
<td>Lo = 320 µH</td>
<td>Lo ≥ Li + Lcable*</td>
<td>Lo = 320 µH</td>
</tr>
</tbody>
</table>

RSMs as source (male connection)

Uo = 8 V
Io = 500 mA
Co = 69 µF
Lo = 320 µH

RSMs as sink (male connection)

Uo = 8 V
Io = 500 mA
Co = 69 µF
Lo = 320 µH
Note: RF devices and RSMs certified as nonincendive equipment in accordance with the circuit parameters in Table 7.1.5.1 allow for the interchangeability of any such RSM with any such RF device.

*Assumption for cable capacitance and inductance: 200 pF/m and 1 µH/m.

7.1.5.2 Intrinsically Safe Systems.

7.1.5.2.1 The RF devices and RSMs shall be permitted to be certified for use in Class I, Division 1, Groups C and D; Class II, Division 1, Groups E, F, and G; and Class III, Divisions 1 and 2 hazardous (i.e., classified) locations as demonstrated by being certified as an intrinsically safe system in accordance with ANSI/TIA-4950-A, Requirements for battery operated, portable land mobile radio applications in Class I, II and III, division 1, Hazardous (Classified) locations, or ANSI/UL 913, Standard for Intrinsically Safe Apparatus and Associated Apparatus for Use in Class I, II, III Division 1, Hazardous (Classified) Locations.

7.1.5.2.2 RF devices that are certified as an intrinsically safe system in accordance with ANSI/TIA-4950-A, Requirements for battery operated, portable land mobile radio applications in Class I, II and III, division 1, Hazardous (Classified) locations, or ANSI/UL 913, Standard for Intrinsically Safe Apparatus and Associated Apparatus for Use in Class I, II, III Division 1, Hazardous (Classified) Locations, shall only be used with the RSM evaluated as part of the system.

7.1.6 Heat Resistance.

7.1.6.1 The RF devices and RSMs shall be tested for resistance to heat as specified in Section 8.8.

7.1.6.2 The RF devices and RSMs shall be evaluated for functionality.

7.1.6.3 The RF devices and RSMs shall not melt, drip, or ignite.

7.1.6.4 The RF devices and RSMs shall have a minimum PESQ of 2.5.

7.1.6.5 The RF devices shall be evaluated for functionality of data logging as specified in Section 6.21.

7.1.7 Ingress Protection.
7.1.7.1 The RF devices and RSMs shall be tested for ingress protection (IP) rating as specified in ISO IEC 60529, Degrees of protection provided by enclosures (IP Code).

7.1.7.2 The RF devices and RSMs shall have a rating of IP6X.

7.1.8 Impact Resistance.

7.1.8.1 The RF devices and RSMs shall be tested for resistance to impact as specified in Section 8.5.

7.1.8.2 The RF devices and RSMs shall be evaluated for functionality.

7.1.8.3 The RF devices and RSMs shall have a minimum PESQ of 2.5.

7.1.8.4 The RF device shall be evaluated for functionality of data logging as specified in Section 6.21.

7.1.9 Corrosion Resistance.

7.1.9.1 The RF devices and RSMs shall be tested for resistance to corrosion as specified in Section 8.6.

7.1.9.2 The RF devices and RSMs shall be evaluated for functionality.

7.1.9.3 The RF devices and RSMs shall have a minimum PESQ of 2.5.

7.1.10 Integrity.

7.1.10.1 The RF devices and RSMs shall be tested for integrity as specified in Section 8.12.

7.1.10.2 The RF devices and RSMs shall have no case, housing, or closure damage.

7.1.10.3 The RF devices and RSMs shall be evaluated for functionality.

7.1.10.4 The RF devices and RSMs shall have a minimum PESQ value of 2.5.

7.1.10.5 The RF device shall be evaluated for functionality of data logging as specified in Section 6.21.

7.1.11 Cable Pullout.

7.1.11.1 The RF devices and RSMs shall be tested for cable pullout as specified in Section 8.11.

7.1.11.2 The RF devices and RSMs shall have a minimum value of 156 N +9/-0 N (35 lbf +2/-0 lbf) in the direction of the wiring.
7.1.11.3 The RF devices and RSMs shall be evaluated for functionality.

7.1.11.4 Separation of interconnecting wiring of any specimen shall constitute failing performance.

7.1.12 Heat and Flame Resistance.

7.1.12.1 The RF devices and RSMs shall be tested for resistance to heat and flame as specified in Section 8.9.

7.1.12.2 The RF devices and RSMs shall not have the afterflame exceed 2.2 seconds.

7.1.12.3 The RF devices and RSMs shall have nothing fall off.

7.1.12.4 The RF devices and RSMs shall not fall from their mounted position.

7.1.12.5 The RF devices and RSMs shall function as follows:

1. The RF devices and RSMs shall be activated using the power/volume knob as specified in Section 6.4.
2. The selector knob shall function as specified in Section 6.5.
3. The emergency button shall function as specified in Section 6.9.
4. The display shall function as specified in Section 6.6.
5. The remote mic audio connection shall function as specified in Section 6.10.

7.1.12.6 The RF device shall be evaluated for proper functioning of data logging as specified in Section 6.20.

7.1.13 Durability and Legibility.

7.1.13.1 The RF device and RSMs shall be tested for durability and legibility as specified in Section 8.10.

7.1.13.2 Product labels shall remain attached to the RF devices and RSMs.

7.1.13.3 Product labels shall be able to be read by the untrained eye for the following exposures:

(1) Corrosion
(2) Heat resistance
(3) Durability

7.1.14 Water Drainage.
7.1.14.1 RF devices and RSMs shall be tested for water drainage as specified in Section 8.13.

7.1.14.2 The RF device shall be evaluated for functionality of data logging as specified in Section 6.20.

7.1.15 After pairing or connecting the RF device to RSMs, each shall be evaluated and function as follows:

(1) The RF device and RSMs shall be activated using the power/volume knob as specified in Section 6.4.
(2) The selector knob shall function as specified in Section 6.5.
(3) The emergency button shall function as specified in Section 6.9.
(4) The display shall function as specified in Section 6.6.
(5) The remote speaker mic shall function as specified in Section 6.10.

7.1.16 Electronic Temperature Stress.

7.1.16.1 RF devices and RSMs shall be tested for resistance to electronic temperature stress as specified in Section 8.19.

7.1.16.2 RF devices shall be evaluated for functionality as specified in Section 6.20.

7.1.16.3 Wired RSMs shall be evaluated for functionality as specified in Section 6.10.

7.1.16.4 Wireless RSMs shall be evaluated for functionality as specified in 6.22.3.5.

7.1.16.5 RF devices shall receive and display the unit ID of another RF device in the analog mode.

7.1.16.6 RF devices shall transmit its unit ID to another RF device in the analog mode.

7.2 RF Device Requirements.

7.2.1 The RF device shall be tested for continuous operation as specified in Section 8.18.

7.2.1.1 The RF device shall be capable of continuous operation for at least 8 hours on a standard-duty cycle of 10-10-80 at a transmit power of 5 watts.

7.2.1.2 Testing.

7.2.1.2.1 The RF device shall be tested according to Section 8.15 and meet the requirements for carrier output power 2.2.1 (analog) as specified in TIA-603-E, Land Mobile FM or PM Communications Equipment Measurement and Performance Standards, and RF power output 2.2.1 (digital) as specified in TIA-102.CAAA-E, Project 25 Digital C4FM/CQPSK Transceiver Measurement Methods.

7.2.1.2.2 Transmit power shall not decrease by more than 1 dB for the first 8 hours.
7.2.1.3 The RF device shall operate without degradation in the presence of 6 colocated like units within a 5 m spherical radius.

7.2.1.4 The RF device shall be tested according to Section 8.16 and meet the requirements for carrier frequency stability 2.2.2 (analog) as specified in TIA-603-E, *Land Mobile FM or PM Communications Equipment Measurement and Performance Standards*, and operating frequency accuracy 2.2.2 (digital) as specified in TIA-102.CAAA-E, *Project 25 Digital C4FM/CQPSK Transceiver Measurement Methods*.

7.2.1.5 The RF device shall be tested according to Section 8.17 and meet the requirements for reference sensitivity 2.1.4 (analog) as specified in TIA-603-E, *Land Mobile FM or PM Communications Equipment Measurement and Performance Standards*, and reference sensitivity 2.1.4 (digital) as specified in TIA-102.CAAA-E, *Project 25 Digital C4FM/CQPSK Transceiver Measurement Methods*.

7.3 The RF antenna shall exhibit a voltage standing wave ratio (VSWR) change of less than 3db across the bandwidth when subjected to the requirements in Section 8.20.

**Chapter 8 Test Methods**

8.1 Sample Preparation.

8.1.1 Application.

8.1.1.1 The sample preparation procedures contained in 8.1.2 through 8.1.4 shall apply to each test method in this chapter, as specifically referenced in each test method.

8.1.1.2 Only the specific sample preparation procedure(s) referenced in each test method shall be applied to that test method.

8.1.1.3 Samples shall be complete devices.

8.1.1.4 Specimens for testing shall be complete devices.

8.1.1.5 A minimum of three specimens shall be tested.

8.1.1.6 Specimens shall be set as follows:

(1) Volume shall be set to maximum or as specified by the manufacturer.
(2) * FM modulation shall be set to analog.
(3) Channel bandwidth shall be set as follows:
   (a) VHF/UHF/700 — narrowband (12.5 kHz)
(b) 800 band non-NPSPAC channels — 25 kHz
(c) 800 band NPSPAC channels — 20 kHz
(4) Transmit power shall be set to maximum or as specified by the manufacturer.
(5) Hazard zone mode shall be enabled.

8.1.2 Room Temperature Conditioning Procedure.

8.1.2.1 Specimens shall be conditioned at a temperature of 22°C ± 3°C (72°F ± 5°F) and relative humidity (RH) of 50 percent ± 25 percent for at least 4 hours.

8.1.2.2 Testing shall begin within 5 minutes of the specimens being removed from the conditioning.

8.1.3 Cold Temperature Conditioning Procedure.

8.1.3.1 Specimens shall be exposed to a temperature of −20°C +0/−3°C (−4°F +0/−5°F) for at least 4 hours.

8.1.3.2 Testing shall begin within 30 seconds of the specimens being removed from the conditioning.

8.1.4 Elevated Temperature Conditioning Procedure.

8.1.4.1 Specimens shall be exposed to a temperature of 71°C +1/−0°C (160°F +2/−0°F) for at least 4 hours.

8.1.4.2 Testing shall begin within 30 seconds of the specimens being removed from the conditioning.

8.2 Perceptual Evaluation of Speech Quality (PESQ) Test.

8.2.1 Apparatus.

8.2.1.1 Testing Chamber. Testing shall be conducted in a chamber having the following characteristics, at a minimum:

(1) Construction shall be hemi-anechoic.

(2) Ambient noise level inside the chamber shall be at least NC-25.

(3) Walls and ceiling shall be ≥90 percent absorptive for 100 Hz.

(4) Clearance from test specimens shall be ≥1 m.
8.2.1.2 Acoustic Treatment. All room surfaces above the floor shall be acoustically treated for internal acoustic absorption as well as for external noise mitigation.

8.2.1.3 Simulator. A G.R.A.S. KEMAR head and torso simulator (HATS), type 45BM or equivalent, shall be used for testing.

8.2.1.3.1 Tone.

8.2.1.3.1.1 The mouth simulator shall be capable of producing 1 kHz sine tone at a sound pressure level of 112 dBA as measured at 25 mm (1 in.) with the mouth reference point un-equalized.

8.2.1.3.1.2 The total harmonic distortion (THD) shall be ≤3 percent.

8.2.1.3.2 Frequency.

8.2.1.3.2.1 The mouth simulator frequency response shall be able to be equalized flat ± 1 dB between 100 Hz and 10 kHz.

8.2.1.3.2.2 The response shall be –15 dB or less at 100 and –20 dB or less at 15 kHz.

8.2.1.4 Sound Pressure Level (SPL) Meter. The SPL meter having the following characteristics shall be used:

(1) The SPL meter shall be capable of measuring an equivalent continuous sound pressure level (L_{eq}) using an A-weighted filter.
(2) The SPL meter shall have a dynamic range from 30 dBA (or less) to 130 dBA (or greater).
(3) The SPL meter shall display the measurement to at least 1/10 dBA.

8.2.1.5 Pink Noise Generator.

8.2.1.5.1 The pink noise analog audio signal generator shall be capable of generating pink noise and sine waves from –80 dBu to –2 dBu in one dBu steps, with a THD+N of –90 dB (0.0032 percent) at 8 dBu noise floor type 25µv.

8.2.1.5.2 The pink noise analog audio signal generator shall have the following characteristics:

(1) A frequency range of 10 Hz to 20 kHz adjustable in one-digit steps resolution ± 0.01 percent
(2) An amplitude accuracy of ± 0.5 dB or less

8.2.1.6 Digital Equalizer. A digital equalizer having the following characteristics shall be used:
(1) The digital equalizer shall be capable of at least two concurrently selectable equalizer sections as follows:

   (a) One 31-band graphic with an adjustment range of at least ± 18 dB
   (b) A 10-band parametric with an adjustment range of at least ± 18 dB

(2) The digital equalizer shall have a dynamic range of 112 dB.

(3) The digital equalizer shall be capable of equalizing the frequency response of the HATS mannequin of ± 1 dB flat between 100 Hz and 10 kHz.

### 8.2.1.7 Microphone

A microphone having the following characteristics shall be used:

(1) The microphone shall be a condenser type.
(2) The microphone polar pattern shall be omnidirectional.
(3) The frequency response shall be flat ± 0.5 dB from 100 Hz to 15 kHz.
(4) The residual noise shall be ≤ –30 dB.
(5) The microphone shall accept signals of at least 130 dBA.

### 8.2.1.8 PESQ Analyzer

A PESQ analyzer having the following characteristics shall be used:

1. The PESQ analyzer shall be capable of measuring perceptual evaluation of speech quality according to ITU-T P.862, *Perception Evaluation of Speech Quality*, in narrowband operation.
2. Input signal shall be 16-bit linear audio sampled at 8 kHz or 16 kHz.
3. The analyzer shall be capable of handling voice files from 6 to 20 seconds in length.
4. The measurement result shall be represented as the PESQ value.

### 8.2.1.9 Radio Test Set/Service Monitor

An Aeroflex 3920 or equivalent radio test set/service monitor having the following characteristics shall be used:

1. The radio test set/service monitor shall be capable of receiving and transmitting analog FM and P25 signals.
2. The radio test set/service monitor shall operate over the frequency range of devices under test.
3. The radio test set/service monitor shall be P25 phase 1 and phase 2 compatible.

### 8.2.1.10 Artificial Mouth

The artificial mouth shall be calibrated as follows (see Figure 8.2.1.10):

1. The pink noise test signal from the mannequin shall be equalized flat with pink noise from 100 –10 kHz to ± 1 dB on a 1/3 octave scale and adjusted to achieve an A-weighted sound level of 97 dBA, ± 0.5 dB at the mouth reference point (MRP), 50 mm, ± 3mm (2 in. ± 1/8 in.) from the test mannequin’s mouth.
(2) The levels for the 125 Hz octave band (the 100, 125, 160 1/3 octave bands) shall be reduced by 10 dB.

(3) The levels for the 250 Hz octave band (the 200, 250, 315 1/3 octave bands) shall be reduced by 2 dB.

(4) The PESQ test signal “Male1_1st_Set_8k.wav” shall be applied and the SPL adjusted until an average (SPL) (Leq) of 95 ± 0.5 dBA is achieved, over a period of time of 45 ± 15 seconds.

Figure 8.2.1.10 Calibration of the Artificial Mouth.

8.2.1.11 Artificial Ear. The artificial ear shall be calibrated as follows (see Figure 8.2.1.11):

1. The microphone calibrator shall be applied to the artificial ear and set to the level specified by the manufacturer.
2. The audio analyzer shall be calibrated according to the calibration procedure specified by the audio analyzer manufacturer.

Figure 8.2.1.11 Calibration of the Artificial Ear.

8.2.1.12 PESQ Measurement Setup.

8.2.1.12.1 The PESQ measurement shall be activated in the audio analyzer.

8.2.1.12.2 Each PESQ measurement shall be recorded for each test signal as follows:

1. Four excitation speech signals, two male and two female, shall be selected by the audio analyzer — “Male1_1st_Set_8k.wav,” “Male2_1st_Set_8k.wav,” “Female1_1st_Set_8k.wav,” and “Female2_1st_Set_8k.wav.”
2. The mode shall be narrowband.
3. Automatic gain control shall be disabled.
4. The four PESQ readings shall be calculated and reported.
8.2.1.13 RF Device RFDC Transmit Audio PESQ Test.

The RF device RFDC transmit audio PESQ test shall be conducted in accordance with the following procedure (see Figure 8.2.1.13):

1. The radio test set/service monitor shall have de-emphasis enabled, IF bandwidth of 12.5 kHz, and audio band pass filter of 0.3 to 3.0 kHz.
2. For wired connection, the audio signal from the PESQ test set shall be fed to the transmitting specimen via the RFDC at nominal level of \(-38\text{dBV}\).
3. Adjust the audio signal from the radio test set/service monitor to the PESQ test to achieve a 0.0 dBu nominal level.
4. The measurement shall be started and the PESQ reading measured and reported.

![Figure 8.2.1.13](image)

**Figure 8.2.1.13**

Measurement Setup for RF Device RFDC Transmit Audio PESQ Test.

8.2.1.14 RF Device Bluetooth Transmit Audio PESQ Test.

The RF device Bluetooth transmit audio PESQ test shall be conducted in accordance with the following procedure (see Figure 8.2.1.14):

1. The radio test set/service monitor shall have de-emphasis enabled, IF bandwidth of 12.5 kHz, and audio band pass filter of 0.3 to 3.0 kHz.
2. The audio signal from the PESQ test set shall be fed to transmitting specimen via Bluetooth at a nominal 80 percent modulation.
3. Adjust the audio signal from the radio test set/service monitor to the PESQ test to achieve a 0.0 dBu nominal level.
4. The measurement shall be started and the PESQ reading measured and reported.

![Figure 8.2.1.14](image)

**Figure 8.2.1.14**

Measurement Setup for RF Device Bluetooth Transmit Audio PESQ Test.

**8.2.1.15** RF Device RFDC Receive Audio PESQ Test.

The RF device RFDC receive audio PESQ test shall be conducted in accordance with the following procedure *(see Figure 8.2.1.15)*:

1. The volume of the RF device shall be set to the maximum rated audio as specified by the manufacturer.

2. The radio test set/service monitor shall have pre-emphasis enabled and transmit power set to −48 dBm.
3. The audio levels shall be adjusted from the PESQ test system until the FM peak modulation is between 2.0 KHz and 2.2 KHz from the service monitor using “Male1_1st_Set_8k.wav.”

4. The measurement shall be started and the PESQ reading measured and reported.

![Diagram of measurement setup]

**Figure 8.2.1.15**

**Measurement Setup for RF Device RFDC Receive Audio PESQ Test.**

### 8.2.1.16 RF Device Bluetooth Receive Audio PESQ Test.

The RF device Bluetooth receive audio PESQ test shall be conducted in accordance with the following procedure *(see Figure 8.2.1.16)*:

1. The volume of the RF device shall be set to the maximum rated audio as specified by the manufacturer.
2. The radio test set/service monitor shall have pre-emphasis enabled and transmit power set to −48 dBm.

3. The audio levels shall be adjusted from the PESQ test system until the FM peak modulation is between 2.0 KHz and 2.2 KHz from the service monitor using “Male1_1st_Set_8k.wav.”

4. The measurement shall be started and the PESQ reading measured and reported.

Figure 8.2.1.16

8.2.1.17 RF Device Internal Mic Transmit Audio PESQ Test.

The RF device internal mic transmit audio PESQ test shall be conducted in accordance with the following procedure (see Figure 8.2.1.17):

1. The RF device shall be set in accordance with the following procedure:
(a) The RF device shall be mounted in front of the artificial mouth via the manufacturer-provided fixture.

(b) The RF device internal mic shall be centered to the artificial mouth at a horizontal axis distance of 50 mm ± 5 mm (2in. ± 0.2 in.).

2. The radio test set/service monitor shall have de-emphasis enabled, IF bandwith of 12.5 kHz, and audio band pass filter of 0.3 to 3.0 kHz.

3. The audio signal shall be adjusted from the radio test set/service monitor to the PESQ test set for 0.0 dBu nominal.

4. The audio signal from the PESQ test set shall be fed to the transmitting specimen via the calibrated mouth.

5. The measurement shall be started and the PESQ reading reported.

Figure 8.2.1.17
Measurement Setup for RF Device Internal Mic Transmit Audio PESQ Test.
8.2.1.18 RF Device Speaker Receive Audio PESQ Test.

The RF device speaker receive audio PESQ test shall be conducted in accordance with the following procedure (see Figure 8.2.1.18):

1. The receiving RF device speaker shall be set in accordance with the following procedure:
   (a) The receiving RF device speaker shall be mounted in front of the artificial ear via the manufacturer-provided fixture.
   (b) The RF device speaker shall be centered to the artificial ear at a horizontal distance of 50 mm ±5 mm (2 in. ±0.2 in.).

2. The volume of the RF device shall be set to the maximum rated audio as specified by the manufacturer.

3. The radio test set/service monitor shall have pre-emphasis enabled and transmit power set to −48 dBm.

4. The audio levels shall be adjusted from the PESQ test system until the FM peak modulation is between 2.0 KHz and 2.2 KHz from the radio test set/service monitor using “Male1_1st_Set_8k.wav.”

5. The input sensitivity of the PESQ analyzer shall be set to the level of the artificial ear calibration (see 8.2.1.11).

6. The measurement shall be started and the PESQ reading reported.
8.2.1.19 Wired RSM Audio PESQ Test.

The wired RSM audio PESQ test shall be conducted in accordance with the following procedure (see Figure 8.2.1.19):

1. The RSM shall be set in accordance with the following procedure:
   (a) The RSM shall be mounted in front of the artificial mouth via the manufacturer-provided fixture.
   (b) The wired RSM shall be centered to the artificial mouth at a horizontal axis distance of 50 mm ± 5 mm (2 in. ± 0.2 in.).

2. The audio signal from the PESQ test set shall be fed to the RSM specimen via the calibrated mouth.
3. The RSM shall be biased as specified by the manufacturer.
4. The input level of the PESQ test shall be set to accommodate the audio level from the speaker microphone.
5. The measurement shall be started and the PESQ reading reported.

**Figure 8.2.1.19**
Measurement Setup for Wired RSM Audio PESQ Test.

**8.2.1.20 Wireless RSM Audio PESQ Test.**

The wireless RSM audio PESQ test shall be conducted in accordance with the following procedure (see Figure 8.2.1.20):

1. The RSM shall be set in accordance with the following procedure:

   (a) The RSM shall be mounted in front of the artificial mouth via the manufacturer-provided fixture.

   (b) The wireless RSM shall be centered to the artificial mouth at a horizontal axis distance of 50 mm ± 5 mm (2 in. ± 0.2 in.).
2. The audio signal from the PESQ test set shall be fed to the RSM specimen via the calibrated mouth.

3. The measurement shall be started and the PESQ reading reported.

\[ \text{Figure 8.2.1.20} \]
\[ \text{Measurement Setup for Wireless RSM Audio PESQ Test.} \]

8.2.1.21 Wired RSM Speaker Audio PESQ Test.

The wired RSM speaker audio PESQ test shall be conducted according to the following procedure (see Figure 8.2.1.21):

1. The RSM shall be set according to the following procedure:
   (a) The RSM shall be mounted in front of the artificial ear via the manufacture-provided fixture.
   (b) The wired RSM speaker shall be centered to the artificial ear at a horizontal distance of 50 mm ± 5 mm (2 in. ± 0.2 in.).

2. The output level of the PESQ test shall be set to provide a 2.8 VRMS nominal signal to the speaker mic.

3. The input sensitivity of the PESQ analyzer shall be set to the level of the artificial ear calibration (see 8.2.1.11).
4. The measurement shall be started and the PESQ reading reported.

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**Figure 8.2.1.21**

Measurement Setup for Wired RSM Speaker Audio PESQ Test.

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**8.2.1.22 Wireless RSM Speaker Audio PESQ Test.**

The wireless RSM speaker audio PESQ test shall be conducted in accordance with the following procedure (see Figure 8.2.1.22):

1. The RSM shall be set according to the following procedure:
   (a) The RSM shall be mounted in front of the artificial ear via the manufacturer-provided fixture.
   (b) The wireless RSM speaker shall be centered to the artificial ear at a horizontal distance of 50mm ± 5 mm (2in. ± 0.2in.).

2. Set the output level of the PESQ test to provide 80 percent Bluetooth modulation to the speaker mic.
3. The input sensitivity of the PESQ analyzer shall be set to the level of the artificial ear calibration (see 8.2.1.11).
4. The measurement shall be started and the PESQ reading reported.

Figure 8.2.1.22
Measurement Setup for Wireless RSM Speaker Audio PESQ Test.

8.3 Heat and Immersion Leakage Resistance.

8.3.1 Application. This test method shall apply to all devices.

8.3.2 Samples.

8.3.2.1 Samples shall be complete devices.

8.3.2.2 Samples shall be conditioned as specified in 8.1.2.

8.3.3 Specimens.

8.3.3.1 Specimens for testing shall be complete devices.

8.3.3.2 A minimum of three specimens shall be tested.
8.3.3.3 Specimens shall be set as specified in 8.1.1.6.
8.3.3.4 Specimens shall be tested in accordance with 8.3.5 and 8.3.6.

8.3.4 Apparatus.

8.3.4.1 A test oven having minimum dimensions of 915 mm depth × 915mm width × 1220mm height (36 in. depth × 36 in. width × 48 in. height) shall be provided.

8.3.4.1.1 The test oven shall have an airflow rate of 38 m/min to 76 m/min (125 ft/min to 250 ft/min) at the standard temperature and pressure of 22°C (72°F) at 1 atmosphere measured at the center point of the oven.

8.3.4.1.2 A test thermocouple shall be positioned so that it is level with the horizontal centerline of a mounted specimen.

8.3.4.2 A test water container capable of covering the uppermost point of the specimen with a depth of 1.5 m (4.9 ft) of water shall be provided.

8.3.4.2.1 The water container shall maintain the devices at that depth.

8.3.4.2.2 The water temperature shall be 22°C ± 3°C (72°F ± 5°F).

8.3.5 Test Procedure 1.

8.3.5.1 Test Oven.

8.3.5.1.1 Specimens shall be placed in a test oven that has been preheated to 177°C +5/−0°C (350°F +10/−0°F).

8.3.5.1.2 Test exposure time of 15 minutes shall begin.

8.3.5.2 Specimen Removal.

8.3.5.2.1 After the test exposure time of 15 minutes, the specimens shall be removed from the oven and within 30 seconds immersed in the test water container for 15 minutes.

8.3.5.2.2 After 15 minutes, the specimens shall be removed from the test water container and wiped dry.

8.3.5.3 Specimens shall be subject to 8.3.5.1 and 8.3.5.2 for six complete cycles.

8.3.5.4 Water Leakage.
8.3.5.4.1 After the sixth cycle, the power source compartment of the specimens shall be opened and inspected for water leakage to determine pass or fail performance.

8.3.5.4.2 Where the device does not fail this portion of the test, the power source shall be reinstalled.

8.3.5.5 After the sixth cycle, the PESQ measurement shall be conducted as specified in Section 8.2 to determine the pass or fail performance.

8.3.5.6 Following the PESQ measurement, the specimen shall be operated to the manufacturer’s instructions as specified in Sections 6.2 through 6.7 to determine functionality and pass or fail performance.

8.3.5.7 Specimen Testing.

8.3.5.7.1 After determining functionality, the specimen shall be tested and meet the requirements in Section 7.2.

8.3.5.7.2 The specimen shall meet the requirements as specified in Section 7.2 without degradation.

8.3.6 Test Procedure 2.

8.3.6.1 Reimmersion.

8.3.6.1.1 Following Test Procedure 1, the specimens shall be reimmersed in the test water container for an additional 5 minutes +30/−0 seconds.

8.3.6.1.2 The power source compartment(s), if so equipped, shall be opened, and the power source shall not be installed.

8.3.6.2 After the 5-minute immersion, the specimens shall be removed from the test water container and wiped dry.

8.3.6.3 The electronic compartment(s) of the specimens shall be opened and inspected for water leakage to determine pass or fail performance.

8.3.7 Report.

8.3.7.1 The PESQ value measured after the heat and immersion leakage test shall be recorded and reported.
8.3.7.2 The functionality of the specimens shall be recorded and reported.

8.3.7.3 The requirements in Section 7.2 shall be tested, recorded, and reported.

8.3.8 Interpretation.

8.3.8.1 Pass or fail performance shall be determined for each specimen.

8.3.8.2 Failure of one or more specimens shall constitute failing performance.

8.4 Vibration Test.

8.4.1 Application. This test method shall apply to all devices.

8.4.2 Samples.

8.4.2.1 Samples shall be complete devices.

8.4.2.2 Samples shall be conditioned as specified in 8.1.2.

8.4.3 Specimens.

8.4.3.1 Specimens for testing shall be complete devices.

8.4.3.2 A minimum of three specimens shall be tested.

8.4.3.3 Specimens shall be set as specified in 8.1.1.6.

8.4.3.4 Specimens shall be conditioned at a temperature of 22°C ± 3°C (72°F ± 5°F), and a relative humidity of 50 percent ± 25 percent, for at least 4 hours.

8.4.3.5 Specimens shall be tested within 5 minutes after removal from conditioning.

8.4.4 Apparatus.

8.4.4.1 Product shall be tested on a typical package tester within the compartments specified in 8.4.4.2 through 8.4.4.4.

8.4.4.2 Compartments shall be set up as specified in Figure 8.4.4.2(a) and Figure 8.4.4.2(b).
8.4.4.2.1 The sides and the base of the compartments shall be constructed of nominal 6 mm (1/4 in.) stainless steel.

8.4.4.2.2 The top of the compartments shall remain open.

8.4.4.2.3 There shall be no burrs, sharp edges, surface discontinuities, or fasteners on the internal surfaces of the holding boxes.
8.4.4.3 The large compartments shall encase the complete devices that are larger than 5161 mm\(^2\) (8 in\(^2\)).

8.4.4.4 The small compartments shall encase the complete devices that are smaller than 5161 mm\(^2\) (8 in\(^2\)).

8.4.5 Procedure.

8.4.5.1 Test specimens shall be placed unrestrained in the compartments specified in 8.4.4.2.

8.4.5.2 Test specimens shall not be tied down.

8.4.5.3 The basic movement of the bed of the test table shall be a 25 mm orbital path such as can be obtained on a standard package tester operating in synchronous mode at 250 rpm ± 5 rpm.

8.4.5.4 The test duration shall be 3 hours.

8.4.5.5 The PESQ measurement shall be conducted as specified in Section 8.2 to determine pass or fail performance.

8.4.5.6 Following the PESQ measurement, the specimen shall be operated to the manufacturer’s instructions to determine functionality as specified in 7.1.1 to determine pass or fail performance.

8.4.5.7 Specimens shall be operated according to the manufacturer’s instructions to determine functionality for data logging as specified in Section 6.16 to determine pass or fail performance.

8.4.5.8 After determining functionality, the specimen shall be tested and meet the requirements in Section 7.2.

8.4.6 Report.

8.4.6.1 The PESQ value measured after the vibration resistance test shall be recorded and reported.

8.4.6.2 The functionality of the specimens shall be recorded and reported.

8.4.6.3 The requirements in Section 7.2 shall be tested, recorded, and reported.
8.4.7 Interpretation.

8.4.7.1 Pass or fail performance shall be determined for each specimen.

8.4.7.2 Failure of one or more specimens shall constitute failing performance for this test.

8.5 Impact Acceleration Resistance Test.

8.5.1 Application. This test method shall apply to all devices.

8.5.2 Samples.

8.5.2.1 Samples shall be complete devices.

8.5.2.2 Samples shall be conditioned as specified in 8.1.2.

8.5.3 Specimens.

8.5.3.1 Specimens for testing shall be complete devices.

8.5.3.2 A minimum of three specimens shall be tested.

8.5.3.3 Specimens shall be set as specified in 8.1.1.6.

8.5.4 Procedure.

8.5.4.1 Three specimens of product shall be subjected to a series of impact acceleration tests.

8.5.4.1.1 One test specimen for ambient temperature conditioning shall be exposed to a temperature of 22°C ± 3°C (72°F ± 5°F), for at least 4 hours.

8.5.4.1.2 One test specimen for cold temperature conditioning shall be exposed to a temperature of −20°C ± 1°C (−4°F ± 2°F), for at least 4 hours.

8.5.4.1.3 One test specimen for elevated temperature conditioning shall be exposed to a temperature of 71°C ± 1°C (160°F ± 2°F) for at least 4 hours.

8.5.4.2 Each product tested shall be complete with power source.

8.5.4.3 Postconditioning.

8.5.4.3.1 After conditioning, product shall be turned to the “on” position.
8.5.4.3.2 Testing shall begin within 30 seconds of removal from conditioning.

8.5.4.4 Following each conditioning, the product shall be dropped a total of eight times from a distance of 3 m (9.8 ft) onto a concrete surface so that impact is on each face and on one corner and one edge of the product.

8.5.4.5 The entire series of drops shall be completed within 10 minutes of removal from conditioning.

8.5.4.6 Specimens shall be evaluated to determine that the device enclosure has not incurred damage that affects normal operation or enclosure integrity.

8.5.4.7 The PESQ measurement shall be conducted as specified in Section 8.2 to determine pass or fail performance.

8.5.4.8 Following the PESQ measurement, the specimen shall be operated to the manufacturer’s instructions as specified in Sections 6.2 through 6.7 to determine functionality and pass or fail performance.

8.5.4.9 Specimens shall be operated according to the manufacturer’s instructions to determine functionality for data logging as specified in Section 6.16 and pass or fail performance.

8.5.4.10 After determining functionality, the specimen shall be tested and meet the requirements in Section 7.2.

8.5.5 Report.

8.5.5.1 The PESQ value measured after the accelerated impact resistance test shall be recorded and reported.

8.5.5.2 The functionality of the specimens shall be recorded and reported.

8.5.5.3 The requirements in Section 7.2 shall be tested, recorded, and reported.

8.5.6 Interpretation.

8.5.6.1 Pass or fail performance shall be determined for each specimen.

8.5.6.2 Failure of one or more specimens shall constitute failing performance for this test.

8.6 Corrosion Test.
8.6.1 Application. This test method shall apply to all devices.

8.6.2 Samples. Samples shall be complete devices.

8.6.3 Specimens.

8.6.3.1 Specimens for testing shall be complete devices.

8.6.3.2 A minimum of three specimens shall be tested.

8.6.3.3 Specimens shall be set as specified in 8.1.1.6.

8.6.3.4 Specimens shall be conditioned at a temperature of 22°C ± 3°C (72°F ± 5°F), and a relative humidity of 50 percent ± 25 percent, for at least 4 hours.

8.6.3.5 Specimens shall be tested within 5 minutes after removal from conditioning.

8.6.4 Procedure.

8.6.4.1 Test Parameters.

8.6.4.1.1 Specimens shall be tested in accordance with ASTM B117, *Standard Practice for Operating Salt Spray (Fog) Apparatus*.

8.6.4.1.2 Salt spray shall be 5 percent saline solution.

8.6.4.1.3 Test exposure shall be for 48 hours, +30/−0 minutes.

8.6.4.1.4 The chamber shall be stabilized at a temperature of 35°C ± 3°C (95°F ± 5°F).

8.6.4.2 Specimens shall be placed in the chamber in the typical operating position as used by first responders, as specified by the manufacturer.

8.6.4.3 At the conclusion of the salt spray period, specimens shall be stored in an environment of 22°C ± 3°C (72°F ± 5°F) at 50 percent ± 5 percent relative humidity for a minimum of 48 hours.

8.6.4.4 Following the conditioning period, specimens shall be tested within 60 seconds of removal from conditioning.

8.6.4.5 The PESQ measurement shall be conducted as specified in Section 8.2 to determine pass or fail performance.
8.6.4.6 The specimen shall be operated to the manufacturer’s instructions as specified in Sections 6.2 through 6.7 to determine functionality and pass or fail performance.

8.6.4.7 After determining functionality, the specimen shall be tested and meet the requirements specified in Section 7.2.

8.6.7 Report.

8.6.7.1 The PESQ value measured after the corrosion test shall be recorded and reported.

8.6.7.2 The functionality of the specimens shall be recorded and reported.

8.6.7.3 The requirements in Section 7.2 shall be tested, recorded, and reported.

8.6.8 Interpretation.

8.6.8.1 Pass or fail performance shall be determined for each specimen.

8.6.8.2 Failure of one or more specimens shall constitute failing performance for this test.

8.7 Viewing Surface Abrasion Test.

8.7.1 Application. This test shall apply to all devices.

8.7.2 Samples. Samples shall be complete viewing surfaces or representative plaques from devices.

8.7.3 Specimens.

8.7.3.1 Specimens for testing shall be complete devices’ viewing surfaces or representative plaques.

8.7.3.2 Four specimens shall be taken.

8.7.3.3 One of the specimens shall be the setup specimen.

8.7.3.4 The test specimen shall include all of the following criteria:

(1) The specimen shall be a square measuring 50 mm × 50 mm (2 in. × 2 in.).
(2) At least 38 mm (1 1/2 in.) of the 50 mm × 50 mm (2 in. × 2 in.) square shall be taken from the viewing surface.

8.7.3.5 Each of the specimens shall be cleaned in the following manner:
(1) The specimen shall be rinsed with clean tap water.
(2) The specimen shall be washed with a solution of nonionic/low-phosphate detergent and water using a clean, soft gauze pad.
(3) The specimen shall be rinsed with deionized water.
(4) The specimen shall be blown dry with clean compressed air or nitrogen.

8.7.3.6 Samples shall be conditioned as specified in 8.1.2.

8.7.3.7 Specimens shall be tested within 5 minutes after removal from conditioning.

8.7.4 Apparatus. The test apparatus shall be constructed in accordance with Figure 8.7.4(a) and Figure 8.7.4(b).

FIGURE 8.7.4(a) Lens Abrasion Tester.
8.7.5 Procedure.

8.7.5.1 The haze of the specimen shall be measured using a haze meter in accordance with ASTM D1003, *Standard Test Method for Haze and Luminous Transmittance of Transparent Plastics*, and recorded with the following additions:

1. The haze shall be measured in the middle 2 mm$^2$ of the specimen.
2. The specimen shall be repositioned to achieve the maximum haze value within the area defined in 8.7.5.1(1).
3. The haze meter shall have a specified aperture of 22 mm.
4. The haze meter shall have a visual display showing 0.1 percent resolution.
5. The haze meter shall be calibrated before and after each day's use following procedures specified in ASTM D1003, *Standard Test Method for Haze and Luminous Transmittance of Transparent Plastics*.

8.7.5.2 Placement.

8.7.5.2.1 The setup specimen shall be placed cover side up in the test apparatus specimen holder.
8.7.5.2 The specimen holder shall be configured with a flat surface under the lens or with an inner radius support.

8.7.5.3 Cylinder.

8.7.5.3.1 The pad holder shall consist of a cylinder 9.5 mm (0.4 in.) high and 25 mm (1 in.) in diameter with a radius of curvature equal to the radius of curvature of the outside of the lens in the viewing area ± 0.25 diopter.

8.7.5.3.2 This cylinder shall be rigidly affixed to the stroking arm by a #10-32 UNF threaded rod.

8.7.5.4 The pad shall be a Blue Streak M306M wool felt polishing pad 23 mm (0.9 in.) in diameter.

8.7.5.5 Abrasive Disc.

8.7.5.5.1 The abrasive disc shall be made from 3M Part Number 7415, wood finishing pad.

8.7.5.5.2 A disc 23 mm (0.9 in.) in diameter shall be cut from the abrasive sheet.

8.7.5.5.3 The marked side of the disc shall be placed against the pad.

8.7.5.5.4 Care shall be exercised to maintain this orientation for each abrasive disc throughout the testing.

8.7.5.6 Stroking Arm.

8.7.5.6.1 The pad holder, pad, and abrasive disc shall be installed on the stroking arm.

8.7.5.6.2 The stroking arm shall be leveled to ± 3 degrees by adjusting the threaded pin.

8.7.5.6.3 The pin shall be secured to prevent rotation of the pad holder.

8.7.5.6.4 The axis of curvature of the pad holder shall be coincident with the axis of curvature of the lens.

8.7.5.6.5 The stroking arm shall be counterbalanced with the pad holder, pad, and abrasive disc in place.

8.7.5.8 The set-up specimen shall be replaced with one of the three specimens to be tested.

8.7.5.9 A 1000 g ± 5 g (2.7 lb ± 0.16 oz) test weight shall be installed on the pin above the test sample.
8.7.5.10 The test shall be run for 200 cycles ± 1 cycle with one cycle consisting of a complete revolution of the eccentric wheel.

8.7.5.11 Stroke.

8.7.5.11.1 The length of stroke shall be 14mm (1/2 in.), producing a pattern 38 mm (1 1/2 in.) long.

8.7.5.11.2 The frequency of the stroke shall be 60 cycles per minute ± 1 cycle per minute.

8.7.5.11.3 The center of the stroke shall be within ± 2 mm (± 0.08 in.) of the center of the specimen.

8.7.5.12 Specimen Removal.

8.7.5.12.1 The specimen shall be removed and cleaned following the test procedure.

8.7.5.12.2 The abrasive disc shall be discarded.

8.7.5.13 The haze of the sample shall be measured following the test procedure.

8.7.5.14 The delta haze shall be calculated by subtracting the initial haze from the final haze.

8.7.5.15 The testing steps specified in 8.7.5.8 through 8.7.5.14 shall be repeated five times with a new sample and abrasive disc.

8.7.6 Report. The three delta haze values shall be averaged, recorded, and reported.

8.7.7 Interpretation. The average delta haze shall be evaluated to determine pass or fail.

8.8 High-Temperature Functionality Test.

8.8.1 Application. This test method shall apply to all devices.

8.8.2 Samples.

8.8.2.1 Samples shall be complete devices.

8.8.2.2 Samples shall be conditioned as specified in 8.1.2.

8.8.3 Specimens.

8.8.3.1 Specimens for testing shall be complete devices.
8.8.3.2 A minimum of three specimens shall be tested.

8.8.3.3 Specimens shall be set as specified in 8.1.1.6.

8.8.3.4 Samples shall be conditioned as specified in 8.1.2.

8.8.3.5 Specimens shall be tested within 5 minutes after removal from conditioning.

8.8.4 Apparatus. The test oven shall be as specified in ISO 17493, *Clothing and equipment for protection against heat — Test method for convective heat resistance using a hot air circulating oven.*

8.8.5 Procedure.

8.8.5.1 Testing shall be performed in accordance with ISO 17493, *Clothing and equipment for protection against heat — Test method for convective heat resistance using a hot air circulating oven,* using the following parameters:

1. A test fixture capable of accommodating the device being tested shall be used.
2. The test temperature shall be 260°C, +6/−0°C (500°F, +10/−0°F).
3. Specimens shall be mounted in the “as worn” position on a test fixture.
4. Specimens shall not touch any oven surface.
5. The test fixture shall not degrade the oven recovery time.
6. The test fixture shall be designed to allow the specimens to be attached in the same configuration as the specimens’ mounting assembly attaches to the specimens.

8.8.5.2 The test fixture with the specimen attached shall be placed in the test oven perpendicular with the front surface facing perpendicular to the airflow of the oven.

8.8.5.3 The specimen shall be set to the “on” mode.

8.8.5.4 Position.

8.8.5.4.1 There shall be no obstructions between the specimen and the airflow.

8.8.5.4.2 The test fixture shall position the specimen equidistant from all interior oven surfaces.

8.8.5.5 Oven Door.

8.8.5.5.1 The test oven door shall not remain open more than 15 seconds.

8.8.5.5.2 The air circulation shall be shut off while the door is open and turned on when the door is closed.
8.8.5.6 Recovery Time.

8.8.5.6.1 The total test oven recovery time shall not exceed 30 seconds.

8.8.5.6.2 The thermocouple reading shall remain at 260°C, +6/−0°C (500°F, +10/−0°F) for the duration of the test.

8.8.5.7 Exposure Time.

8.8.5.7.1 The test specimen, mounted as specified, shall be exposed in the test oven for 5 minutes, +15/−0 seconds.

8.8.5.7.2 The test exposure time shall begin when the test thermocouple recovers to 260°C, +6/−0°C (500°F, +10/−0°F).

8.8.5.8 The specimen shall operate per the manufacturer’s instructions as specified in Sections 6.2 through 6.7 to determine the functionality to determine pass or fail performance initiating within 30 seconds (+5/-0 seconds) of removal from the oven.

8.8.5.9 The PESQ measurement shall be conducted as specified in Section 8.2 to determine pass or fail performance.

8.8.5.10 Specimens shall operate according to the manufacturer’s instructions to determine functionality for data logging as specified in Section 6.16 and pass or fail performance.

8.8.5.11 After determining functionality, the specimen shall be tested and meet the requirements specified in Section 7.2.

8.8.6 Report.

8.8.6.1 The PESQ value measured after the heat resistance test shall be recorded and reported.

8.8.6.2 The functionality of the specimens shall be recorded and reported.

8.8.6.3 The requirements in Section 7.2 shall be tested, recorded, and reported.

8.8.7 Interpretation.

8.8.7.1 Pass or fail performance shall be determined for each specimen.
8.8.7.2 Failure of one or more specimens shall constitute failing performance for this test.

8.9 Heat and Flame Test.

8.9.1 Application. This test method shall apply to all devices.

8.9.2 Samples. Samples shall be complete devices.

8.9.3 Specimens.

8.9.3.1 Specimens for testing shall be complete devices.

8.9.3.2 A minimum of three specimens shall be tested.

8.9.3.3 Specimens shall be set as specified in 8.1.1.6.

8.9.3.4 Specimens shall be tested within 5 minutes after removal from conditioning.

8.9.4 Apparatus.

8.9.4.1 Specimens shall be attached to the front or rear of the test mannequin by the retention system, in accordance with the manufacturer’s instructions, by means of a loop, belt, or other means, on the outside or over the mannequin protective clothing.

8.9.4.2 Instructions.

8.9.4.2.1 The manufacturer shall provide instructions for mounting the RF device on the mannequin.

8.9.4.2.2 Specimens shall be attached to the mannequin in accordance with the manufacturer’s instructions.

8.9.4.3 Heat and Flame Test Apparatus.

8.9.4.3.1 The heat and flame test apparatus shall be as specified in Figure 8.9.4.3.1(a) and Figure 8.9.4.3.1(b).

8.9.4.3.2 The heat and flame test apparatus shall not be supplied by the device manufacturer.

Figure 8.9.4.3.1(a) Heat and Flame Test Apparatus: Top View.
Figure 8.9.4.3.1(b) Heat and Flame Test Apparatus: Side View.
8.9.4.4 Test Oven.

8.9.4.4.1 The test oven shall be a horizontal forced-circulating-air oven with an internal velocity of 61 m/min (200 ft/min) ± 15 m/min.

8.9.4.4.2 The test oven shall have minimum dimensions of 915 mm depth × 915 mm width × 1220 mm height (36 in. × 36 in. × 48 in.).

8.9.5 Procedure.

8.9.5.1 For calibration prior to the heat and flame test, the calibration mannequin shown in Figure 8.9.4.3.1 shall be exposed to direct flame contact for 10 seconds using the heat and flame test apparatus.

8.9.5.2 All peak temperature readings shall be within a temperature range of 815°C to 1150°C (1500°F to 2102°F).

8.9.5.3 The average mean of all peak temperature readings shall not be higher than 950°C (1742°F).

8.9.5.4 The test oven recovery time, after the door is closed, shall not exceed 60 seconds.
8.9.5.5 Temperature.

8.9.5.5.1 Specimens mounted on the test fixture shall first be placed in the test oven, which has been preheated to 95°C ± 2°C (203°F ± 5°F), for 15 minutes, +15/−0 seconds.

8.9.5.5.2 The test exposure time of 15 minutes shall begin after the door is closed and the oven temperature recovers to 95°C (203°F).

8.9.5.6 At the completion of the 15-minute exposure at 95°C ± 2°C (203°F ± 5°F), the specimen mounted on the test fixture shall be moved out of the oven and into the center of the burner array.

8.9.5.7 Flame Contact.

8.9.5.7.1 The product shall then be exposed to direct flame contact for 10 seconds, +1/4/−0 seconds.

8.9.5.7.2 This exposure shall begin within 20 seconds of the product being removed from the test oven.

8.9.5.8 The PESQ measurement shall be conducted as specified in Section 8.2 to determine pass or fail performance.

8.9.5.9 Following the PESQ measurement, the specimen shall be operated to the manufacturer’s instructions to determine functionality and pass or fail performance.

8.9.5.10 After determining functionality, the specimen shall be tested and meet the requirements specified in Section 7.2.

8.9.6 Report.

8.9.6.1 Any afterflame of the test specimen exceeding 2.2 seconds shall be recorded and reported.

8.9.6.2 Anything falling from the test specimen shall be recorded and reported.

8.9.6.3 Any test specimen falling from the mounted position shall be recorded and reported.

8.9.6.4 The PESQ value measured after the heat and flame resistance test shall be recorded and reported.
8.9.6.5 The functionality of the specimens as specified in Sections 6.2 through 6.7 shall be recorded and reported.

8.9.6.6 The requirements of Section 7.2 shall be tested, recorded, and reported.

8.9.7 Interpretation.

8.9.7.1 Pass or Fail performance shall be determined for each specimen.

8.9.7.2 Failure of one or more specimens shall constitute failing performance for this test.

8.9.7.3 Any test specimen exceeding 2.2 seconds of afterflame shall constitute failing performance.

8.9.7.4 Any test specimen having parts or other items falling off shall constitute failing performance.

8.9.7.5 Any test specimen falling from its mounted position shall constitute failing performance.

8.9.7.6 Specimens shall be operated according to the manufacturer’s instructions to determine functionality for data logging as specified in Section 6.16 and pass or fail performance.

8.10 Product Label Durability Test.

8.10.1 Application. This test method shall apply to all product labels.

8.10.2 Samples. Samples shall be complete devices.

8.10.3 Specimens.

8.10.3.1 Specimens for testing shall be complete devices with product labels attached.

8.10.3.2 A minimum of three specimens shall be tested.

8.10.3.3 Samples shall be conditioned as specified in 8.1.2.

8.10.4 Procedure.

8.10.4.1 Specimens with all product labels attached shall be subjected to the tests specified in Sections 8.3, 8.6, and 8.8.

8.10.4.2 After each test, the specimen product labels shall be examined at a distance of 305 mm (12 in.) +25/−0 mm by the unaided eye with 20/20 vision or vision corrected to 20/20.
8.10.4.3 The product labels shall be permitted to be wiped clean with an untreated cloth prior to being examined.

8.10.5 Report. The legibility of each product label shall be recorded and reported.

8.10.6 Interpretation. Any specimen failing the test shall constitute failing performance.

8.11 Cable Pullout Test.

8.11.1 Application. This test method shall apply to devices and any associated assemblies with interconnecting wiring.

8.11.2 Samples. Samples shall be complete devices.

8.11.3 Specimens.

8.11.3.1 Specimens for testing shall be complete devices with any associated assemblies with interconnecting wiring.

8.11.3.2 A minimum of three specimens shall be tested.

8.11.3.3 Specimens shall be set as specified in 8.1.1.6.

8.11.3.4 Samples shall be conditioned as specified in 8.1.2.

8.11.4 Apparatus. A mass of known weight with the means for attachment to wiring shall be provided.

8.11.5 Procedure.

8.11.5.1 Samples shall be conditioned as specified in 8.1.4.

8.11.5.2 A force of 156 N +9/-0 N (35 lbf +2/-0 lbf) shall be applied at a rate of 2.0 in./min (± 0.5 in./min), in an axial direction to the wiring of the specimen tested.

8.11.5.3 The functionality of the specimens as specified in Sections 6.2 through 6.7 shall be recorded and reported.

8.11.6 Report.

8.11.6.1 Observations of the nonseparation and separation of interconnecting wiring shall be recorded and reported.
8.11.6.2 The PESQ measurement shall be conducted as specified in Section 8.2 to determine pass or fail performance.

8.11.6.3 Following the PESQ measurement, the specimen shall be operated to the manufacturer’s instructions as specified in Sections 6.2 through 6.7 to determine the functionality and pass or fail performance.

8.11.7 Interpretation.

Pass or fail performance shall be determined for each specimen.

8.12 Case Integrity Test.

8.12.1 Application. This test method shall apply to all devices.

8.12.2 Samples.

8.12.2.1 Samples shall be complete devices.

8.12.2.2 Samples shall be conditioned as specified in 8.1.2.

8.12.3 Specimens.

8.12.3.1 Specimens for testing shall be complete devices.

8.12.3.2 Specimens shall be set as specified in 8.1.1.6.

8.12.4 Procedure.

8.12.4.1 Specimens shall be subjected to a test weight of 200 kg + 2/−0 kg (442 lb +4.4/−0 lb).

8.12.4.2 The test weight shall be placed on each surface of the specimen case, housing, or enclosure.

8.12.4.3 The test weight shall be placed so as to avoid impact loading.

8.12.4.4 The test weight shall remain on each surface of the specimen case for 1 minute +15/−0 seconds.

8.12.4.5 After removal of the test weight, each surface of the specimen case, housing, and enclosure shall be examined for damage.

8.12.5 The PESQ measurement shall be conducted as specified in Section 8.2 to determine pass or fail performance.
8.12.6 Following the PESQ measurement, the specimen shall be operated to the manufacturer’s instructions as specified in Sections 6.2 through 6.7 to determine the functionality to determine pass or fail performance.

8.12.7 After determining functionality, the specimen shall be tested and meet the requirements specified in Section 7.2.

8.12.8 Report.

8.12.8.1 The PESQ value measured after case integrity shall be recorded and reported.

8.12.8.2 The functionality of the specimens shall be recorded and reported.

8.12.8.3 The requirements of Section 7.2 shall be tested, recorded, and reported.

8.12.9 Interpretation.

8.12.9.1 Pass or fail performance shall be determined for each specimen.

8.12.9.2 Failure of one or more specimens shall constitute failing performance for this test.

8.13 Water Drainage Test.

8.13.1 Application. This test method shall apply to all devices.

8.13.2 Samples.

8.13.2.1 Samples shall be complete devices.

8.13.2.2 Samples shall be conditioned as specified in 8.1.2.

8.13.3 Specimens.

8.13.3.1 Specimens for testing shall be complete devices.

8.13.3.2 Specimens shall be set as specified in 8.1.1.6.

8.13.3.3 A minimum of three specimens shall be tested.

8.13.4 Procedure.
8.13.4.1 Specimens shall be subjected to three water drainage tests.

8.13.4.1.1 The first test shall have the specimens positioned with the speaker oriented in the position it is intended to be worn, in accordance with the manufacturer’s instructions.

8.13.4.1.2 The second test shall have the specimens positioned with the speaker oriented horizontally and facing up.

8.13.4.1.3 A third test shall have the specimen positioned where the speaker is oriented in a position that will retain the greatest volume of water.

8.13.4.2 Water shall be introduced into all openings, indentations, and grilles of the specimens until water overflows from each such opening, indentation, and grille.

8.13.4.3 The filling method shall ensure that no air bubbles remain in any of the openings, indentations, and grilles.

8.13.4.4 The PESQ shall be measured and recorded starting at the 60 second +5/-0 seconds mark to determine pass or fail performance.

8.13.5 Report.

8.13.5.1 The PESQ value measured after the water drainage resistance test shall be recorded and reported.

8.13.5.2 The functionality of the specimens as specified in Sections 6.2 through 6.7 shall be recorded and reported.

8.13.6 Interpretation.

8.13.6.1 Pass or fail performance shall be determined for each specimen.

8.13.6.2 Failure of one or more specimens shall constitute failing performance for this test.

8.14 Tumble — Vibration Test.

8.14.1 Application. This test method shall apply to all personal alert safety systems (PASS).

8.14.2 Samples.

8.14.2.1 Samples shall be complete PASS.
8.14.2.2 Samples shall be conditioned as specified in 8.1.2.

8.14.2.3 Integrated PASS, other than self-contained breathing apparatus (SCBA) integrated PASS, shall be tested in the “as designed” configuration and shall not be altered, separated, or cut apart from what it is integrated with.

8.14.3 Specimens.

8.14.3.1 Specimens for testing shall be complete PASS.

8.14.3.2 A minimum of three specimens shall be tested.

8.14.4 Apparatus. The tumble test apparatus shall be as specified in Figure 8.14.4.
8.14.5 Procedure.

8.14.5.1 The test specimens shall be placed unrestrained in the tumbling apparatus.

8.14.5.2 Only one specimen shall be tested at a time.

8.14.5.3 The tumbling apparatus shall be run at a speed of 15 rpm ± 1 rpm.
8.14.5.4 The test shall be run for a duration of 3 hours +5/−0 minutes.

8.14.5.5 Specimens shall be operated according to the manufacturer’s instructions to determine functionality as specified in 7.1.3 and pass or fail performance.

8.14.5.6 Upon completion of the test duration, specimens shall be operated according to the manufacturer’s instructions to determine functionality for data logging as specified in 6.1.3 and pass or fail performance.

8.14.5.7 The alarm signal sound pressure level shall be measured as specified in 7.1.3 to determine pass or fail performance.


8.14.6.1 The specimen alarm signal sound pressure level shall be measured, recorded, and reported.

8.14.6.2 The functionality of the specimens shall be recorded and reported.

8.14.7 Interpretation.

8.14.7.1 Pass or fail performance shall be determined for each specimen.

8.14.7.2 Any one specimen failing the test shall constitute failing performance.

8.14.8 Reports for Procedures 1, 2, and 3.

8.14.8.1 The PESQ value measured after the durability test shall be recorded and reported.

8.14.8.2 The requirements in Section 7.2 shall be tested, recorded, and reported.

8.14.8.3 Any water leakage into any electronic compartment(s) shall be recorded and reported.

8.14.8.4 In Procedure 3, any water leakage into any power supply compartment(s) or external power supply shall be recorded and reported.

8.14.9 Interpretation.

8.14.9.1 Pass or fail performance shall be determined for each specimen.

8.14.9.2 Failure of one or more specimens shall constitute failing performance for this test.

8.15 TIA Transmit Power.

8.15.1 Application. This test method shall apply to all RF devices.

8.15.2 Samples.
8.15.2.1 Samples shall be complete devices.

8.15.2.2 Samples shall be conditioned as specified in 8.1.2.

8.15.3 Specimens.

8.15.3.1 Specimens for testing shall be complete devices.

8.15.3.2 A minimum of three specimens shall be tested.

8.15.3.3 Specimens shall be tested within 5 minutes after removal from conditioning.

8.15.4 Procedure. Specimens shall be tested and meet the requirements for carrier output power in 2.2.1 of TIA-603-E, *Land Mobile FM or PM Communications Equipment Measurement and Performance Standards*, and RF power output in 2.2.1 of TIA-102.CAAA-E, *Project 25 Digital C4FM/CQPSK Transceiver Measurement Methods*.

8.15.5 Report.

The carrier output power and the RF power output shall be recorded and reported.

8.16 TIA Carrier Frequency Stability.

8.16.1 Application. This test method shall apply to all RF devices.

8.16.2 Samples.

8.16.2.1 Samples shall be complete devices.

8.16.2.2 Samples shall be conditioned as specified in 8.1.2.

8.16.3 Specimens.

8.16.3.1 Specimens for testing shall be complete devices.

8.16.3.2 A minimum of three specimens shall be tested.

8.16.3.3 Specimens shall be tested within 5 minutes after removal from conditioning.

8.16.4 Procedure. Specimens shall be tested and meet the requirements for carrier frequency stability in 2.2.2 of TIA-603-E, *Land Mobile FM or PM Communications Equipment Measurement and Performance Standards*, and RF power output in 2.2.1 of TIA-102.CAAA-E, *Project 25 Digital C4FM/CQPSK Transceiver Measurement Methods*. 

8.16.5 Report.

The carrier frequency stability and the operating frequency accuracy shall be recorded and reported.

8.17 TIA Receiver Sensitivity.

8.17.1 Application. This test method shall apply to all RF devices.

8.17.2 Samples.

8.17.2.1 Samples shall be complete devices.

8.17.2.2 Samples shall be conditioned as specified in 8.1.2.

8.17.3 Specimens.

8.17.3.1 Specimens for testing shall be complete devices.

8.17.3.2 A minimum of three specimens shall be tested.

8.17.3.3 Specimens shall be tested within 5 minutes after removal from conditioning.


8.17.5 Report.

The reference sensitivity (analog) and reference sensitivity (digital) shall be recorded and reported.

8.18 Power Source Performance Test.

8.18.1 Application. This test method shall apply to all RF devices.

8.18.2 Samples.
8.18.2.1 Samples shall be complete devices.

8.18.2.2 Samples shall be conditioned as specified in 8.1.2.

8.18.3 Specimens.

8.18.3.1 Specimens for testing shall be complete devices.

8.18.3.2 A minimum of three specimens shall be tested.

8.18.4 Procedure.

8.18.4.1 The RF device shall be continuously operated for at least 8 hours on a standard-duty cycle of 10-10-80 at maximum rated transmit power.

8.18.4.2 The RF device shall be tested and meet the requirements for carrier output power in 2.2.1 of TIA-603-E, Land Mobile FM or PM Communications Equipment Measurement and Performance Standards, and RF power output in 2.2.1 of TIA-102.CAAA-E, Project 25 Digital C4FM/CQPSK Transceiver Measurement Methods.

8.18.4.3 Transmit power shall not decrease by more than 1 dB for the first 8 hours as specified in 7.2.1.2.1.

8.18.7 Report.

8.18.7.1 The delta power shall be calculated by subtracting the final transmit power from the initial transmit power.

8.18.7.2 Delta power shall be recorded and reported.

8.18.7.3 The functionality of the specimens shall be recorded and reported.

8.19 Electronic Temperature Stress Test.

8.19.1 Application. This test method shall apply to all RF devices.

8.19.2 Samples.

8.19.2.1 Samples shall be conditioned as specified in 8.1.2.

8.19.2.2 A minimum of 3 specimens shall be tested.
8.19.3 Procedure.

8.19.3.1 Each specimen shall be subjected to a series of three temperature stress tests identified as Test Procedure 1, for elevated temperature, in 8.19.4; Test Procedure 2, for low operating temperature, in 8.19.5; and Test Procedure 3, for temperature shock, in 8.19.6.

8.19.3.2 Specimens.

8.19.3.2.1 The same three specimens shall be used for all three test series.

8.19.3.2.2 Each specimen tested shall be complete with power source.

8.19.3.3 Conditions.

8.19.3.3.1 The test chamber or cabinet shall be capable of maintaining the required conditions specified in 8.19.4, 8.19.5, and 8.19.6 throughout the envelope of air surrounding the specimen being tested.

8.19.3.3.2 The required conditions shall be continuously monitored.

8.19.3.4 Following each test procedure, the specimen shall be allowed to stabilize at ambient conditions prior to proceeding to the next test procedure.

8.19.4 Test Procedure 1.

8.19.4.1 Specimens shall be placed in the test apparatus that has been stabilized at 49°C +3/−0°C (120°F +5/−0°F).

8.19.4.2 After 6 hours, the temperature shall be raised to 71°C +3/−0°C (160°F +5/−0°F) within 1 hour and maintained for 4 hours.

8.19.4.3 The temperature shall then be decreased to 49°C +3/−0°C (120°F +5/−0°F) within 1 hour.

8.19.4.4 This cycle shall be repeated twice.

8.19.4.5 After the second cycle, the temperature shall be raised to 71°C +3/−0°C (160°F +5/−0°F) for 4 hours.

8.19.4.6 Specimens shall be removed following the specified conditioning, and testing shall begin within 30 seconds or removal from conditioning.
8.19.4.7 Specimens shall be operated according to the manufacturer’s instructions to determine functionality as specified in Section 6.20.

8.19.4.8 The RF device shall transmit and a receiving RF device shall be used to determine pass or fail performance.

8.19.5 Test Procedure 2.

8.19.5.1 Specimens shall be placed in the test apparatus that has been stabilized at −20°C +0/−3°C (−4°F +0/−5°F) and maintained for a minimum of 4 hours.

8.19.5.2 Removal.

8.19.5.2.1 Specimens shall be removed following the specified conditioning.

8.19.5.2.2 Testing shall begin within 30 seconds of removal from conditioning.

8.19.5.3 Specimens shall be operated according to the manufacturer’s instructions to determine functionality as specified in Section 6.20.

8.19.5.4 The RF device shall transmit and a receiving RF device shall be used to determine pass or fail performance.

8.19.6 Test Procedure 3.

8.19.6.1 Hot/Cold Conditioning.

8.19.6.1.1 Specimens shall be placed in the test apparatus that has been stabilized at −20°C +0/−3°C (−4°F +0/−5°F) cold condition for 4 hours.

8.19.6.1.2 Specimens shall be removed from the cold condition.

8.19.6.1.3 Specimens shall be placed into another test apparatus within 5 minutes that has been stabilized at 71°C +3/−0°C (160°F +5/−0°F) hot condition for 4 hours.

8.19.6.2 The cold-to-hot cycle shall be repeated twice.

8.19.6.3 Removal.

8.19.6.3.1 Specimens shall be removed following the specified conditioning.
8.19.6.3.2 Specimen testing shall begin within 30 seconds of removal from conditioning.

8.19.6.4 Specimens shall be operated according to the manufacturer’s instructions to determine functionality as specified in Section 6.20.

8.19.6.5 The RF device shall transmit and a receiving RF device shall be used to determine pass or fail performance.

8.19.7 Report.

8.19.7.1 The specimen alarm signal sound pressure level shall be measured, recorded, and reported.

8.19.7.2 The functioning of the specimens shall be recorded and reported.

8.19.8 Interpretation.

8.19.8.1 Pass or fail performance shall be determined for each specimen.

8.19.8.2 Failure of one or more specimens shall constitute failing performance for this test.

8.20 Antenna VSWR Swept Frequency Test.

8.20.1 Application. This test method shall apply to all RF devices.

8.20.2 Samples.

8.20.2.1 Samples shall be complete devices.

8.20.2.2 Samples shall be conditioned as specified in 8.1.2.

8.20.3 Specimens.

Specimens for testing shall be the RF device antenna.

8.20.4 Apparatus.

8.20.4.1 The manufacturer shall provide a jig to mount the antenna to facilitate the swept frequency VSWR test.

8.20.4.2 The jig shall provide an N-type female connector to connect the RF cable from the meter to the jig.

8.20.5 Procedure.
8.20.5.1 Calibration.

8.20.5.1.1 The swept frequency VSWR meter shall be calibrated by connecting the meter to the jig and applying the calibration loads to the antenna mounting point.

8.20.5.1.2 Adapters shall be permitted to connect the calibration load to the antenna mounting point.

8.20.5.1.3 The effect of adapters on the calibration shall be ignored.

8.20.5.2 The specimen's antenna shall be removed from the specimen and mounted in the jig.

8.20.5.3 Configuration.

8.20.5.3.1 The swept frequency VSWR meter shall be configured for a start and stop frequency equal to the vendor-specified antenna bandwidth.

8.20.5.3.2 A minimum of 100 sample points shall be taken across the bandwidth.

8.20.5.4 VSWR Charts.

8.20.5.4.1 A baseline swept VSWR chart of the antenna shall be created before the RF device is subjected to any performance tests.

8.20.5.4.2 Subsequent swept VSWR charts shall be created after each performance test as specified.

8.20.5.4.3 These VSWR charts shall be compared to the baseline.

8.20.6 Report. The change in dB shall be recorded and reported.

Annex A  Explanatory Material

A.1.1.1 For the scope of this document, the primary function of an RF device is facilitating the voice communication link between personnel within a hazard zone and the incident commander (IC) or person(s) as indicated by the authority having jurisdiction (AHJ). This document is not intended to restrict the development or introduction of other forms of noninterfering communications or devices that use RF links for unrelated functions. An example would be short-range team intercom communication devices integrated into personal
protective equipment (PPE) that do not serve as, but might augment, the RF device’s voice link to the IC. Further, a device providing telemetry data on a firefighter or their equipment is not considered an RF device for the purposes of this document.

**A.1.3.1** Outside the hazard zone, an RF device or RSM can be configured with compatible devices, including devices that serve the function of an RSM, that do not meet the requirements of this standard as long as the noncompliant item(s) can be quickly and easily deconfigured by the user prior to entering the hazard zone. For example, a boom mic headset or earpiece can be used in the course of duties performed by fire service personnel when not actively engaged in a hazard zone.

**A.1.3.5** Emergency response organizations are cautioned that accessories are not part of the certified product but could be attached to a certified product by means not engineered, manufactured, or authorized by the certified product manufacturer.

Emergency response organizations are cautioned that if an accessory or its means of attachment causes the structural or electrical integrity of the certified product to be compromised, the certified product might not be compliant with the standard to which it was originally certified as compliant. Additionally, if an accessory or the accessory’s means of attachment are not designed and manufactured from suitable materials for the hazardous environments of emergency incidents, the failure of the accessory or means of attachment could cause injury to the emergency responder. Because the aftermarket for accessories is so broad, emergency response organizations are advised to contact both the accessory manufacturer and the manufacturer of the certified product and verify that the accessory and its means of attachment are suitable for use in the intended emergency response environment. Emergency response organizations should seek and receive written documentation from the accessory manufacturer to validate the following assurances:

1. Accessories for a certified product and the means of attachment will not degrade the designed protection or performance of the certified product below the requirements of the standard to which it was designed, manufactured, tested, and certified.

2. The accessory, when properly attached to the certified product, will not interfere with form, fit, or function of any of the certified product or with the form, fit, and function of any of the certified product’s component parts. Users are also cautioned that the means of attachment for accessories that fail to safely and securely attach the accessory to a certified product could allow the accessory to become inadvertently dislodged from the certified product, possibly posing a risk to emergency response personnel in the vicinity.
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.3.3.6 Bluetooth. Bluetooth is defined in the IEEE standard 802.15.1.

A.3.3.10 Compatible Device. A compatible device could include a self-contained breathing apparatus (SCBA) mask microphone/earpiece.

A.3.3.24 Hazard Zone Mode. These activities include, but are not limited to, fire suppression — both interior/exterior structural and wildland, as well as hazardous materials mitigation and technical rescue.

A.3.3.31 Intrinsic Safety (IS). IS is a protection concept associated with the rating of equipment for operation in potentially hazardous atmospheres. IS ratings take into account the nature of the explosive atmosphere encountered — Class I being explosive gas atmospheres and Class II being explosive dust atmospheres — and the frequency or interval of the presence of such explosive atmosphere (i.e., continuously, intermittently, or abnormally). The frequency or interval of the presence of the explosive atmosphere determines the proper division (e.g., Division 1 or Division 2) or zone (e.g., Zone 0, Zone 1, or Zone 2) classifications that are applied to a particular IS rating. To determine the appropriate IS rating for portable radios, the AHJ
identifies the expected explosive atmospheres likely to be encountered and the expected frequency or interval of the presence of such expected explosive atmosphere.

**A.3.3.38 Mode.** Such features could include a radio channel, talk paths in a conventional system or a talkgroup in a trunked system, a CTCSS tone, an encryption type, or another feature.

**A.3.3.40 Nonhazard Zone Mode.** This mode would be used when first responders are performing administrative, training, inspections, or other duties not in the hazard zone.

**A.3.3.42 Out-of-Range Indication.** The out-of-range indication warns ESP that their RF device is no longer in communication with the system. This feature is most commonly offered in radio trunking systems, where loss of the trunking control channel or data stream will cause the RF device to emit a “honk” tone to the user who is pressing the push-to-talk (PTT) button, indicating that the RF device cannot be used because it cannot receive the control channel. Note that this standard requires that the user experience an audible indication when the control channel is lost, and not just when the user attempts a PTT.

**3.3.43 Perceptual Evaluation of Speech Quality (PESQ).** PESQ is defined in ITU-T P.862, *Perception Evaluation of Speech Quality*.

**A.3.3.48 Product Label.** The product label is not the certification organization’s label, symbol, or identifying mark; however, the certification organization’s label, symbol, or identifying mark is attached to or is part of the product label.

**A.3.3.52 RF Device.** This is most commonly a portable two way land mobile radio.

**A.3.3.62 Talkgroup.** Talkgroups may also have some unique and common features, such as a priority level of transmission, a common encryption code, etc. Talkgroups are typically associated with trunked radio systems, as opposed to conventional radio systems that do not use trunking techniques.

**A.3.3.63 Telecommunications Industry Association (TIA).** TIA is accredited by the American National Standards Institute (ANSI) as a standards developing organization.

**A.3.3.65 Trunking Signaling Block (TSBK).** These messages are typically formatted as a single block message and use the same Trellis coding as an unconfirmed data packet. *(See 6.9.6 and 6.9.7.2.)*

**A.3.3.68 Voltage Standing Wave Radio (VSWR).** Examples of how radio-frequency power is transmitted from a power source include through a transmission line, into a load, or from a power amplifier through a transmission line to an antenna.
A.3.3.70 Zone. This is often a group of 16 channels or talkgroups, because of the way that most land mobile radio RF devices are manufactured today.

A.4.6.1 An FMEA provides an approach to identifying and ranking RF device or RSM failure modes that could lead to product hazard. The FMEA is organized based on safety functions provided by the RF device. These functions can be implemented in a single component or across multiple components. The FMEA should address, at a minimum, all failure modes of components that would result in the following failure effects of the RF device:

1. Failure to indicate inadequate power source
2. Failure to turn on
3. Failure to receive voice communications
4. Failure to transmit voice communications
5. Failure to transmit emergency alert
6. Failure to receive emergency activation
7. Failure of the radio display
8. Failure to connect and communicate with the RSM
9. Failure to log data

The FMEA should address, at a minimum, all failure modes of components that would result in the following failure effects of an RSM:

1. Failure to turn on
2. Failure to receive voice communications
3. Failure to transmit voice communications
4. Failure to transmit emergency alert
5. Failure to connect and communicate with the a secondary RSM from a primary RSM

The FMEA should be conducted in accordance with JEP131A, Potential Failure Mode and Effects Analysis (FMEA). The effect of the failure mode is determined by the system’s response to the failure. The FMEA identifies subassemblies and their functions, the failure mode for those subassemblies, the failure effect on other subassemblies as well as the whole system, and the corrective action to be taken.

Step 1: Select function. The FMEA process begins by selecting an RF device function to be analyzed. Record the requirement number and the requirement description on the FMEA form (see Figure A.4.6.1).
<table>
<thead>
<tr>
<th>Req. no.</th>
<th>Design lead.</th>
<th>Date</th>
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<tbody>
<tr>
<td></td>
<td>Participants</td>
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</table>

<table>
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<th>4</th>
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Prepared by: Date: Page ___ of ___

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Figure A.4.6.1 FEMA Form.
Step 2: Identify equipment components. Step 2 identifies all the equipment components that implement the function requirement. List the components in column 1 of the FMEA form.

Step 3: Specify failure mode for identified components. For each component listed in column 1 of the FMEA form, list potential failure modes in column 2. A failure mode is any component failure that results in failure of the component to deliver part or all of its intended functionality.

Step 4: Identify failure effects. For each component failure mode included in column 2, step 4 identifies one or more failure effects that the identified failure mode would have on delivery of the RF device function being analyzed. Include the failure effect in the third column. A failure effect is a deviation in function output value or timing.

Step 5: Determine severity (S) of failure modes and effects. Table A.4.6.1 (a) provides the criteria for determining the severity of failure modes and effects. For each component failure mode and effect included in column 3 of the FMEA form, the value for the severity level is recorded in column 4. Base the value of the severity level, on the criteria provided in Table A.4.6.1(a).

<table>
<thead>
<tr>
<th>Severity (S)</th>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Critical</td>
<td>A product hazard that judgment and experience indicate is likely to result in a condition immediately dangerous to life or health (IDLH) for individuals using or depending on the compliant product. If an IDLH condition occurs, the user will sustain or will be likely to sustain an injury of a severity that could result in loss of life or in significant bodily injury or loss of bodily function, either immediately or at some point in the future.</td>
<td>10</td>
</tr>
<tr>
<td>Major A</td>
<td>A product hazard other than Critical that is likely to result in failure to the degree that the compliant product either does not provide any protection or reduces protection and that is not detectable to the user. The term “reduces protection” means the failure of specific protective design(s) or feature(s) that results in degradation of protection in advance of reasonable life expectancy to the point that continued use of the product is likely to cause physical harm to the user, or where continued degradation could lead to IDLH conditions.</td>
<td>10</td>
</tr>
<tr>
<td>Major B</td>
<td>A product hazard other than Critical or Major A that is likely to result in reduced protection and that is detectable to the user.</td>
<td>5</td>
</tr>
</tbody>
</table>
The term “reduces protection” means the failure of specific protective design(s) or feature(s) that results in degradation of protection in advance of reasonable life expectancy to the point that continued use of the product is likely to cause physical harm to the user, or where continued degradation could lead to IDLH conditions.

Minor

A product hazard other than Critical, Major A, or Major B that is not likely to materially reduce the usability of the compliant product for its intended purpose or a product hazard that is a departure from the established applicable standard and has little bearing on the effective use or operation of the compliant product for its intended purpose.

Step 6: Determine the causes of failure and their probability (P). Table A.4.6.1(b) lists the probability of the failure for each potential failure mode and effect combination in column 5. For each root cause, list in column 6 the probability that the failure would occur using the categories in Table A.4.6.1(b).

Table A.4.6.1(b). Probability (P) Criteria

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequent</td>
<td>The failure will occur often in the equipment life cycle.</td>
<td>10</td>
</tr>
<tr>
<td>Occasional</td>
<td>The failure will occur at least once in the equipment life cycle.</td>
<td>5</td>
</tr>
<tr>
<td>Improbable</td>
<td>So unlikely that it can be assumed that the failure will not occur in the equipment life cycle.</td>
<td>1</td>
</tr>
</tbody>
</table>

Step 7: Determine design controls and detectability (D). For each likely cause of failure, Table A.4.6.1(c) lists whether the design controls will help ensure that the failure can be detected. The design control is identified in column 7 of the FMEA form. When causes are identified, discuss and document the design controls that will prevent, remove, or detect and recover from the effects of the failure mode. For each design control, assign a detectability value based on the criteria in Table A.4.6.1(c) and list it in column 8 of the FMEA form.

Table A.4.6.1(c). Detectability (D) Criteria

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Undetectable</td>
<td>There is no way to detect the occurrence of the failure mode and effect. Effective design controls are not in place.</td>
<td>10</td>
</tr>
<tr>
<td>Not Sure</td>
<td>The design controls in place might not always detect the failure mode and effect.</td>
<td>5</td>
</tr>
<tr>
<td>Category</td>
<td>Description</td>
<td>Value</td>
</tr>
<tr>
<td>-------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>-------</td>
</tr>
<tr>
<td>Detectable</td>
<td>The design controls in place will always detect the failure mode and effect.</td>
<td>1</td>
</tr>
</tbody>
</table>

**Step 8: Compute risk priority number (RPN).** Step 8 computes a risk priority number (RPN), listed in column 9 of the FMEA form, based on the values of risk, probability, and detectability, as follows:

\[ RPN = S \times P \times D \]

The lower the value of the RPN, the lower the risk that a given failure will occur. The RPN value is the measure used as input to the risk analysis.

**A.4.6.4** The FMEA process includes a step for computing a measure identified as the risk priority number, or RPN (column 9), in Figure A.4.6.1. Higher RPN values imply higher risks. RPN values can be used to determine the ALARP region. Using the ALARP region provides a consistent criterion for stopping the FMEA for a required two-way, portable RF voice communications device function. As shown in Figure A.4.6.4, the ALARP region has an upper and a lower limit. The upper limit is the horizontal line that separates the ALARP region from the intolerable region, where risk is refused. The lower limit is the horizontal line that separates ALARP from the broadly acceptable region, where the risk is insignificant. When the design controls implemented have reduced the risk to fall in the ALARP region, the FMEA can be stopped.

![Figure A.4.6.4 Upper and Lower Limits of ALARP Region Based on RPN.](image-url)
Specifying an ALARP value of 25 reduces the risk of remaining failures to the following:

1. Minor severity failures that are occasional and that might or might not be detected
2. Major B severity failures that are improbable and that might or might not be detected
3. Major B severity failures that are occasional and that will be detected

The value of 25 thus seems reasonable for a more quantitative definition of an ALARP upper limit devices. Specifying an ALARP value of 10 reduces the risk of remaining failures to the following:

1. Minor severity failures that are improbable and that will not be detected
2. Minor severity failures that are frequent and that might or might not be detected
3. Critical or Major A severity failures that are improbable and that will be detected

The value of 10 thus seems reasonable for a more quantitative definition of an ALARP lower limit devices.

Table A.4.6.4 maps the target ALARP upper and lower limits to exposure.

**Table A.4.6.4** Target ALARP Upper and Lower Exposure Limits

<table>
<thead>
<tr>
<th>Exposure Category</th>
<th>ALARP Region</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hostile, fire</td>
<td>10 ≤ RPN ≤ 25</td>
</tr>
<tr>
<td>Hostile, non-fire</td>
<td>10 ≤ RPN ≤ 25</td>
</tr>
</tbody>
</table>
A.5.2.3 Information and materials intended for the end user in the field provides the user with information about the operation of the portable RF device as well as its care and maintenance. The organization of the user’s manual is not specified. The checklist in Table A.5.2.3 can help assure that the supplied documentation addresses all requirements. The column labeled “Page no./Paragraph” should identify the page and paragraph number where the requirement in the column labeled “Description” is addressed. This will ensure that all requirements have been met and manufacturers can provide the table to the certification organization with their user’s manual to assist with the verification of their compliance with this standard. Including this checklist, or some form of it, as part of the user’s manual will also assist users in becoming familiar with the device.

Table A.5.2.3 Supplied Documentation Checklist

<table>
<thead>
<tr>
<th>SECTION</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.2.3</td>
<td>Information and materials regarding preoperational use shall be provided on at least the following areas:</td>
</tr>
<tr>
<td></td>
<td>1. Safety considerations</td>
</tr>
<tr>
<td></td>
<td>2. Preuse/periodic checks</td>
</tr>
<tr>
<td></td>
<td>3. Limitations of use</td>
</tr>
<tr>
<td></td>
<td>4. Power source requirements, type, and brand</td>
</tr>
<tr>
<td></td>
<td>5. Estimate operation time on fully charged power source in each available mode</td>
</tr>
<tr>
<td></td>
<td>6. Low power source signals and power supply replacement, where applicable</td>
</tr>
<tr>
<td></td>
<td>7. Location and description of controls/sounds/AHJ programmable options</td>
</tr>
<tr>
<td></td>
<td>8. Device/feature/component failure and fallback indications</td>
</tr>
<tr>
<td></td>
<td>9. Marking recommendations and restrictions</td>
</tr>
<tr>
<td></td>
<td>10. Recommended storage practices</td>
</tr>
<tr>
<td></td>
<td>11. Cleaning instructions and precautions</td>
</tr>
<tr>
<td></td>
<td>12. Disinfecting procedures if exposed to</td>
</tr>
</tbody>
</table>
chemical or biological hazards

13. Periodic maintenance frequency and details

14. Guidelines for requesting service and repair

5.2.4 Information and materials for communications systems administrators

1. Information and training regarding radio programmable features and options

2. Information and training regarding design and implementation of two-way RF communications systems

3. Maximum rated volume and associated volume control setting

4. Maximum RF transmit power in all bands and modes of operation

A.6.1.4 The analog FM channel is the lowest common denominator required of the devices defined by this standard, and this is in conformance with 9.3.1.4 of NFPA 1221, which requires an analog simplex tactical communications channel. Because differing channel bandwidths are used in some national jurisdictions on different radio bands, the AHJ should ensure that the channel bandwidths for the frequency bands being used are in compliance with the national licensing authority’s regulations.

In addition, it should be noted that some national licensing authorities are pushing for narrower channels in land mobile radio bands to create more useable spectrum. In the specific case of the FCC in the United States, they have stated in a recent docket (i.e., DA 17-632, 29 June 2017) that they do intend to push at some future point in time for licensees in the VHF and UHF bands to move from 12.5 kHz spacing to 6.25 kHz spacing, and a request for this not to apply to the
U.S. fire service was denied. If and when such a mandate to 6.25 kHz spacing is made, it will be necessary for users to move from analog to digital technology, because analog technology cannot support such narrow channel spacings. Therefore, AHJs should consider the ramifications of purchasing and using equipment that cannot be migrated to 6.25 kHz operation in the future.

**A.6.2.1** The nonhazard zone is expected to include administrative activities, fire marshal (i.e., inspection) duties, EMS runs, and so on. Use in the nonhazard zone is not expected to require some of the special features of the hazard zone mode, such as full RF power emergency transmissions.

**A.6.2.4** It is recommended that the AHJ program the RF device such that two separate actions are required to power off the RF device while it is in the Hazard Zone mode. This is to prevent an inadvertent powering off of the RF device. An example of a possible two-action process might be to turn the volume control to off at the same time that the side programmable button is depressed.

**A.6.3.1 (4)** The two-position switch is typically programmed to provide additional features to the RF device that are commonly used. Examples include encryption on/off, scanning on/off, nonhazard zone selection, or other functions.

**A.6.3.1 (5)** The three-position switch is typically programmed to provide three banks of channels, talkgroups, or talk paths. This switch, together with the selector knob of Section 6.4, provides a total of $3 \times 16 = 48$ channels, talkgroups, or talk paths.

**A.6.3.5(2)** The programmable side button can be used for a number of functions. One possibility is that this button plus the volume on/off can be pressed simultaneously to completely power down the device to prevent accidental powering down of the device (see 6.2.4). Another possible use of this button is to activate the nonhazard zone mode by turning the RF device off via pressing the volume button and the side button, then turning the RF device back on by pressing the volume button and the side programmable button. Longer or shorter presses of the programmable side button could also activate additional functions, such as receive scan on/off, although this might add some ergonomic complexity for users.

**A.6.3.6** The purpose of the transmitter time-out timer is to ensure that if a short occurs on a PTT, the RF device experiencing that failure doesn’t tie up the channel more than the time set by the time-out timer. This requirement is also in conformance with 9.3.6.4 of NFPA 1221.

**A.6.5.2** The selector knob of the RF device can change various things depending on whether the RF device is operating in a conventional system or a trunking system. The things that are changing are called the “mode.” For example, on a particular position of the selector knob, the
AHJ might determine that the user is operating in a conventional system. In this case, the selector knob will be changing channels, which means the transmit and receive frequencies, and transmit and receive continuous tone-coded squelch system (CTCSS) tones, and perhaps other items such as unit ID signaling, are all being selected and activated.

Then on another position of the selector knob, the AHJ could determine that the user is operating in a trunking system. In this case, the channel selector position will be determining the talkgroup that the user will be affiliated with. In general, in a trunking system, the specific talkpath (i.e., the transmit and receive frequencies) will be determined by the trunking controller, and the RF device will automatically use those frequencies that are assigned by the trunking controller for that talkgroup.

It is common practice for AHJs to program the main channel, talkgroup, or talk path most frequently used by the responders, in both the first and sixteenth positions, so that the responder can merely turn the selector knob either way until it reaches its stop, and know that they are on the main channel, talkgroup, or talk path.

A.6.8.5 Once a user activates the emergency alert function, whether deliberately or accidentally, the emergency alert function will activate all units on scene that are on that same talkgroup or channel. The AHJ can determine who will have the authority to cancel the emergency function.

A.6.8.7.2.1 The AHJ can select the protocol or protocols appropriate for operational/infrastructure requirements, as required.

AHJ selectable options for when the EAB is activated include the following:

1. Remain on selected channels, talkgroups, or talk paths for electrically initiated device (EID) transmission
2. Channels, talkgroups, or talk paths revert to a preprogrammed EID transmission channel, talkgroup, or talk path

After the radio transmits the radio ID, the AHJ can also then select one of the following options:

1. Remain on the selected channel, talkgroup, or talk path
2. Revert to preprogrammed channels, talkgroups, or talk paths for transmission of all subsequent voice traffic
A.6.8.8(1) These other signaling schemes are often used by AHJ radio systems to provide ID, emergency alert, and other functions, typically in conventional (i.e., not trunked) radio systems. TSBK is the signaling format used in P25 trunking systems, and in this case the standard is requiring the same signaling format for conventional systems as well for ID and emergency. This is to ensure interoperability among units that might be called in to a mutual aid incident in a jurisdiction that uses a conventional radio system. However, it is not the purpose of this standard to force AHJs to change their current radio system to utilize this TSBK signaling format if another format is already in use. Hence, AHJs can utilize another format. However, the following points need to be made:

(1) Use of another format, such as MDC 1200, is in addition to TSBK signaling. This means that every transmission from a device will thus include both signaling formats. Depending on how this is configured, this might mean that voice transmission time is delayed by several hundred milliseconds to a second. AHJs need to consider the operational implications of that delay.

(2) Some AHJs deliberately program their radios with a ‘wait tone’ to allow the signaling or the trunking channel to be served up prior to allowing a user to transmit voice, to avoid the first word or syllables from being dropped.

(3) In a trunked P25 radio system, TSBK signaling is already employed, so there is no need for AHJs to be concerned in that case about the TSBK signaling — it is already there.

A.6.8.8(2) Reverting to a preprogrammed channel, talkgroup, or talk path could be for moving all incident units to another incident ground channel, talkgroup, or talk path if there is a downed/trapped responder; or moving a downed/trapped responder to a “downed/trapped responder channel, talkgroup, or talk path” (most AHJs don’t recommend or do this because of the difficulty a downed/trapped responder might have in manipulating correctly the RF device controls); or to move responders on the RIT/RIC/RID/FAST team to their own channel, talk group, or talk path.

A.6.8.9.2.2 At large or long duration incidents, it is possible that multiple emergency alarms may occur. This provision allows all the emergency alarms to be captured, if correctly received by receiving units, and stored and displayed, so that the incident commander, safety officer, telecommunicator, and others do not lose accountability of the responders that have called for help.
A.6.9.5 The AHJ can program this option button for various purposes as it deems fit, to enhance ESP safety. Some of the uses for which this button might be programmed for could include, but are not be limited to, the following:

1. Revert to a “home” radio channel or talkgroup regardless of the selector knob position on the RF device, if the selector knob on the RF device is accidentally turned by movement of the user.

2. Toggling between two to four channels/talkgroups such as dispatch, incident ground A, incident ground B, or RIT/RIC.

3. Toggling between two or three receive audio levels on the RSM (e.g., the level set by the volume knob on the radio, 6 dB higher than that volume setting, and 6 dB lower than the volume setting).

4. This one button might be able to be used for multiple functions, such as toggling volume and toggling channels/talkgroups, by utilizing short presses for one function and long presses for another.

A.6.9.6 There are various configurations of the RF device with one or more compatible devices. Figure A.6.9.6(a) and Figure A.6.9.6(b) illustrate some of those configurations.

Figure A.6.9.6(a) Possible Configurations of RF Devices.
Figure A.6.9.6(b) RF Device with Wired or Wireless Compatible Device.

Reference Communication System

RF device with one wired compatible device.

RF device with two wired compatible devices.

RF device with one wired compatible device, which has a wireless connection to a second compatible device. Different topology than Figure A.6.10.7.4 in that wireless connection is to the wired RSM or compatible device.

RF device with two wireless compatible devices.

Note: Physical connection can be a cable (i.e., wire) or mechanically fixed connection, such as the universal connector mounted in an RSM housing.
**A.6.13** This can be typically found in a trunked radio system, although some manufacturers have applied this to conventional systems as well. AHJs should carefully evaluate how this feature is implemented in RF devices that they are contemplating using.

**A.6.14** Table A.6.14(a) is a summary of the various ergonomic outputs of the RF device or tRSM per this standard.

**Table A.6.14(a) Ergonomic Outputs of RF Devices or RSMs**

<table>
<thead>
<tr>
<th>Feature</th>
<th>LED</th>
<th>Display</th>
<th>Voice Ann. 6.11.5</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Battery indic, device</td>
<td></td>
<td>Icons, flashes if &lt;25%</td>
<td></td>
<td>Audible tone at max vol.</td>
</tr>
<tr>
<td>Emergency initiator, RF device</td>
<td>Full green RX</td>
<td>Flashing orange: EMERG SENT</td>
<td>&quot;Sending emergency&quot;</td>
<td></td>
</tr>
<tr>
<td>Emergency-receiver, RF device</td>
<td>Solid orange: ID of initiator</td>
<td>&quot;Receiving emergency&quot;</td>
<td></td>
<td>3 sec. to max vol; go to max receive vol;</td>
</tr>
<tr>
<td>IDs during emergency</td>
<td></td>
<td></td>
<td></td>
<td>14 char. alpha-numeric, last 20; 3K entries</td>
</tr>
<tr>
<td>Display</td>
<td></td>
<td>8 characters, additional scrolling; backlit illum. 2 sec.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RF device</td>
<td>Solid grn RX, solid red TX</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RSM</td>
<td>Solid grn RX,</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table A.6.14(b) is a summary of the various ergonomic outputs of RF devices or the RSMs per this standard, including those that have AHJ programmable alerts and indications.

The RSM can display event indicators as listed in Table A.6.14(b) for the RF device, if it is capable.
## Table A.6.14(b) Ergonomic Outputs of RF Devices or RSMs

<table>
<thead>
<tr>
<th>Event</th>
<th>Device</th>
<th>LED</th>
<th>Display</th>
<th>Audible</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Battery charge remaining</td>
<td>RF device</td>
<td>Icons as specified in Table 6.1.5.2</td>
<td>Alert tone</td>
<td>Recurring every two minutes when less than 25% capacity.</td>
<td></td>
</tr>
<tr>
<td>Emergency - initiator</td>
<td>RF device, RSM</td>
<td>Flashing orange</td>
<td>Flashing orange:</td>
<td>Alert tone</td>
<td>User ID sent; Audible recurring tone at max volume; subsequent transmissions at highest rated power until cleared.</td>
</tr>
<tr>
<td>Emergency - receiver</td>
<td>RF device, RSM</td>
<td>Steady orange</td>
<td>Steady orange: ID of initiator</td>
<td>Alert tone</td>
<td>Audible recurring tone at max volume until cleared.</td>
</tr>
<tr>
<td>Transmit</td>
<td>RF device, RSM</td>
<td>Steady red</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Receive</td>
<td>RF device, RSM</td>
<td>Steady green</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RSM failure</td>
<td>RF device</td>
<td>Steady orange</td>
<td>Steady orange: “Failed Accessory”</td>
<td>“Failed ACCSRY”</td>
<td>Maximum volume</td>
</tr>
<tr>
<td>Out of range</td>
<td>RF device, RSM</td>
<td>Flashing red</td>
<td>Flashing red</td>
<td>Alert tone</td>
<td>1 sec. tone every 15 sec.; 70% volume.</td>
</tr>
</tbody>
</table>
A.6.16.1 The purpose of detecting an over-temperature event is to alert users that the RF device or the RSM has been exposed to a high temperature such that the features and operation might be seriously impaired. It might also have other uses, including maintenance records, and forensic investigations where a tragic event occurred in connection with the use of the RF device or RSMs.

A.6.16.6.3 The reason for maintaining the distinction between the two items is because some AHJ’s might have to make a decision whether to “repair or replace” RF devices or RSMs that are
exposed to extreme temperatures, and knowing which unit has the exposure can be helpful.

**A.6.17.2(1)** Connectivity of the RSM or compatible device is important because if it fails, depending upon the method used to wear the RF device, it might be impossible for the first responder to properly use the RF device or its features, such as the EAB.

**A.7.1.1.2** A consistent complaint from ESP with current RF devices and RSMs is that voice traffic on the incident scene is often distorted and unintelligible. This standard requires a PESQ score for voice quality of 2.5 for the RF devices and RSMs covered by this standard. This PESQ testing is done end-to-end (i.e., from mouth to ear), to ensure that it attempts to test as closely as possible what the end user will experience in using the equipment. This should provide an incentive to the industry to address the recurring issue of voice intelligibility. PESQ allows automated testing of voice quality, and hence helps ensure testing repeatability and reduced testing cost. It also equally applies to both analog and digital technologies. It will be noted that after each major physical stress test, a PESQ test is made to ensure that the voice quality will remain adequate during an incident even when the equipment covered by this standard have been physically and electrically stressed.

**A.7.1.5** For decades, the standard for intrinsic safety (IS) for land mobile portable radios has traditionally been derived from sections of the *NFPA 70*, which provided for fixed electrical power installations in hazardous locations such as refineries and grain elevators. The use-case for fire service portable radios is different in many ways from fixed electrical installations. In addition, recently some changes were made in how testing organizations test portable radios for IS. These changes provide an opportunity to revisit what exact level of IS is really required for portable radios used in the fire service. The committee has spent a significant amount of time looking at the various issues, reviewing the past history of incidents, and talking to industry experts. This standard in regards to IS reflects that extensive analysis and the resulting decision. The information following is an explanation of some of the many issues and tradeoffs that were considered during this process.

First, the term *certified on delivery* warrants explanation. The firefighter faces many varied operating conditions and therefore needs equipment that can span those multiple conditions. Designing for hazardous locations, as classified by the *National Electrical Code (NEC)*, is done with standards that often assume permanent mounting of electrical fixtures within a defined area. None of those areas approaches the environment found within any structure fire. As such, there is no established set of failure mechanisms, practices for design, or means of testing and validation that would make a product certified for use in an *NEC* classified area retain its “guarantee of safety” in a structural fire. In other words, a product designed and certified for
even the most hazardous conditions can lose their “guarantee of safety” after its first exposure to adverse environments commonly found on the fire ground. In a sense then, the pursuit of traditional NEC IS certifications might not have provided the level of assurance that the fire service in fact thought it did. Because the purpose and scope of this document is first and foremost rooted in defining a product suitable for use on an active fire ground, it cannot be ignored that one of its requirements can be invalidated by the resulting product’s intended use case.

Next, there is the reality that to date in the United States, there has been no known instance of a fire service portable radio ever having caused an explosion — it should be pointed out that many fire service organizations do not use IS portables, so this fact is especially notable. The task group investigated the prior history with multiple organizations, determined that there were only three possible incidents, and upon detailed investigation determined that none of them had anything to do with the portable radio.

However, there remain multiple first-responder missions in environments that do resemble the NEC classified hazardous locations. These include incident scenes without a current active fire, such as fuel spills, reported or actual gas leaks, and so on. These environments resemble classified hazardous locations in that there is likely a presence of an ignitable atmosphere; however, they differ in the following ways from what was envisioned in the NEC IS certifications:

1. In these areas there is likely to be multiple pieces of commercial or industrial equipment not designed to any IS standard and by their very nature could be capable or even likely of igniting an atmosphere in normal or intended operation. In contrast, products designed for use in NEC classified environments are designed so as to prevent the chance of combustion under normal operating conditions (i.e., Division 2), or for situations where there are multiple internal faults (i.e., Division 1).

2. Devices used by the firefighter spend much of their product life in relatively benign environments, interrupted by brief excursions into extremely hostile environments where combustion is often already taking place. Due to the transient nature of this exposure, there is only a small window of time where the benefit of a product being designed for use in an explosive atmosphere is of value. By contrast, products designed for use in NEC classified Division 1 hazardous locations are intended for continuous use in those environments.

3. Portable radios used by first responders have multiple items that can either be disconnected or replaced, such as RSMs, batteries, and
interfaces to self-contained breathing apparatus (SCBA) masks. For example, IS-rated portable radios come with instructions not to change the battery in a hazardous environment. However, it is very possible that the RSM connection could accidently become disconnected in the hazardous atmosphere. By contrast, fixed electrical installations in hazardous areas are physically interconnected by secured conduit and cable systems to the enclosures. This prevents sparks from being created within the area that contains the hazardous material, and also contains any explosions that might occur.

It is recognized that it might be desirable to obtain the level of confidence and safety resulting from the inherent design techniques required to gain certification for use in NEC classified Division 1 hazardous locations. However, currently no solution exists that would enable a product to retain its “guarantee of safety” during or after exposure to the extreme environment of an active fire. It is this intent which is captured by the term certified on delivery. There is an expectation that both the users and the AHJ will monitor IS rated equipment, such as portable radios, for continued fitness for use, including regular visual inspection for obvious compromise, examination and replacement of aging or damaged batteries, and periodic maintenance as prescribed by the manufacturer.

Therefore, at this time, this minimum standard requires Division 2 certification for portable radios. This does not stop vendors and the fire service from pursuing Division 1 IS certified portable radios if they so desire.

A.8.1.1.6(2) Analog voice is the minimum operational mode for incident communications per 9.3.1.4 of NFPA 1221; therefore, it is this mode of operation that will be tested, at a minimum, in this standard.

Annex X References Annex

X.X.X IEEE Publications.
Institute of Electrical and Electronics Engineers, 445 Hoes Lane, Piscataway, NJ 08854-4141.

X.X.X ITU Publications.
International Telecommunication Union, Place des Nations, 1211 Geneva 20, Switzerland.

Hi, Linda –

I request a Fall 2020 cycle for 1891 to align with the PPE reorg previously approved by the Standards Council.

Thank You -

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MEMORANDUM

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

FROM: Yvonne Smith, Project Administrator

DATE: March 27, 2018

SUBJECT: Ballot to Release NFPA Preliminary Draft 1891 Final Results

According to the final ballot results, the ballot did receive the necessary affirmative votes to pass ballot. Please see the attached report for results and any comments received.

31 Eligible to Vote
6 Not Returned (Barker, Fargo, Hosea, Legendre, Mauti, Varner)

The criteria necessary to pass ballot is a simple majority of the Technical Committee and Correlating Committee. See Section 4.3.2.1(b) of the Regulations Governing the Development of NFPA Standards.
Per section 4.3.2.1(b) of the Regs, prior to entering a Revision Cycle and approval for public review, a Ballot of the Committees is required to pass, by at least, a simple majority. NOTE: This ballot is for formally voting on whether or not you are in agreement with the Technical Committee to release the draft of NFPA 1891.

Eligible to Vote: 31
Not Returned : 6
Roger L. Barker, Cristine Z. Fargo, Thomas M. Hosea, Jeff Legendre, Bruce H. Varner, Benjamin Mauti

<table>
<thead>
<tr>
<th>Vote Selection</th>
<th>Votes</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Affirmative</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>Affirmative with Comment</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Negative</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Abstain</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

Total Voted : 25

For Simple majority, the affirmative votes needed are 16
MEMORANDUM

TO: Technical Committee on Hazardous Materials Protective Clothing and Equipment

FROM: Yvonne Smith, Project Administrator

DATE: March 19, 2018

SUBJECT: TC Ballot to Release NFPA Preliminary Draft 1891 - Final Results

According to the final ballot results, the ballot did receive the necessary affirmative votes to pass ballot. Please see the attached report for results and any comments received.

29 Eligible to Vote
6 Not Returned (Buck, Del Re, Green, Greene, Kirsteins, Zeigler)

The criteria necessary to pass ballot is a simple majority of the Technical Committee and Correlating Committee. See Section 4.3.2.1(b) of the Regulations Governing the Development of NFPA Standards.
Election:1891_FAE-HAZ_prelimdraftrelease_ballot

Per section 4.3.2.1(b) of the Regs, prior to entering a Revision Cycle and approval for public review, a Ballot of the Committee is required to pass, by at least, a simple majority. NOTE: This ballot is for formally voting on whether or not you are in agreement with the release of the NFPA 1891 draft.

Eligible to Vote: 29
Not Returned : 6
Russell R. Greene, Ted S. Buck, James P. Zeigler, Nicholas Del Re, Dustin Green, Andra Kirsteins

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Total Voted : 23

For Simple majority and also two-third majority election; the simple affirmative votes needed are 15 and the two-third affirmative votes needed are 16
Chapter 1 ADMINISTRATION

1.1 Scope.

1.1.1 This standard shall specify the minimum requirements for the selection, care, and maintenance of hazardous materials, CBRN, and emergency medical operations protective ensembles, ensemble elements, and clothing [i.e., hazardous materials (hazmat) personal protective equipment (PPE)] that are used for protection during hazardous materials emergencies and CBRN terrorism incidents.

1.1.2 This standard shall also specify requirements for hazmat PPE manufactured to previous editions of NFPA 1991, NFPA 1992, NFPA 1994, and NFPA 1999.

1.1.3 This standard shall not be construed as addressing all of the safety concerns associated with the use of compliant hazmat PPE. The persons and organizations that use compliant hazmat PPE shall be responsible for establishing safety and health practices and for determining the applicability of regulatory limitations before use.

1.1.3.1 Compliance with this document is not intended to be a substitute for compliance with all applicable laws and regulations.

1.1.4 This standard shall not apply to initial life-safety operations where personnel take immediate action using available PPE to perform a rescue or evacuate an area following a preliminary risk analysis.

1.1.5 This standard shall not specify requirements, such as appropriate use of hazmat PPE for training, operations, or infection control, for other organizational programs because these programs are under the jurisdiction of other NFPA standards.

1.1.6 This standard shall not apply to protective ensembles, ensemble elements, or clothing that are compliant with NFPA 1951, NFPA 1971, and NFPA 1977.
1.1.7 This standard shall not apply to protective ensembles, ensemble elements, or clothing for protection against ionizing radiation, cryogenic liquid hazards, or explosive atmospheres.

1.1.8 Nothing herein shall restrict any jurisdiction from exceeding these minimum requirements.

1.2 Purpose.

1.2.1 The purpose of this standard shall be to establish procedures as part of a program to provide selection, care, and maintenance requirements for hazmat PPE to reduce the safety risks and potential health risks associated with poorly selected, poorly maintained, contaminated, and/or damaged hazardous materials and CBRN protective equipment.

1.2.2 This standard shall establish a basic criteria for selecting, inspecting, cleaning, decontaminating, repairing, storing, and retiring hazmat PPE compliant with the requirements of NFPA 1991, NFPA 1992, NFPA 1994, and NFPA 1999.

1.3 Application.

1.3.1 This standard shall apply to hazmat PPE that is certified compliant in accordance with NFPA 1991, NFPA 1992, NFPA 1994, and NFPA 1999.

1.3.2 This standard shall also apply to hazmat PPE that is manufactured to previous editions of NFPA 1991, NFPA 1992, NFPA 1994, and NFPA 1999.

1.3.3 This standard shall not apply to other organizational programs such as the appropriate use of training, operations, or infection control because these programs are under the jurisdiction of other NFPA standards.

1.3.4 This standard shall not apply to respiratory protective equipment other than where such equipment interfaces with hazardous materials and CBRN protective ensembles.
1.3.5 Requirements of this standard shall not apply to accessories attached to any element of the hazmat PPE unless specifically addressed herein.

1.4 Responsibility.

1.4.1 To ensure the greatest possible protection of the organization’s employees at the scene of a hazardous materials emergency or CBRN terrorism incident, both employers and employees shall collaborate to establish and maintain a safe and healthy work environment.

1.4.2 At a minimum, employers shall be responsible for the following:
   1) Performing a hazard analysis at the scene of a hazardous materials emergency or CBRN terrorism incident to identify and control physical and health hazards
   2) Identifying and providing appropriate PPE for employees
   3) Advising employees of the hazards they face and the limitations of the selected PPE
   4) Training employees in the use and care of PPE
   5) Maintaining PPE, including replacing worn or damaged PPE
   6) Periodically reviewing, updating, and evaluating the effectiveness of the PPE program

1.4.3 At a minimum, employees shall be responsible for the following:
   1) Wearing PPE properly
   2) Attending training sessions on PPE
   3) Ensuring proper care, cleaning, and maintenance of PPE
   4) Informing a supervisor of the need to repair or replace PPE
   5) Informing a supervisor when they have questions about their PPE

1.5 Implementation.

1.5.1 When the standard is adopted by an organization or by a jurisdiction, the authority having jurisdiction shall set a date or dates for achieving compliance with the requirements of this standard.

1.5.2 The organization or the jurisdiction shall be permitted to establish a phase-in schedule for compliance with specific requirements of this standard.
1.6 Units.

1.6.1 In this standard, values for measurements are followed by an equivalent in parentheses, but only the first stated value shall be regarded as the requirement.

1.6.2 Equivalent values in parentheses shall not be considered as the requirement as these values are approximate.

CHAPTER 2 REFERENCE PUBLICATIONS

2.1 General. The following documents or portions thereof are referenced in this standard as mandatory requirements and shall be considered part of the requirements of this standard. The edition indicated for each referenced mandatory document is the current edition as of the date of the NFPA issuance of this standard. Some of these mandatory documents might also be referenced in this standard for specific informational purposes and, therefore, are listed in Annex B.

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


### 2.3 Other Publications.

#### 2.3.1 ASTM Publications.

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


#### 2.3.2 U.S. Government Publications.


#### 2.3.3 Other Publications.


### 2.4 References for Extracts in Mandatory Sections. (Reserved)
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 in another chapter, they shall be defined using their ordinarily accepted meanings in 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 phrase “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 Accessories. Those items that are attached to hazardous materials protective clothing, hazardous materials protective ensembles, or individual elements but designed in such a manner to be removable from the hazardous materials protective clothing, hazardous materials protective ensembles, and individual elements and that are not necessary to be attached to meet the requirements of the standard. Such accessories include, but are not limited to, utility belts, harnesses, backpacks, tools, tool packs, radios, radio packs, suspenders, and lights.

3.3.2 Agents.

3.3.2.1 Biological Terrorism Agents. Liquid or particulate agents that can consist of a biologically derived toxin or pathogen used to inflict lethal or incapacitating casualties, generally on a civilian population as a result of a terrorist attack.

3.3.2.2 CBRN Terrorism Agents. The term used to refer to chemical terrorism agents including both chemical warfare agents and toxic industrial chemicals, biological terrorism agents, and radiological particulate terrorism agents.

3.3.2.3 Chemical Terrorism Agents. Liquid, solid, gaseous, and vapor chemical warfare agents and toxic industrial chemicals used to inflict lethal or incapacitating casualties, generally on a civilian population as a result of a terrorist attack.
3.3.2.4 **Chemical Warfare (CW) Agents.** Liquid, solid, gaseous, and vapor chemical agents (most are liquids) traditionally used during warfare or armed conflict to kill or incapacitate an enemy.

3.3.2.5 **Radiological Particulate Terrorism Agents.** Particles that emit ionizing radiation in excess of normal background levels used to inflict lethal or incapacitating casualties, generally on a civilian population, as the result of a terrorist attack.

3.3.3 **Body Fluids.** Fluids produced by the body including, but not limited to, blood, semen, mucus, feces, urine, vaginal secretions, breast milk, amniotic fluids, cerebrospinal fluid, synovia fluid, and pericardial fluid.

3.3.4* **Carcinogen/Carcinogenic.** A cancer-causing substance which is identified in one of several published lists including, but not limited to, the NIOSH “Pocket Guide to Chemical Hazards,” SAX’s “Dangerous Properties of Industrial Materials,” and the ACGIH “Threshold Limit Values and Biological Exposure Indices.” *Carcinogenic* is the adjective form of the word.

3.3.5 **Care.** Procedures for cleaning, decontaminating, and storing hazardous materials protective clothing, hazardous materials protective ensembles and individual elements.

3.3.6* **Certification/Certified.** A system whereby a certification organization determines that a manufacturer has demonstrated the ability to produce a product that complies with the requirements of the standard, authorizes the manufacturer to use a label on listed products that comply with the requirements of the standard, and establishes a follow-up program conducted by the certification organization as a check on the methods the manufacturer uses to determine continued compliance with the requirements of the standard.

3.3.7 **Cleaning.** The act of removing soil and contamination from protective clothing, protective ensembles and ensemble elements by mechanical, chemical, thermal, or combined processes.

3.3.8 **Component.** Any material, part, or subassembly used in the construction of the compliant product.
3.3.9 **Contamination.** The process of transferring a hazardous material, or the hazardous component of a weapon of mass destruction (WMD), from its source to people, animals, the environment, or equipment, that can act as a carrier.

3.3.9.1 **Cross Contamination.** The process by which a contaminant is carried out of the hot zone and contaminates people, animals, the environment, or equipment.

3.3.10 **Craze.** The appearance of fine cracks or hairline fractures in the surface a transparent material such as a faceshield or visor.

3.3.11* **Decontamination.** The physical and/or chemical process of reducing the amount and preventing the spread of hazardous contaminants to people, animals, the environment, or equipment involved at a hazardous materials emergency or a CBRN terrorism incident.

3.3.12* **Disinfectant.** A type of antimicrobial agent that destroys or irreversibly inactivates fungi and bacteria, but not necessarily their spores, on inanimate surfaces and objects.

3.3.13 **Ensemble Elements.** Garment(s), gloves, footwear, hood(s), etc., used to assemble a complete protective ensemble.

3.3.13.1 **Footwear.** The element of the protective ensemble that provides protection to the foot, ankle, and lower leg.

3.3.13.2 **Footwear Cover.** The item of the protective ensemble to be worn over standard footwear that provides a barrier and physical protection to the wearer’s feet, and possibly ankles and lower legs.

3.3.13.3 **Garment(s).** The element or elements of the protective ensemble that provides protection to the upper and lower torso, arms, and legs and possibly the head; excluding the hands and feet.

3.3.13.4 **Gloves.** The element of the protective ensemble that provides protection to the wearer’s hands and wrists.
3.3.13.5 **Hood.** The element of the protective ensemble that provides protection to the wearer’s head and neck.

3.2.13.6 **Sock.** An extension of the garment or suit leg or a separate item that covers the entire foot and ankle and is intended to be worn inside a protective outer boot.

3.3.14 **Encapsulating.** A protective ensemble providing vapor tight or liquid tight protection to the upper and lower torso, head, arms, hands, legs, and feet and completely covering the wearer and the wearer’s respirator.

3.3.15 **Faceshield.** A hazardous materials protective component intended to help protect a portion of the wearer’s face, not intended as primary eye protection.

3.3.16 **Fit.** The quality, state or manner in which the width, length, and other dimensions of clothing, when worn, relates to the wearer’s body.

3.3.17* **Gross Decontamination.** A phase of the decontamination process where significant reduction of the amount of surface contamination takes place as soon as possible, most often accomplished by mechanical removal of the contaminant or initial rinsing from handheld hose lines, emergency showers, or other nearby sources of water.

3.3.18 **Hardware.** Nontextile components of the hazardous materials protective clothing, hazardous materials protective ensemble, or individual elements including, but not limited to, those made of metal or rigid plastic.

3.3.19 **Hazardous Materials.** Any solid, liquid, gas, or mixture thereof that can potentially cause harm to the human body through respiration, ingestion, skin absorption, injection, or contact.

3.3.20 **Hazardous Materials and CBRN Protective Ensembles and Ensemble Elements.** Protective ensembles and ensemble elements designed to provide minimum full-body protection against exposure to hazardous chemicals or chemical/biological terrorism agents occurring during emergencies.
3.3.20.1 **Emergency Medical Protective Clothing.** Items of both single-use and multiple-use protective clothing that provide limited physical protection and barrier protection against body fluid-borne pathogen contact with the wearer’s body during delivery of emergency patient care and other emergency medical functions.

3.3.20.2 **Liquid Splash–Protective Ensembles and Ensemble Elements.**

3.3.20.2.1 **Liquid Splash–Protective Clothing.** Multiple items of compliant protective clothing and equipment products that provide protection from some, but not all, risks of hazardous materials emergency incident operations involving liquids.

3.3.20.2.2 **Liquid Splash–Protective Ensemble.** Multiple elements of compliant protective clothing and equipment products that when worn together provide protection from some, but not all, risks of hazardous materials emergency incident operations involving liquids.

3.3.20.2.3 **Liquid Splash–Protective Footwear.** The element of the protective ensemble, or the item of protective clothing that provide protection from some, but not all, risks of hazardous materials emergency incident operations involving liquids to the feet, ankles, and lower legs.

3.3.20.2.4 **Liquid Splash–Protective Garment.** The element of the protective ensemble or the item of protective clothing that provide protection from some, but not all, risks of hazardous materials emergency incident operations involving liquids to the upper and lower torso, arms and legs, and possibly the head, hands, and feet.

3.3.20.2.5 **Liquid Splash–Protective Glove.** The element of the protective ensemble, or the item of protective that provide protection from some, but not all, risks of hazardous materials emergency incident operations involving liquids to the hands and wrists.
3.3.20.2.6 **Liquid–Splash Protective Hood.** The element of the protective ensemble or an item of protective clothing that provides protection from some, but not all, risks of hazardous materials emergency incident operations involving liquids to the head and neck.

3.3.20.3 **Protective Ensembles to Hazardous Materials Emergencies and CBRN Terrorism Incidents.**

3.3.20.3.1 **Class 1 CBRN Protective Ensemble and Ensemble Elements.** A CBRN protective ensemble and ensemble elements designed to protect emergency first responder personnel at terrorism incidents involving vapor or liquid chemical hazards where the concentrations are at or above immediately dangerous to life and health (IDLH), requiring the use of self-contained breathing apparatus (SCBA).

3.3.20.3.2 **Class 2 CBRN Protective Ensemble and Ensemble Elements.** A CBRN protective ensemble and ensemble elements designed to protect emergency first responder personnel at terrorism incidents involving vapor or liquid chemical hazards where the concentrations are at or above immediately dangerous to life and health (IDLH), requiring the use of self-contained breathing apparatus (SCBA).

3.3.20.3.3 **Class 3 CBRN Protective Ensemble and Ensemble Elements.** A CBRN protective ensemble and ensemble elements designed to protect emergency first responder personnel at terrorism incidents involving low levels of vapor or liquid chemical hazards where the concentrations are below immediately dangerous to life and health (IDLH), permitting the use of CBRN air-purifying respirators (APR) or CBRN-powered air-purifying respirators (PAPR).

3.3.20.3.4 **Class 4 CBRN Protective Ensemble and Ensemble Elements.** A CBRN protective ensemble and ensemble elements designed to protect emergency first responder personnel at terrorism incidents involving biological hazards or radiological particulate hazards where the concentrations are below immediately dangerous to life and health (IDLH), permitting the use of air-purifying respirators (APR) or powered air-purifying respirators (PAPR).
3.3.20.4 Vapor-Protective Ensembles for Hazardous Materials Emergencies and CBRN Terrorism Incidents. Multiple elements of compliant protective clothing and equipment that when worn together provide protection from some risks, but not all risks, of vapor, liquid-splash, and particulate environments during hazardous materials incidents and from chemical and biological terrorism agents in vapor, gas, liquid, or particulate form.

3.3.21 Hazmat. Abbreviation for the compound term hazardous materials, as in hazmat team.

3.3.22 Independent Service Provider (ISP). An organization performing services for inspection, cleaning, disinfection, sanitization, decontamination for reuse and repair of hazmat PPE.

3.3.23 Maintenance. Procedures for inspection, repair, and removal from service of hazardous materials and CBRN protective ensembles, ensemble elements, and clothing.

3.3.24 Manufacturer. The entity that directs and controls compliant product design, compliant product manufacturing, or compliant product quality assurance; or the entity that assumes the liability for the compliant product or provides the warranty for the compliant product.

3.3.25 Model. The collective term used to identify a group of individual items of the same basic design and components from a single manufacturer, produced by the same manufacturing and quality assurance procedures, and that are covered by the same certification.

3.3.26 Nonencapsulating. Protective ensemble or protective clothing that does not fully cover the wearer's respirator and relies on the facepiece of the respirator to interface with the garment to complete the enclosure of the wearer.

3.3.27 Organization. The entity that provides the direct management and supervision for emergency incident response personnel. Examples of such entities include, but are not
limited to, fire departments, police departments, rescue squads, emergency medical service providers, and hazardous materials response teams.

3.3.28* Products of Combustion. The end product when fuels, such as hydrocarbons and materials, remain after the process of combustion in a fire.

3.3.29 Removal from Active Service. The process of removing from inventory a hazardous materials ensemble so that it is no longer available to be used in an active application at an incident.

3.3.30 Retirement. The process of removing from inventory hazardous materials and CBRN protective ensembles, ensemble elements, and clothing so that they are no longer available for any purpose, including training.

3.3.31* Sanitizer. A type of antimicrobial agent that is used to reduce, but not necessarily eliminate, microorganisms from the inanimate environment to levels considered safe as determined by public health codes or regulations.

3.3.32 Seam. A line along which two pieces of protective material are sewn together in a garment or other article. Excludes external fittings, gaskets, and garment closure assemblies.

3.3.33 Selection. The process of determining what hazardous materials and CBRN protective ensembles, ensemble elements, and clothing are necessary for protection of responders from an anticipated, specific hazard or other activity; the procurement of the appropriate hazardous materials and CBRN protective ensembles, ensemble elements, and clothing; and the choice of hazardous materials and CBRN protective ensembles, ensemble elements, and clothing for a specific hazard or activity at an emergency incident.

3.3.34 Service Life. The period for which hazardous materials and CBRN protective ensembles, ensemble elements, and clothing are useful before retirement.

3.3.35* Soiling. The accumulation of sweat, dust, dirt, debris, and other nonhazardous materials on or in hazmat PPE that could degrade its performance or cause hygiene issues.
3.3.36 Standard Operating Procedure (SOP). A written directive that establishes specific operational or administrative methods to be followed routinely for the performance of a task or for the use of equipment.

3.3.37 Storage Life/Shelf Life. The useful life expected of the hazardous materials and CBRN protective ensembles, ensemble elements, and clothing from the date of manufacture when it has been stored, inspected, and has undergone proper care and maintenance in accordance with manufacturer’s instructions, but has not been used, donned, doffed, or repaired.

3.3.38* Universal Precautions. An approach to infection control in which human blood and certain human body fluids are treated as if known to be infectious for HIV, HBV, and other bloodborne pathogens.

3.3.39 Utility Sink. A separate sink used for cleaning ensembles and ensemble elements.

3.3.40 Visor. The portion of the hazardous materials protective ensemble or hazardous materials protective clothing that permits the wearer to see outside of the ensemble or clothing.

3.3.41 Visor Material. The transparent chemical protective clothing or ensemble material that allows the wearer to see outside the hazardous materials and CBRN protective ensembles, ensemble elements, and clothing.

3.3.42 Wear Test. A controlled evaluation of one or more hazardous materials and CBRN protective ensembles, ensemble elements, and clothing involving selected organization members wearing hazardous materials and CBRN protective ensembles, ensemble elements, and clothing in actual or simulated activities with the objective of providing quantitative ratings and subjective comments from participating members.
CHAPTER 4 PROGRAM

4.1 General.

4.1.1 The organization shall develop and implement a program for the selection, care, and maintenance of hazardous materials, CBRN, and emergency medical operations protective ensembles, ensemble elements, and clothing [i.e., hazardous materials personal protective equipment (hazmat PPE)] used by the members of the organization in the performance of their assigned functions or as required by the AHJ.

4.1.2 This program shall have the goal of providing hazmat PPE that are suitable and appropriate for the intended use; maintaining such hazmat PPE in a safe, usable condition to provide the intended protection to the user; removing from use such hazmat PPE that could cause or contribute to user injury, illness, or death because of its condition; and reconditioning, repairing, or retiring such hazmat PPE.

4.1.3 Where this program for the selection, care, and maintenance of hazmat PPE is part of an organization’s program on protective clothing and protective equipment, the portion of the organization’s program that affects hazmat PPE shall be in accordance with this document.

4.2 Program Parts.

4.2.1 The organization shall develop written standard operating procedures (SOP) as part of the program that identify and define various roles and responsibilities of the organization and of the members.

4.2.2 The program shall at least incorporate the requirements in the chapters as listed in Table 4.2.2:
### Table 4.2.2 Required Program Parts for Hazmat PPE

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</table>

### 4.2.3 The organization shall not add accessories that compromise the scope and purpose of the product certification and shall not permit accessories to be added to hazmat PPE unless:

1) The accessory has been certified for use with the element in accordance with NFPA 1991, NFPA 1992, NFPA 1994, or NFPA 1999.
2) The organization has the equipment manufacturer’s approval to use the accessory with their hazmat PPE.

### 4.3 Records.

### 4.3.1 The organization shall compile and maintain records on their hazmat PPE.

### 4.3.2 At least the following records shall be kept for hazmat PPE:

1) Date and condition when received
2) Manufacturer and model name or design
3) Manufacturer’s identification number, lot number, or serial number
4) Month and year of manufacture
5) Date(s) of and findings of advanced inspection(s) by organization
6) Date(s) of advanced cleaning or decontamination by organization
7) Reason for advanced cleaning or decontamination and who performed cleaning or decontamination
8) Date(s) of maintenance(s), names of who performed maintenance(s), and brief description of any maintenance(s)
9) Date of removal from active service inventory or retirement
10) Date and method of destruction and/or disposal

4.4 Manufacturer’s Instructions.

4.4.1 When issuing new hazmat PPE, the organization shall provide users with the instructions provided by the manufacturer on the care, use, and maintenance of the hazmat PPE, including any warnings provided by the manufacturer.

4.4.2 Where the manufacturer’s instructions regarding the care or maintenance of their hazmat PPE differ from a specific requirement(s) in this standard, the manufacturer’s instructions shall be followed for that requirement(s).

4.4.3 The organization shall retain a copy of the manufacturer’s instructions for the hazmat PPE for reference purposes.

4.5 Protecting the Public from Contamination.

4.5.1 The organization shall develop written SOPs as part of the program that minimize the public’s exposure to soiled or contaminated hazmat PPE.

CHAPTER 5 SELECTION

5.1 Selection for Procurement.

5.1.1 The AHJ shall establish a process to conduct selection for procurement.

5.1.2 The following reference materials shall be considered:
1) This standard
2) NFPA 472
3) NFPA 473
4) NFPA 475
5) NFPA 1500
6) NFPA 1981
7) NFPA 1986
8) NFPA 1991
9) NFPA 1992
10) NFPA 1994
11) NFPA 1999
12) All applicable federal, state, and local regulations

5.1.3 Before starting the procurement process for hazardous materials, CBRN, and emergency medical operations protective ensembles, ensemble elements, and clothing [i.e., hazardous materials personal protective equipment (hazmat PPE)], a hazard assessment and risk analysis study shall be conducted following the procedures provided in NFPA 475, Chapter 5, Risk Assessment.

The risk assessment shall include the following steps:
1) Hazard identification and vulnerability assessment
2) Consequence identification
3) Risk analysis

5.1.3.1 The hazard identification and vulnerability assessment process shall include collecting information regarding the locations and types of hazardous materials in the organization/jurisdiction. The process shall include, but not be limited to, the following:
1) Identification of facilities that manufacture/produce, store, transport, use, treat, or dispose of hazardous materials
2) Identification of all materials that are capable of causing death, injury, property damage, and system disruptions where there is an accidental or intentional release at identified locations
3) Identification of materials, material properties, quantities, concentrations, containers, storage considerations, transportation routes, potential hazards associated with spills or releases, and surrounding conditions

5.1.3.1.1 Special consideration shall be given to hazards specifically related to the selection of PPE including, but not limited to, the following:

1) State of material
2) Flash fire
3) Continuous fire environments
4) Structural collapse risk
5) Ruggedness
6) Compatibility with equipment
7) Chemical permeation data
8) Exclusion of cryogenics, radiation, explosive atmospheres

5.1.3.2 Analyzing the consequences of a release of hazardous materials found at each location in the organization/jurisdiction is the process of evaluating the likely behavior of a container and its contents to determine the hazards associated with the release and the likely outcomes (e.g., deaths and injuries, environmental and property damage, system disruptions) associated with that release.

5.1.3.3 Risk analysis is a judgment of the likelihood or probability of a release occurring coupled with the severity of outcomes, based on hazardous materials in the organization/jurisdiction and an estimate of the likely outcomes associated with their release in the organization/jurisdiction.

5.1.3.3.1 On conclusion of the risk analysis study, the AHJ shall determine the required levels of protection in vapor protection, liquid splash protection, particulate protection, chemical flash fire protection, liquefied gas protection, and CBRN protection.

5.1.4 The AHJ shall ensure that hazmat PPE under consideration are certified as compliant with NFPA 1991, NFPA 1992, NFPA 1994, or NFPA 1999.
5.1.5 The AHJ shall conduct a review of commercially available NFPA-compliant hazmat PPE and shall consider the following factors:

1) Chemical protection against specific chemical hazards in the area of jurisdiction
2) Resistance to physical and other hazards in the area of jurisdiction
3) Chemical protective ensembles, ensemble elements, and clothing design features and options
4) Available sizes of hazardous materials and CBRN protective ensembles, ensemble elements, and clothing provided by the manufacturer
5) Human factors assessments including donning, doffing, mobility, visibility, dexterity, tactility, and tactical considerations required for the area of jurisdiction
6) Compatibility with other protective equipment and accessories (e.g., respiratory equipment, head protection, undergarments, communication systems, and cooling devices)
7) Durability and suitability for single use or reuse
8) Ease of decontamination for doffing and reuse
9) Storage recommendations and considerations
10) Warranties and disclaimers
11) User information and technical data package
12) Cost
13) Return policy, ability to repair, and replacement of individual elements
14) Recommended periodic testing and testing procedures
15) Recommended inspection programs
16) Recommendations for removal from active service inventory
17) Recommendations for retirement
18) Recommendations for destruction methods and disposal

5.1.6 The AHJ shall verify that hazmat PPE under consideration interface properly and shall confirm compatibility of all operational equipment to be worn with the certified PPE.

5.1.7* Where a wear trial of hazmat PPE is performed by the organization, the wear trial shall:

1) Mimic likely operational scenarios
2) Use the hazmat PPE as it would be used in the field, including use of all operational equipment and simulating typical wear times and activities
3) Use an objective rating system based on the needs of the organization

5.1.8 Where the organization develops purchase specifications, those specifications shall indicate that the hazmat PPE shall be certified as compliant with NFPA 1991, NFPA 1992, NFPA 1994, or NFPA 1999. The purchase specifications shall also include any other performance features found to be critical to acceptability for use based on the AHJ hazard assessment, wear trial, and selection process.

5.2* Selection for Use.

5.2.1* The organization shall ensure that a selection process for hazmat PPE is in place and is conducted at the scene of all hazardous materials emergencies and CBRN terrorism incidents.

5.2.1.1 Before starting the selection process for hazmat PPE, a hazard assessment and risk analysis study shall be conducted following the procedures provided in NFPA 475, Chapter 5, Risk Assessment.

5.2.2* The AHJ shall designate a position in the organization with the authority to select the appropriate hazmat PPE at each hazardous materials incident response.

5.2.2.1 The designated individual shall have all pertinent information about the hazmat PPE available to them for selection consideration at each incident response.

5.2.2.2 The designated individual shall be trained according to NFPA 472 and shall have a minimum level of training to Operations Level Responder with the mission-specific knowledge and skills identified in Section 6.2 of NFPA 472, Mission-Specific Competencies: Personal Protective Equipment (PPE).

5.2.3* Before starting the selection process for the use of hazmat PPE, a hazard assessment and risk analysis study shall be conducted by the designated individual.
5.2.4 The hazard assessment study shall include an examination of the expected hazards and threats involving hazardous materials that might be encountered by members of the organization at the scene of the hazardous materials incident to include, but not be limited to, the following:

1) Categorization of the substance(s) in relation to its hazard(s) by using a classification system, such as the U.S. Department of Transportation “Nine Classes of Hazardous Materials,” and including cryogenics and carcinogens as separate categories

2) Listing of the chemical, physical, reactive, and toxicological properties of the substance(s)

3) Documentation of the type of facility or property on which the incident is located including, but not limited to, manufacturing, storage, packaging, distribution, transportation system, and/or consumption

4) Documentation of any potential threat to adjacent sensitive occupancies including, but not limited to, public assembly, government facilities, schools, shopping complexes, churches, underground occupancies, and abovegrade occupancies

5) Documentation of the size, condition of, damage to, and estimated integral strength of containers and container types, plumbing, valving, tanks, distribution systems, channels, holding ponds, and racking systems

6) Documentation of potentially vulnerable infrastructures, types of terrain, existing weather conditions, and limitations of the organization

5.2.5 The risk analysis study shall follow the hazards assessment study at the scene of a hazardous materials emergency or CBRN terrorism incident.

5.2.5.1 The risk analysis study shall include documentation of the projected dangers and unsafe situations that might be encountered by members of the organization if the decision is made that intervention activities are necessary.

5.2.6 On conclusion of the risk analysis study, the designated individual shall determine the required level(s) of protection from vapors, liquid splashes, particulates, chemical flash fire, liquefied gas, and physical hazards.
5.2.7 The designated individual shall ensure that the hazmat PPE under consideration for use are certified as compliant with NFPA 1991, NFPA 1992, NFPA 1994, or NFPA 1999.

5.2.8 The designated individual shall verify that hazmat PPE under consideration for use shall interface properly and shall be compatible with all operational equipment and accessories to be worn.

CHAPTER 6 INSPECTION

6.1 General.

6.1.1 Nothing in this standard shall restrict any organization from exceeding these minimum requirements for inspection.

6.1.2 Before any inspection procedure is initiated, the organization shall ensure that all items to be inspected are clean and devoid of any contaminants in accordance with Chapter 7.

6.1.3 The organization shall develop an inspection program for hazardous materials, CBRN, and emergency medical operations protective ensembles, ensemble elements, and clothing [i.e., hazardous materials personal protective equipment (hazmat PPE)].

6.1.3.1 The inspection program shall identify, at a minimum, recommendation from the manufacturer, inspection types, inspection procedures, and inspection intervals (where applicable). The organization’s inspection program shall ensure, among other things, that the focus of inspections is to promote the highest level of readiness of the protective garments and provide the highest level of protection.

6.1.3.2 Types of Inspections.

6.1.3.2.1 On receipt of delivery inspection, the organization shall inspect purchased hazmat PPE items to ensure they meet specifications and that they were not damaged during
shipment. The organization shall also verify quantity and sizes of all items in the shipment received.

The organization shall ensure that procedures be established for returning unsatisfactory products, items not meeting specifications, errors in lot or model numbers, items not ordered, and items arriving damaged.

6.1.3.2.2 Annual inspections shall include all of the following:
   1) Hazmat PPE recommendations from the manufacturer
   2) Elements identified for receipt-of-delivery inspection
   3) Procedures as outlined in ASTM F1052, Practice for Pressure Testing of Gas-Tight Totally-Encapsulated Hazardous Materials Protective Suits
   4) Testing, where applicable
   5) Additional procedures as determined by the AHJ

6.1.3.2.3 Prior-to-donning inspections shall be conducted immediately before donning and include the following:
   1) Hazmat PPE recommendations from the manufacturer
   2) Additional procedures as determined by the AHJ

6.1.3.2.4 After use or the decontamination inspections shall include the following:
   1) Hazmat PPE recommendations from the manufacturer
   2) Additional procedures as determined by the AHJ

6.1.3.2.5 On receipt after repairs, inspections shall include the following:
   1) Hazmat PPE recommendations from the manufacturer
   2) Elements identified for receipt of delivery inspection
   3) ASTM F1052 testing when applicable
   4) Additional procedures as determined by the AHJ

6.1.3.3 The organization shall include in the inspection program the steps to be taken if deficiencies are found with any hazmat PPE that would lead to the recommendation of appropriate follow-up actions determined by the inspection program.
6.1.4 At a minimum, any necessary cleaning or decontamination shall be done in accordance with the requirements specified in Chapter 7.

6.1.5 At a minimum, any necessary repairs shall be done in accordance with the requirements specified in Chapter 8.

6.1.6 At a minimum, any necessary modifications or recommendations to storage practices shall be done in accordance with the requirements specified in Chapter 9.

6.1.7 Repairs to any hazmat PPE should be completed by the manufacturer or its designated entity. At a minimum, any necessary retirement practices shall be done in accordance with the requirements specified in Chapter 10.

6.1.8 At a minimum, any necessary records and record-keeping shall be done in accordance with the requirements specified in Chapter 11.

6.2 Inspection Training and Authorization.

6.2.1 The AHJ shall identify a training program in the inspection program for those who are authorized to conduct inspections and to make decisions for hazmat PPE.

6.2.2 Members of the organization that are approved to use hazmat PPE shall be trained and familiar with conducting the prior-to-donning inspection.

6.2.3 The AHJ shall identify the person or persons responsible for making decisions regarding in-service or out-of-service hazmat PPE, based on the findings of any conducted inspection.

6.2.4 Inspection categories that shall be addressed and explained in the inspection program, in addition to the manufacturer’s recommendation, are general cleanliness; physical condition; contamination residue; mechanical function and integrity; and storage, stacking, and packaging.

6.3* Inspection Categories and Subcategories.
6.3.1* The inspection program shall address categories and subcategories for hazardous materials protective clothing, hazardous materials protective ensembles, and individual elements: general cleanliness; physical condition; contamination residue; mechanical function and integrity; and storage, stacking, and packaging.

6.3.2* The inspection program for annual inspections shall include at a minimum the inspection elements recommended by the manufacturer, and might include the integrity of the following additional inspection elements: packaging, outer glove, outer fabric, outer seam, elastomeric seals, inner surface fabric, inner seam, zipper, and label.

CHAPTER 7 CLEANING AND DECONTAMINATION

7.1 General Organization Requirements.

7.1.1 Organizations shall be responsible for providing cleaning, gross decontamination, sanitization, disinfection, and decontamination for reuse of hazardous materials, CBRN, or emergency medical operations protective ensembles, ensemble elements, and clothing [i.e., hazardous materials personal protective equipment (hazmat PPE)] following their use as needed and depending on the type of protective ensembles, the type of use, the type of exposure, and the nature of the contamination involved in any exposure.

7.1.2 Specific personnel in the organization shall be trained in at least the proper cleaning and gross decontamination of hazmat PPE.

7.1.2.1 Cleaning and gross decontamination of hazmat PPE shall be carried out only by those individuals who have been trained according to the organization’s standard operating procedures.

7.1.2.2 Organizations shall be permitted to use qualified independent service providers for the cleaning of hazmat PPE.
7.1.3 Organizations that encounter body fluids, potentially infectious materials, or other biological agents as part of the hazardous materials operations or emergency medical operations shall develop standard operating procedures for either the sanitization or disinfection of hazmat PPE.

7.1.3.1 Disinfection or sanitization of hazmat PPE shall be carried out only by those individuals in the organization who have been trained according to the organization’s standard operating procedures.

7.1.3.2 Organizations shall be permitted to use independent service providers for the disinfection or sanitization and any subsequent cleaning of hazmat PPE.

7.1.4 Where hazmat PPE are indicated by the manufacturer as potentially reusable, organizations shall develop standard operating procedures that indicate the circumstances where reuse is possible and the specific methods for decontamination of hazmat PPE for allowing safe reuse.

7.1.4.1 Decontamination of hazmat PPE for reuse shall be carried out only by those individuals in the organization who have been trained according to the organization’s standard operating procedures.

7.1.4.2 Organizations shall be permitted to use independent service providers for the decontamination of hazmat PPE for reuse.

7.2 Organization Standard Operating Procedures.

7.2.1 Organizations shall establish standard operating procedures (SOPs) that address gross decontamination, decontamination for reuse (where permitted), cleaning, disinfection, and sanitization of hazmat PPE.

7.2.2 Organization SOPs shall be consistent with the instructions provided by the manufacturer of the hazmat PPE. In the absence of detailed manufacturer instructions, organizations shall be permitted to use the specific procedures included in this chapter.
7.2.2 Organization SOPs shall account for the following factors:

1) The type of hazmat PPE in use by the organization
2) The intended applications for the organization hazmat PPE
3) Specific hazardous materials or categories of hazardous materials that are covered by the procedures, including body fluids, infectious materials, and other biological contaminants
4) The specific circumstances for which cleaning, gross decontamination, decontamination for reuse, disinfection, or sanitization are to be carried out
5) The specific competencies of individuals or independent service organizations that are able to perform cleaning, gross decontamination, decontamination for reuse, disinfection, or sanitization of hazmat PPE

7.3 Approach for Making Cleaning and Decontamination Decisions. Organizations shall undertake the following approaches as shown in Figure 7.3 to cleaning and decontamination unless otherwise specified for the particular incident.
FIGURE 7.3 Decision Logic for Applying Cleaning, Decontamination, Disinfection, and Sanitization Procedures.

7.3.1 Where used in a hazardous materials response, and hazmat PPE are not exposed to hazardous materials, hazmat PPE shall be cleaned if intended to be reused as specified in Section 7.4.

7.3.2 Where hazmat PPE are exposed to hazardous materials, suitable gross decontamination procedures shall be applied to allow for the safe doffing of the hazmat PPE as specified in Section 7.5.

7.3.3 Where hazmat PPE have been used in a hazardous materials response or emergency medical operations and are exposed to body fluids, potentially infectious materials, or other biological agents, additional disinfection or sanitization procedures shall be undertaken as needed if the hazmat PPE are intended to be reused as specified in Section 7.6.

7.3.4 Where hazmat PPE have been used in a hazardous materials response and are exposed to hazardous materials, additional decontamination procedures shall be undertaken as needed if the hazmat PPE are intended to be reused as specified in Section 7.7.

7.3.5 Where hazmat PPE have been used in a hazardous materials response involving hazardous materials or emergency medical operations involving potentially infectious materials, the organization shall consider conducting an evaluation of the decontamination effectiveness for the applied decontamination procedures if prior evidence has not demonstrated that the hazmat PPE are safe to reuse as specified in Section 7.8.

7.4 Cleaning Procedures.

7.4.1 General Cleaning Procedures.

7.4.1.1 Hazmat PPE that were worn and became soiled from sweat or nonhazardous materials shall be cleaned in accordance with manufacturer’s instructions if not damaged,
the manufacturer indicates that the hazmat PPE can be reused, and an assessment has been made that the item(s) can be reused.

**7.4.1.2** Unless otherwise specified by the manufacturer, hazmat PPE shall be cleaned in a utility sink subject to the following restrictions and procedures:

1) The utility sink shall not be used for personal applications and shall be of a suitable size for washing and rinsing the protective clothing, protective ensemble, or ensemble element(s).

2) Water at a temperature no greater than 40°C (105°F) shall be used.

3) A mild detergent with a pH in the range of 6.0 to 10.5, as specified on the detergent safety data sheet, shall be used at the dilution recommended by the detergent supplier.

4) Washing shall be carried out using a soft cloth, sponge, or soft bristle brush.

5) Both the exterior and interior of the hazmat PPE shall be washed.

6) The hazmat PPE shall be thoroughly rinsed following washing, and the rinsing shall be repeated if necessary.

7) The hazmat PPE shall be hung on a rack or other supporting device in a well-ventilated area for drying out of direct or indirect sunlight.

8) The hazmat PPE shall be inspected in accordance with procedures provided in Chapter 6 before being returned to service.

**7.4.2** Laundering.

**7.4.2.1** Where permitted by the manufacturer, hazmat PPE shall be machine laundered.

**7.4.2.2** Unless otherwise specified by the manufacturer, the following procedures shall be used for machine laundering of the hazmat PPE:

1) Any components on the hazmat PPE that can be damaged during the laundering shall be removed if designed for removal.

2) A washer/extractor having a suitably sized wash basket shall be used where the extraction acceleration does not exceed 100 gs.

3) The washer/extractor shall be loaded to more than 80 percent of the rated capability of the washbasin as based on the dry weight of the wash load.
4) Wash water temperature shall not exceed 40°C (105°F).

5) Unless a cold wash water temperature is used, the rinse water temperature shall be cooler than the wash water temperature.

6) A mild detergent with a pH in the range of 6.0 to 10.5, as specified on the detergent safety data sheet, shall be used at the dilution recommended by the detergent supplier.

7) A minimum of two rinses shall be used, with an extraction step following each rinse.

8) Machine drying shall be performed only if permitted by the manufacturer of the hazmat PPE.

9) Where machine drying is used, a low- or no-heat setting shall be used.

10) If machine drying is not permitted, drying shall be accomplished by hanging the hazmat PPE on a rack or other supporting device in a well-ventilated area out of direct or indirect sunlight.

11) The hazmat PPE shall be inspected in accordance with procedures provided in Chapter 6 before being returned to service.

7.5 Gross Decontamination Procedures.

7.5.1 Gross decontamination shall be applied where the hazmat PPE has been subject to exposure and contamination by hazardous materials to enable the safe exit of the wearer and to minimize transfer of contaminant to the wearer and items in the contamination control zone.

7.5.2 Gross decontamination shall be carried out in the contamination control corridor of the warm zone of the hazardous materials incident scene or other emergency scene.

7.5.2.1* Where possible, the organization shall carry out gross decontamination immediately after exiting the emergency scene at any incident where their hazmat PPE could have become contaminated.

7.5.2.2* On exiting the emergency scene, the user shall remain on self-contained breathing apparatus (SCBA) air and switch to ambient air if the cylinder is empty, or continue to use the respirator that is part of the hazmat PPE.
7.5.2.3 If returning to the emergency scene after an air cylinder or filter change, any dry debris shall be brushed off the hazmat PPE, including the respirator, before changing out the cylinder or filters.

7.5.2.4 If the user is completing their time on the scene, dry or wet mitigation techniques shall be conducted before the removal of any hazmat PPE.

7.5.2.4.1 Dry Technique. The dry mitigation technique shall be performed by brushing debris or solid contaminants from the exterior of hazmat PPE with a soft bristle brush before removal.

7.5.2.4.2 Wet Technique. The wet mitigation technique shall be performed by gently rinsing the exterior of hazmat PPE using low pressure and low volume flow water. A mild detergent shall be permitted to be used to aid in the wet mitigation technique followed by gentle rinsing. Heavy scrubbing or spraying with high-velocity water jets such as a power washer shall not be used.

7.5.2.4.3 If used in combination, dry mitigation shall precede wet mitigation.

7.5.2.5* Following dry or wet mitigation, hazmat PPE shall be isolated and bagged. Where possible, hazmat PPE, even when bagged, shall not be transported in the passenger areas of apparatus or personal vehicles.

7.5.2.6 Following gross decontamination, hazmat PPE shall be subject to the appropriate cleaning and decontamination procedures specified in Sections 7.4, 7.5, and 7.6, as needed and depending on the intended reuse of hazmat PPE.

7.5.6 Transport.

7.5.6.1 Following gross decontamination, protective clothing and hazmat PPE that are intended for disposal shall be bagged as specified in Section 7.8.
7.5.6.2 Where intended for reuse, the hazmat PPE shall be placed in a plastic bag or other airtight container for transport to the appropriate facility for further decontamination or inspection, as needed.

7.5.6.3 Bagged and isolated hazmat PPE shall not be transported in the passenger spaces of response or personal vehicles.

7.5.6.4 Bagged and isolated hazmat PPE shall not be stored and should be removed for further decontamination and inspection as soon as practically possible following the exposure incident.

7.6 Disinfection and Sanitization Procedures.

7.6.1* Organizations and other facilities that engage in disinfection, sanitization, and cleaning of hazmat PPE contaminated with body fluids and other forms of microbial-containing liquids shall comply with the applicable regulations in Title 29 Code of Federal Regulations Part 1910.1030 on “Bloodborne Pathogens.”

7.6.2* Hazmat PPE that are contaminated with body fluids and other potentially infectious liquids shall be subject to either disinfection or sanitization. If the disinfection or sanitization process is not already part of a decontamination process, the disinfection or sanitization shall be followed by advanced cleaning depending on the types of disinfection, sanitization, and cleaning agents and processes that are available and the type and composition of the protective clothing or ensemble element.

7.6.2.1 Disinfectants and sanitizers shall be registered with the U.S. Environmental Protection Agency for efficacy for the appropriate product type — hard surface versus fabrics and textiles.

7.6.2.2 Where disinfectants and sanitizers are used, they shall not degrade the performance properties of the hazmat PPE.
7.6.2.3 Disinfectants and sanitizers shall be used in accordance with the instructions provided by the supplier.

7.6.2.4* It shall be permitted to include disinfection and sanitization as part of a cleaning or decontamination process only when its effectiveness has been demonstrated as providing disinfection and sanitization as required for the specific hazmat PPE.

7.6.2.5* In cases where the area of contamination is limited and clearly visible, spot sanitization or disinfection followed by spot cleaning shall be permitted for the sanitization or disinfection of the affected contaminated area of the hazmat PPE.

7.7 Decontamination for Reuse Procedures.

7.7.1* Where a decision has been made for considering the reuse of hazmat PPE, procedures shall be specific to the type of contaminant and type of PPE.

7.7.2 Organizations shall rely on expertise from experienced hazardous materials teams, infection control specialists, independent service providers, or other individuals knowledgeable of the type of contaminant and how it can be removed from hazmat PPE. This expertise shall be relied on for determining whether the type of contamination can be removed effectively and determining the procedures to be used for the removal of the specific contaminant(s).

7.7.2.1 In cases where a determination is made that the contaminant(s) cannot be removed sufficiently, the ensemble or ensemble elements shall be condemned and disposed of in accordance with federal, state, and local regulations for the handling and disposal of hazardous materials.

7.7.2.2* In cases where a determination is made that the contaminant(s) can be removed sufficiently, specific procedures shall be conducted for cleaning, treating, or decontaminating the contaminated ensembles or ensemble elements based on one of the following:
1) Evidence is provided from a documented source that the applied procedures have shown effectiveness in the past under similar exposure circumstances and contamination conditions.

2) Testing of the contaminated clothing items is performed that provides detailed results showing the absence of any residual contamination or levels of contaminants that are deemed to be safe.

7.7.2.3 Any testing procedures that are used for assessing residual levels of contamination shall be specific to the contaminants of concern and performed by a laboratory that is accredited for the specific types of analysis carried out on the ensemble or ensemble elements.

7.7.2.4 When specialized cleaning is applied for the cleaning of ensembles or ensemble elements involving highly hazardous contaminants, consideration should be given to the disposition of the effluent from the cleaning process and whether disposal into the local sewer system is acceptable according to federal, state, and local regulations.

7.8 Retirement and Disposal Procedures.

7.8.1 Hazmat PPE that have been contaminated and are not intended for reuse shall be bagged, tagged, and disposed of in accordance with federal, state, and local regulations, and any additional instructions provided by the manufacturer.

7.8.2 Hazmat PPE that are not contaminated but are retired for reasons of damage or end of service life shall be disposed of in a manner that prevents their reuse.

7.8.3 It shall be permitted to use retired, uncontaminated hazmat PPE in training as long as these items are clearly marked “FOR TRAINING PURPOSES ONLY.”
CHAPTER 8 SERVICE and REPAIR

8.1 General Repair Requirements.

8.1.1 The AHJ shall institute a repair program for hazardous materials, CBRN, and emergency medical operations protective ensembles, ensemble elements, and clothing [i.e., hazardous materials personal protective equipment (hazmat PPE)]. If the hazmat PPE fails an inspection as identified in Chapter 6, the manufacturer shall be contacted for repairs of the hazmat PPE.

8.1.1.1 The manufacturer shall provide specific instructions, including testing, about permissible repairs that do not compromise the integrity or performance of the protective clothing and are authorized by the manufacturer.

8.1.1.2 Replaceable components, as identified by the manufacturer, shall not be considered a repair and shall be permitted to be conducted by the AHJ.

8.1.3 The AHJ shall not ship hazmat PPE to the manufacturer for repair without prior acceptance for receipt by the manufacturer.

8.1.3.1 Hazmat PPE shall be decontaminated before shipping to a manufacturer or a manufacturer-approved repair facility.

8.1.3.2 The AHJ shall provide written documentation to the manufacturer on the exposures and decontamination processes employed on the hazmat PPE to be repaired, if applicable.

8.1.4 For all hazmat PPE that are identified to be in need of repair, the AHJ shall institute a program that will accomplish the following:

1) Guarantee immediate removal of the item from active service
2) Mark or identify the item “out of service” properly and clearly
3) Coordinate with the manufacturer to obtain returned goods authorization
4) Prepare for packaging and shipping
5) Document the need for repair, including descriptions why the product is being returned for repair, such as failed pressure tests

6) Document any past exposures and decontamination processes, if applicable

7) Determine the facility that will conduct the repair in conjunction with the manufacturer

8) On return of the item, validate and document that repairs were applied or replacement of the item has occurred. If the manufacturer provides a replacement item, the item shall be treated as a new procurement and shall follow the procedures detailed in Section 11.2.

8.1.5 All repairs to hazmat PPE shall be performed by the manufacturer or a repair facility approved by the manufacturer.

8.1.5.1 Where the AHJ has incorporated an in-house maintenance function as part of their program, the AHJ shall ensure that only the members trained and qualified by the manufacturer repair the hazmat PPE.

8.1.5.2 Where the AHJ has incorporated an in-house maintenance function as part of their program, the organization shall ensure that the proper tools, replacement parts, equipment, and written procedures are provided as specified by the manufacturer(s).

8.1.6 The incorporation of replacement parts shall not jeopardize the original NFPA certification of the garment.

8.1.6.1 In the event that the original part is no longer available, and replacement parts have been certified to meet the minimum requirements of the standard, the manufacturer or a repair facility designated by the manufacturer shall incorporate the new or replacement parts.

8.1.7 After completion of all repairs, the hazmat PPE submitted for repairs shall be inspected in accordance with the requirement in Chapter 6 of this standard before being placed back into service.
8.1.8 A record of repairs shall be maintained for each inventoried hazmat PPE in accordance with Chapter 4 of this standard.

CHAPTER 9 STORAGE

9.1 General.

9.1.1 The organization shall institute a storage program for hazardous materials, CBRN, and emergency medical operations protective ensembles, ensemble elements, and clothing [i.e., hazardous materials personal protective equipment (hazmat PPE)], which includes, but is not limited to, the following:

1) Complete integral hazardous materials, CBRN, or emergency medical operations protective ensembles, or garments
2) Gloves
3) Socks
4) Boots
5) Visors or faceshield
6) Hoods
7) Accessories

9.1.2 The storage program shall include the appropriate steps to be taken if deficiencies are found with any hazmat PPE that would lead to the recommendation of any one of the following follow-up actions:

1) Cleaning
2) Decontamination
3) Repair
4) Storage or stocking modifications
5) Removal from active service inventory
6) Retirement
7) Destruction and/or disposal
9.1.2.1 Before any storage procedure is initiated, the organization shall ensure that necessary cleaning or decontamination of all items to be stored shall be done in accordance with Chapter 7.

9.1.2.2 At a minimum, any necessary repairs shall be done in accordance with the requirements specified in Chapter 8.

9.1.2.3 At a minimum, any necessary removal from active service inventory, retirement, and/or destruction and disposal practices shall be done in accordance with the requirements specified in Chapter 9.

9.1.3 The organization shall follow the recommended storage procedures of the manufacturer for hazmat PPE. In the event information is not provided, the organization shall consult with the manufacturer.

9.1.3.1 Routine storage and restocking supplies of hazmat protective clothing, hazmat protective ensembles, and individual elements shall:
   1) Not be subjected to direct sunlight or UV exposure
   2) Be provided with good ventilation to ensure that stored items are maintained clean and dry
   3) Be arranged, organized, and/or designed in such a manner to avoid exposure to temperature extremes, as specified by the manufacturer
   4) Always be stored dry, and that the storage method be such that it prohibits the formation of condensation

9.1.4 Each member of the organization trained and approved to use hazmat protective clothing, hazmat protective ensembles, and individual elements shall be trained and familiar with the storage, packaging, and restocking practices of the organization.

9.1.5 The organization shall ensure that only the members of the organization that have been trained in the storage, packaging, and restocking procedures of hazmat protective clothing, hazmat protective ensembles, and individual elements be allowed to implement, conduct, and supervise such procedures.
9.2 Packaging and Storage for Restocking or Use.

9.2.1 The storage program guidelines ensure that items held in storage for restocking or use are not exposed to other items in storage that might pose unacceptable exposure to solids, liquids, or vapors from the following:

1) Solvents
2) Hydrocarbons
3) Corrosives
4) Cleaning compounds
5) Oxidizing agents
6) Chemicals used in hazardous materials testing kits and equipment
7) Hydraulic fluids
8) Exhaust fumes
9) Other materials specified by the manufacturer

9.2.2 The organization shall include in the written storage program guidelines to ensure that items inventoried for restocking or use are packaged and arranged in a manner to avoid damage from the following:

1) Sharp objects, corners, protruding bolts, hardware
2) Tools, tool receptacles, latching devices
3) Abrasion
4) Inappropriate stacking
5) Temperature and humidity extremes, as defined by the manufacturer

9.2.2.1 When selected as a storage system for restocking or use by the organization, the organization shall incorporate and use storage containers provided by the manufacturer.

9.2.2.2 Where such storage containers are not provided by the manufacturer but are deemed an appropriate and safe storage system, the organization shall consult with the manufacturer to ensure the proper container size shall be acquired to prevent damage to the stored item(s).
9.2.3 When selected as a storage system by the organization and deemed appropriate by the manufacturer, the organization shall incorporate and use sturdy hangers stored in a way to minimize damage or contamination.

9.3.5 Where packaging systems, containerization, and storage cases are used, they shall be secured to prevent unnecessary wear or damage to the stored items, as well as to prevent damage to other stored items or containers.

9.3.6 The organization shall include guidelines for storage of kits including the ensemble, garment, or ensemble element with other response elements, such as helmets, outer gloves, and outer boots, so that they shall be folded, packaged and/or stored in such a fashion to avoid abrasion between the items in the kit.

9.2.4 Chemical protective ensembles and garments shall be removed from packaging systems, containerization and storage cases and inspected, refolded or rehung in accordance with manufacturer's frequency recommendations at a minimum to ensure that folds and creases do not promote a permanent set of creases and cause damage.

9.3 Storage and Packaging for Soiled Items.

9.4.1 The storage program shall include guidelines to ensure that items that are soiled or contaminated and are to be transported to a specified location for cleaning and/or decontamination are containerized and marked correctly.

9.4.1.1 Soiled or contaminated items shall not be transported or stored in the following ways:

1) With personal belongings
2) With noncontaminated PPE
3) In passenger compartments of vehicles
4) In living quarters or adjacent to air intakes for living quarters
5) In an area with uncontrolled public access

9.3.1.2 Soiled or contaminated items that must be transported shall be containerized in such a manner as to prevent cross-contamination.
CHAPTER 10 RETIREMENT

10.1 General.

10.1.1 The organization shall develop guidelines for the disposition of hazardous materials, CBRN, and emergency medical operations protective ensembles, ensemble elements, and clothing [i.e., hazardous materials personal protective equipment (hazmat PPE)] to include, but not be limited to, removal from active service inventory in accordance in this standard.

10.1.2 The organization shall follow and institute removal from active service inventory, retirement, and destruction and/or disposal recommendations as provided by the manufacturer.

10.1.3 The organization shall include, but not be limited to, criteria regarding each of the following contributing factors that affect the development of guidelines for the removal from active service inventory, the retirement of, and/or the destruction and disposal of, hazmat PPE:

1) Defects and degradation caused by physical exposure that cannot be repaired or corrected
2) Defects and degradation caused by chemical exposure that cannot be remedied by cleaning or decontamination
3) Garments, ensembles, and/or items that are manufactured only for single-use application
4) Garments, ensembles, and/or items that have become obsolete and are no longer available
5) Replacement parts that would rehabilitate the garment, ensemble, or item are no longer available
6) Garments, ensembles, and/or items have seriously deteriorated while in storage
7) Garments, ensembles, and/or items that are labeled or designated by the manufacturer for a specified life expectancy

10.1.4 The organization shall have a removal from active service inventory, retirement, destruction, and disposal practices program for hazmat PPE.
10.2 Removal from Active Service Inventory.

10.2.1 The organization shall develop guidelines that will identify and explain the criteria to be used to determine when hazmat PPE is to be removed from active service inventory, with review of referred section.

10.2.2 Written procedures shall be developed by the organization to accomplish the following:

1) Identify and explain a system for the removal from active service inventory of hazmat PPE to include, but not be limited to, the following:
   a) Identification of the hazmat PPE that shall be removed from active service inventory
   b) Determination of the disposition of hazmat PPE removed from active service inventory to include reassignment to training and/or demonstration use, or to destruction and disposal
   c) Preparation, packaging, and labeling or marking hazmat PPE removed from active service inventory
   d) Documentation and record upkeep for the hazmat PPE removed from active service inventory

2) Written procedures shall also include the following:
   a) Procedures for reassignment for training or demonstrations only
   b) Procedures for retirement in accordance with Section 10.3
   c) Procedures destruction in accordance with Section 10.4
   d) Procedures for disposal in accordance with Section 10.5

10.2.3 Written procedures shall be developed by the organization to identify and explain who in the organization has the ultimate responsibility for each of the requirements listed in 10.2.2.

10.2.4 In the event that hazmat PPE has been removed from active service inventory and has been considered for reassignment to a training-only status, the following procedures shall be instituted:
1) The hazmat PPE shall be marked or labeled boldly and legibly in such a manner as to identify clearly its reassignment and use, such as “Out-of-Service” or “Training Only.”

2) The hazmat PPE shall be mutilated in an overt and obvious fashion to render the garment or item not usable for emergency use.

3) Storage procedures for hazmat PPE reassigned to training and demonstrations-only status shall be such that accidental restocking of the hazmat PPE into the active service inventory shall not occur.

10.3 Retirement.

10.3.1 The organization shall develop guidelines, consistent with the manufacturer’s recommendation, that will identify and explain the criteria to be used to determine when hazmat PPE is to be retired.

10.3.2 Written procedures shall be developed by the organization to identify and explain a system of retirement of hazmat PPE.

10.3.3 Written procedures shall be developed by the organization to document and record the hazmat PPE that are retired.

10.3.4 Written procedures shall be developed by the organization to provide guidelines for preparing, packaging, and labeling hazmat PPE that is retired.

10.3.5 Written procedures shall be developed by the organization to identify and explain who in the organization has the ultimate responsibility for each of the retirement requirements.

10.4 Destruction.

10.4.1 The organization shall develop guidelines that will identify and explain the criteria to be used to determine when hazmat PPE is to be destroyed.
10.4.2 Written procedures shall be developed by the organization to identify and explain a system for the destruction of hazmat PPE to include, but not be limited to, the following:
   1) Identification of the garments or hazmat PPE that shall be destroyed
   2) Determination of the disposition of hazmat PPE to be destroyed, including disposal
   3) Preparation, packaging, and labeling or marking the hazmat PPE to be destroyed
   4) Documentation and record upkeep for the hazmat PPE to be destroyed
   5) Procedures for disposal in accordance with Section 10.5

10.4.3 Written procedures shall be developed by the organization to identify who in the organization has the ultimate responsibility for each of the requirements as listed in 10.4.2.

10.4.4 For preparation, packaging, and labeling of the hazmat PPE for destruction, the garment, ensemble, and/or item shall be marked or labeled in such a manner to identify clearly its designation for destruction, such as a clearly visible attached tag or card labeled: “To Be Destroyed. Do Not Use.”

10.4.4.1 Where a bagging or packaging policy is instituted, then the bag or package shall also be marked or labeled in such a manner as described in 10.4.4.

10.4.4.2 Temporary storage procedures for hazmat PPE designated for destruction shall be such that accidental restocking of the hazmat PPE into the active service inventory shall not occur.

10.4.5 For the method of destruction of the hazmat PPE, the following procedures shall be instituted:
   1) Hazmat PPE shall be rendered totally nonfunctional, such as cutting a garment in half or the complete removal of arms or legs, and cutting gloves in half.
   2) Other items, including hardware and accessories, shall be removed if possible, and rendered totally nonfunctional, such as destruction of exhaust valves, destruction of screw threads, removal of pass-through, etc.
10.4.6 Where destruction procedures are to be implemented, the organization shall ensure the process is conducted following established guidelines in a safe location.

10.5 Disposal.

10.5.1 Hazmat PPE that are removed from active service inventory and retirement and are designated for disposal shall, when appropriate, be disposed of in accordance with all appropriate local, state, and federal regulations regarding hazardous waste to include, but not be limited to, the following:
   1) Packaging, packing, and containerization
   2) Transfer to a hazardous waste company
   3) Labeling
   4) Transportation
   5) Invoicing and hazardous waste manifests

10.5.2 Written procedures shall be developed by the organization to identify and explain who in the organization has the ultimate responsibility for each of the requirements.

10.5.6 Hazmat PPE that has been removed from active service inventory in accordance with the organization’s requirements shall be disposed of according to the organization’s plans and local, state, or federal regulations.

CHAPTER 11 DOCUMENTATION AND RECORDS

11.1 General.

11.1.1 Documentation of the selection for purchase and use of hazardous materials, CBRN, and emergency medical operations protective ensembles, ensemble elements, and clothing [i.e., hazardous materials personal protective equipment (hazmat PPE)] shall be maintained in accordance with Section 11.2.
11.1.2 Documentation of the inspection procedures of hazmat PPE shall be maintained in accordance with Section 11.3.

11.1.3 Documentation of decontamination of hazmat PPE shall be maintained in accordance with Section 11.4.

11.1.4 Documentation of damage and repair of hazmat PPE shall be maintained in accordance with Section 11.5.

11.1.5 Documentation of storage, stocking, and packaging of hazmat PPE shall be maintained in accordance with Section 11.6.

11.1.6 Documentation of removal from active service, retirement, destruction, and disposal of hazmat PPE shall be maintained in accordance with Section 11.7.

11.1.7 Records shall be maintained for at least as long as the hazmat PPE is maintained in active service. Records for items removed from active service, reassigned to training or demonstration, or for destruction and disposal, shall be maintained for a time in accordance with local, state, and federal requirements that govern the length of time records, reports, and documents must be retained.

11.1.8 The organization shall ensure that the record-keeping system be managed by an individual who is trained and qualified to ensure that information is obtained, collected, maintained, communicated, retrieved, used, and stored in accordance with the organization’s written plan.

11.1.8.1 The manager of the record-keeping system shall educate and train designated personnel in the organization in completing, filing, and using various components of the record-keeping system. The manager shall be assisted by sufficient staff to fulfill all duties.

11.1.8.2 The manager of the record-keeping system shall conduct an annual audit of records, reports, inventories, and documents. Following the audit, the manager shall recommend changes or improvements to the record-keeping system, as needed.
11.1.9 The organization shall provide in its documentation and records policy written instructions on how each of its forms are to be completed correctly.

11.2 Documentation for Selection and Use.

11.2.1 A written policy shall be developed and provided by the organization to include instructions on how to collect and assemble data that correspond to the selection for purchase of hazmat PPE and the establishment and maintenance of an inventory system.

11.2.1.1 The written policy shall identify and describe what minimum forms are necessary to successfully support the documentation of the selection for purchase process, and for the maintenance of an inventory system.

11.2.1.2 At least the following records shall be maintained for the purchase of hazmat PPE:
   1) Written specifications for purchase, if necessary
   2) Date of submission of purchase order
   3) Manufacturer or supplier
   4) Model name, number, or design
   5) Material of manufacture
   6) Size(s)
   7) Number of each specific garment, item, or element
   8) Manufacturer’s identification number, lot number, or serial number
   9) Month and year of manufacture
   10) Organization’s purchase order number or contract number
   11) Date of delivery

11.2.2 The organization shall create, tabulate, and maintain an accurate, up-to-date, and complete inventory of all hazmat PPE.

11.2.2.1 Information that will comprise the complete inventory list shall be supplied from the information recorded for selection for purchase data.
11.2.2 At least the following information shall be included in the development and maintenance of a complete inventory list:

1) Organizations’ inventory number assigned to each garment or item
2) Date of purchase
3) Date of assignment to active service or storage
4) Item description
5) Size
6) Serial number or model number
7) Operational unit to whom garment or item is assigned

11.2.3 A written policy shall be developed and provided by the organization to include instructions on how to collect and assemble data that documents the use of hazmat PPE and shall explain the specific types of garments and/or ensembles for which such documentation is maintained.

11.2.3.1 The written policy shall identify and describe what minimum forms are necessary to support the documentation of use successfully.

11.2.3.2 At least the following records shall be maintained when documenting the use of each hazmat PPE:

1) Organization’s inventory number
2) Description of the garment or ensemble
3) Date of each use
4) Organization's incident number
5) Name of wearer
6) Assignment (role of the person wearing the garment)
7) Duration of time of use
8) Documentation of actual or suspect exposure or contact to chemicals
9) Name of chemical, or identity of chemical hazard classification, when known

11.3 Inspection Records.
11.3.1 A written policy shall be developed and provided by the organization to include instructions on how to collect and assemble data that correspond to the inspections of hazmat PPE.

11.3.1.1 The written policy shall identify and describe what minimum forms are necessary to support successfully the documentation of the inspections processes, and shall at a minimum include the routine and advanced inspection types described in 4.3.2 of this standard.

11.3.1.2 At least the following records shall be maintained for routine inspections of hazmat PPE:

1) Organization’s inventory number
2) Description of the garment or ensemble
3) Date of inspection(s)
4) Employee conducting inspection
5) Description of item inspected
6) Documentation that notes the location of any physical damage to a garment or item that requires removal from service or repair
7) Pass/fail recording for each routine inspection element

11.3.1.3 At least the following records shall be maintained for advanced inspections of hazmat PPE:

1) All of the records indicated in 11.3.1.2
2) Pass/fail recording for each of the advanced inspection elements noted in 4.3.2.
4) Documentation that notes the location of any damage to a garment or item that requires removal from service or repair

11.4 Decontamination Records.
11.4.1 A written policy shall be developed and provided by the organization that includes instructions on how to collect and assemble data that correspond to the decontamination of hazmat PPE.

11.4.1.1 The written policy shall identify and describe what minimum forms are necessary to support the documentation of the decontamination process successfully, and shall at a minimum include the types and kinds of decontamination described in Chapter 7.

11.4.1.2 At least the following records shall be maintained when documenting the decontamination of hazmat PPE:

1) Description of the garment or ensemble
2) Manufacturer or supplier
3) Model name, number, or design
4) Material of manufacture
5) Manufacturer’s identification number, lot number, or serial number
6) Month and year placed into service
7) Month and year removed from service
8) Organization’s inventory number
9) Assignment
10) Date of the decontamination
11) Method or type of decontamination
12) Name or identification number of employee applying or supervising decontamination
13) Location where decontamination was applied
14) Comments of general condition of garment, including notation of damage
15) Method of drying
16) Notation when and if item was placed back into service

11.5 Damage and Repair Records.

11.5.1 A written policy shall be developed and provided by the organization to include instructions on how to collect and assemble data that correspond to the damage and repair of hazmat PPE.
11.5.1.1 The written policy shall identify and describe what minimum forms are necessary to successfully support the documentation of the damage and repair process described in Chapter 8.

11.5.1.2 At least the following records shall be maintained when documenting the damage and repair records of hazmat PPE:

1) Organization’s inventory number
2) Description of the garment or ensemble
3) Date damage or inspection failure was discovered (pulled from service)
4) Who discovered the damage or inspection failure
5) Description of damage found and how it was discovered
6) Who is to administer the repairs
7) Repairs performed
8) Results of inspection following repairs
9) Date item was placed back into service

11.6 Storage, Stocking, and Packaging Records.

11.6.1 A written policy shall be developed and provided by the organization to include instructions on how to collect and assemble data that correspond to the storage, stocking, and packaging of hazmat PPE.

11.6.1.1 The written policy shall identify and describe what minimum forms are necessary to support the successful documentation of the storage, stocking, and packaging as described in Chapter 9.

1) Storage conditions (e.g., climate controlled, on rig) following manufacturer’s recommendations
2) Packaging practices (e.g., garment bag, vacuum packed)

11.7 Removal from Active Service, Retirement, Destruction, and Disposal Records.
11.7.1 A written policy shall be developed and provided by the organization to include instructions on how to collect and assemble data that correspond to the removal from active service, retirement, destruction, and disposal of hazmat PPE.

11.7.1.1 The written policy shall identify and describe what minimum forms are necessary to support the successful documentation of the removal from active service, retirement, destruction, and disposal process, as described in Chapter 10.

11.7.1.2 At least the following records shall be maintained when documenting the removal from active service, retirement, destruction, and disposal of hazmat PPE:

1) Organization’s inventory number
2) Description of the garment or ensemble
3) Explanation why item is being removed from active service
4) Date removed from active service
5) Date of reassigned to inactive service
6) An indication of the type of labeling or stenciling for inactive service assignment
7) Date of reassignment for destruction
8) An indication of the type of destruction to render nonfunctional
9) An indication that any applicable hardware has been removed
10) Date of disposal
11) An indication of the disposal method

ANNEX A Explanatory Material

Annex A is not a part of the recommendations 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.3.3.4 Carcinogens/Carcinogenic. Lists of carcinogens are available from the following sources. Each organization uses a different way to classify specific substances or activities as carcinogenic.

1) U.S. National Toxicology Program (NTP):

https://ntp.niehs.nih.gov/pubhealth/roc/index-1.html#toc1
2) International Agency for Research on Cancer (IARC):

http://monographs.iarc.fr/ENG/Classification

3) National Institute for Occupational Safety and Health (NIOSH):

https://www.cdc.gov/niosh/topics/cancer/npotocca.html

4) American Conference of Governmental Industrial Hygienists (ACGIH): 2016 Threshold Limit Values (TLVs) and Biological Exposure Indices (BEIs)

A.3.3.11 Decontamination. Three types of decontamination (commonly known as “decon”) are performed by emergency responders: emergency, mass, and technical. Decontamination performed sometimes on victims in a hospital setting is referred to as definitive decontamination, but that is not covered in this standard. Gross decontamination is a phase of decontamination where significant reduction of the amount surface contamination takes place as quickly as possible. This is usually accomplished by mechanical removal of the contaminant or initial rinsing from handheld hose lines, emergency showers, or other nearby sources of water. Gross decontamination is performed on the following:

1) Team members before their technical decontamination
2) Emergency responders before leaving the incident scene
3) Victims during emergency decontamination
4) Persons requiring mass decontamination
5) Personal protective equipment (PPE) used by emergency responders before leaving the scene

A.3.3.12 Disinfectant. Disinfectants as antimicrobial agents are considered pesticides and thus subject to regulations established by the U.S. Environmental Protection Agency (EPA). All disinfectants must be registered with the EPA and meet specific labeling requirements. A listing of currently registered disinfectants is posted at www.epa.gov/oppad001/chemregindex.htm. Disinfectants are required to be used as specified on the product label as determined by the EPA registration process. Disinfectants can be used on either hard surfaces such as helmet shells, eye and face protection devices, or as a presoak treatment for fabrics and textiles. Appropriately labeled and registered disinfectants might also be used for disinfecting laundry. The specific requirements for demonstrating acceptable performance are in the following
EPA Office of Chemical Safety and Pollution Prevention (OCSPP) product performance test guidelines:

1) OCSPP 810.2200, *Disinfectants for Use on Hard Surfaces — Efficacy Data Recommendations*

2) OCSPP 810.2400, *Disinfectants and Sanitizers for Use on Fabrics and Textiles — Efficacy Data Recommendations*

Each of these documents provides different classifications of disinfectants for their intended use. Classifications include limited (primarily for household use), general or broad spectrum (used in commercial areas), and hospital or health care. Specific procedures and target microorganisms are used to demonstrate the effectiveness of the respective disinfectant. In general, a disinfectant must kill all target microorganisms.

**A.3.3.17 Gross Decontamination.** Victims of a hazardous material release that is potentially life threatening due to continued exposure from contamination are put through a gross decontamination initially, which will significantly reduce the amount of additional exposure. This is usually accomplished by mechanical removal of the contaminant or initial rinsing from handheld hose lines, emergency showers, or other sources of water. Responders operating in a contaminated zone in PPE are put through gross decontamination, which makes it safer for them to remove the PPE without exposure and for members assisting them.

**A.3.3.28 Products of Combustion.** Normal products of combustion during fires include smoke (carbon particulates) and fire gases such as carbon dioxide, water, carbon monoxide, hydrogen chloride, nitric oxide, and a number of other chemicals at different concentrations. The type and quantities of combustion products produced during a fire extensively vary with the type of fuels and fire conditions. Most fires are highly complex and entail a myriad of different materials that serve as fuels and create a large number of chemicals that are carcinogenic, toxic, corrosive, or create allergic reactions. Many products of combustion include chemical substances that are persistent due to their low relative volatility or their adsorption onto soot or carbon particles created during combustion.

**A.3.3.31 Sanitizer.** Like disinfectants (see A.3.3.21), sanitizers are considered pesticides and thus are subject to regulations established by the U.S. Environmental Protection Agency (EPA). All sanitizers must be registered with the EPA and meet specific labeling requirements. A listing of currently registered sanitizers is posted at [www.epa.gov/oppad001/chemregindex.htm](http://www.epa.gov/oppad001/chemregindex.htm). Sanitizers are required to be used as specified on the product label as determined by the EPA registration process.
Sanitizers can be used on either hard surfaces such as helmet shells, eye and face protection devices, or as presoak treatments or laundry additives for fabrics and textiles. Specific requirements for demonstrating acceptable performance are in the following EPA Office of Chemical Safety and Pollution Prevention (OCSPP) product performance test guidelines:

1) OCSPP 810.2300, *Sanitizers for Use on Hard Surfaces — Efficacy Data Recommendations*
2) OCSPP 810.2400, *Disinfectants and Sanitizers for Use on Fabrics and Textiles — Efficacy Data Recommendations*

Each of these documents provides different classifications of disinfectants for their intended use. Classifications include sanitizers for food contact and nonfood contact products. Specific procedures and different target microorganisms are used to demonstrate the effectiveness of the respective sanitizer. In general, a sanitizer must reduce the number of microorganisms by 99.9 percent (a $\log_{10} 3$ reduction).

**A.3.3.35 Soiling.** Soiling excludes contaminants that could adversely affect the wearer such as products of combustion and other hazardous materials including toxic, corrosive, or sensitizing chemicals, potentially infectious body fluids, other infectious microorganisms, and CBRN terrorism agents.

**A.3.3.38 Universal Precautions.** Under circumstances in which differentiation between body fluids is difficult or impossible, all body fluids should be considered potentially infectious materials.

**A.5.1.7** The following criteria should be used for designing a systematic wear trial evaluation procedure:

1) Test participants, representing the AHJ, should be selected based on a cross section of personnel, willingness to participate, objectivity, and level of operational activity.

2) Participants should wear test each product model being considered from each manufacturer for a particular hazardous material and CBRN protective ensemble, ensemble element, or clothing. Participants should be fitted for each product model being evaluated from each manufacturer. Evaluations should be conducted using the same participants to evaluate all hazardous materials and CBRN protective ensemble, ensemble element, or clothing category. It is not necessary to have the exact same wearer evaluate all 1991 ensembles and all 1992 ensembles/clothing.
and all 1994 ensembles, but it is important for the same wearer to evaluate all ensembles, ensemble elements, or clothing certified to the same level of protection.

3) A product evaluation form should be developed for each hazardous material and CBRN protective ensemble, ensemble element, or clothing candidate. The form should include a rating system for the characteristics considered important to the organization that will facilitate a quantitative evaluation. Evaluation forms that provide only narrative responses should be avoided.

4) The organization should confirm that wear trial participants are aware of all PPE that they are to assess so that all candidate PPE is rated.

5) The organization should solicit periodic reports from participants in the field tests.

6) The organization should conclude the evaluation process and analyze the results.

[A.5.2 text has been moved to create Annex B.]

A.6.3 The definitions that follow were developed to provide explanations of the terms used in Table A.6.3, which summarizes categories for classifying potential defects when receiving equipment from a contractor. Table A.6.3 can also be used to institute, support, or improve maintenance and care programs.

1) A critical defect might critically reduce the functionality or protection provided by the equipment. The AHJ is strongly encouraged to categorize the item as out of service and contact distributor for guidance on repair or replacement.

2) A major defect is one that might reduce the functionality or protection of the equipment. The AHJ is recommended to do the following:
   a) Annotate and take action to remediate the deficiency before use
   b) Contact the distributor for guidance
   c) Exercise additional discretion before putting the equipment into service.

3) A minor defect can be considered a cosmetic defect with little to no impact on functionality or protection. The AHJ is recommended to examine and note the cosmetic deficiency and put the equipment into service in accordance with standard operating procedures.
<table>
<thead>
<tr>
<th>Defect</th>
<th>Critical</th>
<th>Major</th>
<th>Minor</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carton</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Packaging Integrity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Damaged</td>
<td></td>
<td></td>
<td>X</td>
<td>Considered cosmetic only if carton contents are not damaged.</td>
</tr>
<tr>
<td>Missing</td>
<td></td>
<td></td>
<td>X</td>
<td>Minor as long as suit is not damaged.</td>
</tr>
<tr>
<td>Soiled</td>
<td></td>
<td></td>
<td>X</td>
<td>Considered cosmetic only if carton contents are not soiled.</td>
</tr>
<tr>
<td><strong>Storage Bag Integrity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Storage bag damaged</td>
<td></td>
<td></td>
<td>X</td>
<td>Considered minor/cosmetic if damage does not extend to contents. Bags might be opened during inspection processes, which will be noted on bag and box.</td>
</tr>
<tr>
<td>Storage bag missing</td>
<td></td>
<td></td>
<td>X</td>
<td>Considered minor if all components (manual, gloves) are included and no damage to the ensemble. If any components are missing or damaged upgrade to major.</td>
</tr>
<tr>
<td><strong>Technical Manual</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Technical manual missing</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Incorrect manual</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Outer Gloves</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outer gloves missing</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Incorrect glove Sizes</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Incorrect glove Type</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Damaged gloves (holes, rips, punctures, etc.)</td>
<td>X</td>
<td></td>
<td></td>
<td>Suit must be worn with glove(s) for proper protection.</td>
</tr>
<tr>
<td><strong>Overall Integrity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shelf life expired</td>
<td></td>
<td>X</td>
<td></td>
<td>All ensembles and ensemble elements have a specific shelf life that must be managed.</td>
</tr>
<tr>
<td>Defect that could cause injury to wearer</td>
<td></td>
<td>X</td>
<td></td>
<td>Any defect or damage such as holes, burns, tears, exposed stitching of seams, etc., that prevents suit from providing proper protection and would result in exposure to the wearer.</td>
</tr>
<tr>
<td><strong>End Item</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patches anywhere on the suit</td>
<td></td>
<td>X</td>
<td>X</td>
<td>Users are encouraged to determine before delivery a maximum acceptable quantity or area of patches that are placed by manufacturer on the item. Users are encouraged to note location and quantity, and if the total exceeds user-defined threshold, then upgrade to a major defect and consult with manufacturer.</td>
</tr>
<tr>
<td>Staining/discholoration anywhere on suit</td>
<td></td>
<td>X</td>
<td>X</td>
<td>Blemishes might not affect performance. This might include areas adjacent to seam tape, visors, gloves, or other seams. Users are encouraged to determine an acceptable quantity or area of stained or discolored areas on the item at delivery. Users are encouraged to note</td>
</tr>
<tr>
<td>Defect</td>
<td>Critical</td>
<td>Major</td>
<td>Minor</td>
<td>Notes</td>
</tr>
<tr>
<td>-----------------------------------------------------------------------</td>
<td>----------</td>
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<td>-------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Equipment Data</strong></td>
<td></td>
<td></td>
<td></td>
<td>location and quantity, and if the total exceeds user-defined threshold, then upgrade to a major defect and consult with manufacturer.</td>
</tr>
<tr>
<td>Illegible marking on suit label</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Illegible marking on carton, storage bag, or base glove</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Missing marking on suit label</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Missing marking on carton, storage bag, or base glove</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Incorrect data on suit label</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Incorrect information on unit applied labels</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Incorrect or inconsistent data on carton, storage bag, or base glove</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Improperly located labels or any strike through</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Surface Integrity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any hole, tear, burn, or mis-stitch that fully penetrates suit (excluding boot/glove flap) and is not repaired with tape patch</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any hole, tear, burn, or mis-stitch that fully penetrates material on boot or glove flap and is not repaired with tape patch</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Any hole, tear, burn, mis-stitch repaired with tape patch inside suit. Tape must be centered and extend equally on all sides of defect</td>
<td>X</td>
<td>X</td>
<td></td>
<td>All tape repairs should be centered and extend equally past the defect on either side. If tape is not sufficient, then suggest upgrade to major defect.</td>
</tr>
<tr>
<td>Any other weakening defect such as abrasion, thin spot, nonpenetrating mis-stich, or worn spot that does not penetrate suit, not repaired with tape</td>
<td></td>
<td></td>
<td>X</td>
<td>All tape repairs should be centered and extend equally past the defect on either side. If tape is not sufficient, then suggest upgrade to major defect.</td>
</tr>
<tr>
<td>Any other weakening defect such as abrasion, thin spot, nonpenetrating mis-stich, worn spot, or repair with tape</td>
<td></td>
<td></td>
<td></td>
<td>All tape repairs should be centered and extend equally past the defect on either side. If tape is not sufficient, then suggest upgrade to major defect.</td>
</tr>
<tr>
<td>Any missing component (sock, boot flap, glove flap, hood, exhaust valves, pass-through, etc.)</td>
<td>X</td>
<td></td>
<td></td>
<td>Refer to user manual for all required components.</td>
</tr>
<tr>
<td>Visor (if present) punctured, cracked, or otherwise damaged to an extent that a clear field of vision is not provided</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Outer Fabric (including outer Boot Flap, Glove Flap, Hood and Attached Socks and Gloves)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Staining/Marking</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Defect</td>
<td>Critical</td>
<td>Major</td>
<td>Minor</td>
<td>Notes</td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
<td>----------</td>
<td>-------</td>
<td>-------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Surface staining or discoloration (excluding seam tape adhesive) on the</td>
<td></td>
<td></td>
<td>X</td>
<td>Users might want to consider a maximum acceptable quantity or percentage of surface area stained/discolored before considering a major defect.</td>
</tr>
<tr>
<td>outer level that doesn’t penetrate to inner fabric. Includes oil, grease,</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ink, or other surface staining (might have seam tape patch located on</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>inside of suit)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any size surface stain (excluding seam tape adhesive) on outer surface</td>
<td></td>
<td>X</td>
<td></td>
<td>Any stain that penetrates a protective layer might have compromised the protection of the garment.</td>
</tr>
<tr>
<td>that penetrates to inner fabric without seam tape patch</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fasteners</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nonfunctioning hook and loop tape</td>
<td></td>
<td></td>
<td>X</td>
<td>Critical flaps, such as the zipper flap, cover protective hardware of the ensemble.</td>
</tr>
<tr>
<td>Missing hook and loop tape on critical flaps</td>
<td></td>
<td>X</td>
<td></td>
<td>Noncritical hook and loop tape go over pockets or accessories that do not provide protection.</td>
</tr>
<tr>
<td>Missing hook and loop tape on noncritical flaps</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Flattened or crushed teeth</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wrong type, color, width, or misplaced/not position as specified</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Stitching is too loose or too tight, causing puckering or twisting</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>If snaps or other fasteners present are damaged or otherwise not in</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>good working order</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Glove</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any hole, tear, burn, or mis-stitch that penetrates glove material</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any other weakening defect such as abrasion, thin spot, nonpenetrating</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>needle chew, or worn spot on glove material</td>
<td></td>
<td></td>
<td>X</td>
<td>Check all seams, especially in the finger crotch area, for gaps that penetrate the glove. Do not completely invert attached glove,</td>
</tr>
<tr>
<td>Any gaps in seams around fingers</td>
<td></td>
<td>X</td>
<td></td>
<td>laterally pull fingers away from each other, or pull with excessive force as that might damage the glove.</td>
</tr>
<tr>
<td>Seam Accuracy</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any joining seams that has missing or misplaced resulting stitching</td>
<td></td>
<td>X</td>
<td></td>
<td>One or more broken stitches, two or more continuous skipped or runoff stitches, or a visibly incomplete/damaged weld on joining</td>
</tr>
<tr>
<td>or incomplete ultrasonic welds that result in an open seam</td>
<td></td>
<td></td>
<td></td>
<td>seam constitutes an open seam.</td>
</tr>
<tr>
<td>Stitches skipped or broken (or incomplete ultrasonic welds) not</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>resulting in an open seam</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Outer Seams (Primary Garment Structural Seams)
<table>
<thead>
<tr>
<th>Defect</th>
<th>Critical</th>
<th>Major</th>
<th>Minor</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seam irregular, twisted, puckered, or pleated</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Material caught in stitching/welds</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Missing stitching/welds on noncritical seam</td>
<td>X</td>
<td></td>
<td></td>
<td>Critical seams are defects that allow direct exposure of the wearer to threats.</td>
</tr>
<tr>
<td>Missing stitching/welds on critical seam</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Seam Integrity**

<table>
<thead>
<tr>
<th>Defect</th>
<th>Critical</th>
<th>Major</th>
<th>Minor</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loose or lifting seam tape under the boot flap</td>
<td>X</td>
<td></td>
<td></td>
<td>When examining flap, do not invert the flap completely. Lift and examine underneath. If sticking is noticed use hand or visual inspection to avoid damaging tape.</td>
</tr>
<tr>
<td>Loose, skipped, or twisted threads</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Material caught in sewing or seam tape</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wrinkled seam tape where wrinkling extends to one edge of seam tape</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Outer Boot and Glove Splash Flap**

<table>
<thead>
<tr>
<th>Defect</th>
<th>Critical</th>
<th>Major</th>
<th>Minor</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any abrasions, cut, tears, punctures, brittleness, unexplained discoloration, or dry rot present on rubber seal that prevents seal from functioning correctly</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seal missing or incorrect</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loss of elasticity</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Material caught in sewing</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Broken stitches or poor stitch tension</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mask seal air pocket deflated or missing</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any weakening defect such as a closed blister, burn or pinch, thin spots, or pits</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Visible soiling and staining of any material layer by oil, grease, ink, powder, or other contaminating substance more than ½ in. in size (largest dimension in any direction)</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thread ends unsecured</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Elastomeric Mask Seal**

<table>
<thead>
<tr>
<th>Defect</th>
<th>Critical</th>
<th>Major</th>
<th>Minor</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any abrasions, cut, tears, punctures, brittleness, unexplained discoloration, or dry rot present on rubber seal that prevents seal from functioning correctly</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seal missing or incorrect</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loss of elasticity</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Material caught in sewing</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Broken stitches or poor stitch tension</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mask seal air pocket deflated or missing</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any weakening defect such as a closed blister, burn or pinch, thin spots, or pits</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Visible soiling and staining of any material layer by oil, grease, ink, powder, or other contaminating substance more than ½ in. in size (largest dimension in any direction)</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thread ends unsecured</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Defect</td>
<td>Critical</td>
<td>Major</td>
<td>Minor</td>
<td>Notes</td>
</tr>
<tr>
<td>-----------------------------------------------------------------------</td>
<td>----------</td>
<td>-------</td>
<td>-------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Seam twisted, component not adhered or attached securely, foreign matter, or any malformation or distortion</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Any repair or patch</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Delamination in material</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

**Surface Integrity**

<table>
<thead>
<tr>
<th>Defect</th>
<th>Critical</th>
<th>Major</th>
<th>Minor</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any hole, tear, burn, or mis-stitch that penetrates suit</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Any other weakening defect such as abrasion, thin spot, nonpenetrating needle chew, or worn spot that does not penetrate suit</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Any minor defect in inner liner fabric such as minor pull that does not penetrate barrier layer</td>
<td>X</td>
<td></td>
<td></td>
<td>X Patch on inside of fabric without any detectable defect. Users are encouraged to determine before delivery a maximum acceptable quantity or area of patches that are placed by manufacturer. Users are encouraged to note location and quantity, and if the total exceeds user-defined threshold, then upgrade to a major defect and consult with manufacturer.</td>
</tr>
<tr>
<td>Unidentified patch</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

**Staining/Marking**

<table>
<thead>
<tr>
<th>Defect</th>
<th>Critical</th>
<th>Major</th>
<th>Minor</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surface staining or discoloration (excluding seam tape adhesive) on the outer level that doesn’t penetrate to inner fabric. Includes oil, grease, ink, or other surface staining (might have seam tape patch on inside of suit)</td>
<td>X</td>
<td></td>
<td></td>
<td>X Users might want to consider a maximum acceptable quantity or percentage of surface area as stained/discolored before considering a major defect.</td>
</tr>
<tr>
<td>Any size surface stain (excluding seam tape adhesive) on inner surface that is visible on both sides of suit</td>
<td>X</td>
<td></td>
<td></td>
<td>X Any stain that penetrates a protective layer might have compromised the protection of the garment.</td>
</tr>
<tr>
<td>Adhesive transfer</td>
<td>X</td>
<td></td>
<td></td>
<td>X During the manufacturing process, if the garments were folded when the adhesive was not completely dry, there might be visible adhesive transfer that appears as white, colorless, yellow, frosted, etc., and does not effect performance.</td>
</tr>
</tbody>
</table>

**Label**

<table>
<thead>
<tr>
<th>Defect</th>
<th>Critical</th>
<th>Major</th>
<th>Minor</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety/certification labels not present</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Safety/certification labels illegible</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Defect</td>
<td>Critical</td>
<td>Major</td>
<td>Minor</td>
<td>Notes</td>
</tr>
<tr>
<td>-----------------------------------------------------------------------</td>
<td>----------</td>
<td>-------</td>
<td>-------</td>
<td>-----------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Inner Seams</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seam Accuracy</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any joining seams stitching missing, misplaced, or a visibly incomplete/damaged weld(s) resulting in an open seam</td>
<td>X</td>
<td></td>
<td></td>
<td>One or more broken stitches, or two or more continuous skipped or runoff stitches on joining seam constitutes an open seam. Scored as a critical when seriously affecting performance or serviceability.</td>
</tr>
<tr>
<td>Stitches skipped or broken or a visibly incomplete/damaged weld not resulting in an open seam</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seam irregular, twisted, puckered, or pleated</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Material caught in sewing or seam tape</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loose, missing, or lifting seam tape that exposes the seam</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loose or missing stitching</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wrinkled seam tape where wrinkling extends to one edge of tape</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loose or lifting seam tape that does not expose the seam</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Zipper</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zipper Integrity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zipper missing</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Damaged teeth or fastener</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fails to function properly</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Improperly positioned</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cuts or tears in the zipper tape material</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cosmetic issue such as staining or discoloration</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zipper difficult to operate</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
A.7.5.2.1 Gross decontamination after an incident can remove substantial amounts of surface contaminants before they have a chance to set in, and it can help limit the transfer of contaminants to apparatus, personal vehicles, and stations. Many contaminants that cause damage to hazmat PPE materials and components can be removed if gross decontamination is performed as soon as possible after an exposure to those contaminants. It is recognized that it is not always practical for organizations to carry out gross decontamination because of constraints in personnel, on-scene resources, the availability of spare gear, weather, and other operational factors. Nevertheless, it is important for organizations to implement some form of gross decontamination as soon as possible, particularly following an event where hazmat PPE are contaminated.

Use of a portable decontamination shower unit that conforms to the requirements in ANSI/ISEA 113, American National Standard for Fixed and Portable Decontamination Shower Units, provides one means for providing wet mitigation as part of preliminary exposure reduction.

A.7.5.2.2 The purposes of maintaining respiratory protection are to minimize the user’s exposure to contaminants that might off gas from the hazmat PPE following contaminant exposure during a hazardous materials incident or emergency medical care and to avoid breathing in particulates that might be dislodged from the ensemble or ensemble elements during dry mitigation.

Portable decontamination showers that conform to ANSI/ISEA 113, American National Standard for Fixed and Portable Decontamination Shower Units, can also be used and assist where weather, modesty, or other issues occur.

A.7.5.2.5 The removal of hazmat PPE at the scene might require additional clothing to be present, particularly under inclement or cold weather conditions. Portable facilities might be required for users to change clothing. Portable decontamination showers conforming
to ANSI/ISEA 113, *American National Standard for Fixed and Portable Decontamination Shower Units*, can be set up at the scene in a relatively short time and require limited resources for provided in protection from weather and modesty to fire fighters. In addition, it is recommended that personnel use disposable wet wipes to clean face and skin when known to be directly exposed to contaminants, change into a clean station/work uniform, and take a shower as soon as possible.

For isolation of hazmat PPE, airtight protective containers or bags should be used to minimize cross contamination. Examples include disposable polyethylene bags or sealable plastic cases, which are cleanable. If a plastic bag is used, it is recommended that the bag be transparent to ensure that the contents of the bag can be readily identified. Ensembles or ensemble elements should not be transported from the incident scene in passenger areas of apparatus or personal vehicles. This helps to reduce further exposure of personnel to contaminated ensembles and helps to reduce cross contamination of apparatus or personal vehicles.

If hazmat PPE are wet, the hazmat PPE should be removed as soon as possible following transport from the fire or other emergency scene because ensembles and ensemble elements that remain wet under closed conditions can result in the growth of mold and mildew that causes damage. It is important that following their transport, protective ensembles and elements should be stored under conditions where they can dry until appropriate cleaning and decontamination procedures can be conducted as specified in Chapter 7.

**A.7.6.1** Applicable regulations in Title 29, Code of Federal Regulations Part 1910.1030, “Bloodborne Pathogens,” include observing universal precautions, instituting engineering and workplace controls, using appropriate PPE, and ensuring the that the decontamination area is in a clean and sanitary condition. Universal precautions are
applied to prevent contact with blood or other potentially infectious materials where all body fluids are considered potentially infectious. Engineering and workplace controls include the provision of hand washing facilities and prohibiting food and beverages in the areas where handling and decontamination are carried out. In addition, controls include bagging and appropriately identifying clothing contaminated by body fluid using either a biohazard symbol or red bag to indicate to potential infectious materials. PPE includes the use of gloves, aprons, full torso covers, arm covers, and eye/face protection. As a minimum, personnel involved in cleaning contaminated ensembles and ensemble elements should wear cleaning gloves, an apron and protective sleeves or a coverall, and a pair of goggles or face shield that conform to NFPA 1999. In addition, cleaning of contaminated ensembles and ensemble elements should take place in a designated area with sinks and counters made of materials, such as stainless steel, that can be decontaminated following an element-cleaning procedure.

NFPA 1581 should be consulted for additional guidance.

**A.7.6.2** The contamination of hazmat PPE with body fluids or other potentially infectious materials, such as contaminated floodwater, requires specific procedures to be applied for eliminating the health threats associated with microbial contamination. As a minimum, hazmat PPE should be subject to sanitization where the levels of microbial contamination are reduced to acceptable levels or disinfection were all viable microbial contamination has been eliminated. In general, sanitization is most often applied to fabrics and textiles associated with garments, gloves, footwear, and hoods where disinfection is applied to hard surfaces such as respirators, with the exception of any textile-based straps or other components.

In many cases, disinfection or sanitization is initially applied to the hazmat PPE for inactivating the microbial contamination and is then followed up by cleaning. Any sanitizer
or disinfectant that is used on the ensemble or ensemble element should be registered with the EPA, which has approval processes for types of sanitizers and disinfectants. EPA has established guidelines for demonstrating the efficacy of both disinfectants and sanitizers on both textiles or fabrics and hard surfaces. These procedures are established in the following publications:

1) OCSPP 810.2200, *Disinfectants for Use on Hard Surfaces — Efficacy Data Recommendations*

2) OCSPP 810.2300, *Sanitizers for Use on Hard Surfaces — Efficacy Data Recommendations*

3) OCSPP 810.2400, *Disinfectants and Sanitizers for Use on Fabrics and Textiles — Efficacy Data Recommendations*

A listing of currently registered disinfectants and sanitizers is posted at [www.epa.gov/oppad001/chemregindex.htm](http://www.epa.gov/oppad001/chemregindex.htm).

Where these types of products are used, it is essential that the instructions provided by the supplier be followed because the efficacy for their disinfection and sanitization is based on specific ratios of agent to water, residence time, and other application factors. Unless specifically indicated as a laundry additive, many disinfectants and sanitizers are not to be used as part of the wash chemicals.

Since disinfection and sanitization only affects microbial contamination, it must be followed up with advanced cleaning to remove soils associated with body fluid or other infectious material.

**A.7.6.2.4** The determination of the effectiveness for a specific sanitizer or disinfectant can be accomplished by using products registered with the EPA as appropriate for the type and materials for the ensemble element.
The application of spot sanitization and cleaning requires judgment because not all blood and body fluid contamination might be clearly visible. This judgment should take into account how the exposure occurred so that a determination can be made whether spot sanitization and cleaning will remove the contamination completely. Some forms of biological contamination are not likely to be visible, such as MRSA or other population and health care infections.

A.7.6.2.5 For the purposes of this standard, the removal of visible blood or body fluids is considered the absence of staining. More sophisticated methods can be used where the clothing material area(s) are nondestructively extracted and evaluated for the presence of proteins and carbohydrates associated with these types of fluids compared to a noncontaminated area.

A.7.7.1 See Figure A.7.7.1.

![Decontamination Approaches Diagram](image)

**FIGURE A.7.7.1 Example Matrix for General Selection of Decontamination Approach.**
A.7.7.2.2 It might not be possible for a specific cleaning or decontamination procedure to remove all contaminants completely. In some cases, testing of contaminated clothing might show residual levels of contamination still present after cleaning or decontamination. In these cases, the organization should contact individuals with expertise on exposures and hazards associated with the specific contaminants to determine if there are levels of residual contamination that are acceptable for continued safe use of the ensemble or ensemble element.

There are certain persistent contaminants that will be found in clothing whether or not the hazmat PPE have been exposed in an incident. For example, certain phthalates are common contaminants in clothing as the result of contact with plastics. These plasticizer chemicals are found in many ordinary items worn or used by individuals. Other ordinary environmental contaminants also can show up on protective ensembles and ensemble elements.

In addition, it is important that any testing determine baseline levels of certain chemicals or other substances that might be intrinsically part of the hazmat PPE. Typically, certain heavy metals might be found in dyes and other constituents of heavy metals and not imparted by the process of contamination on the fireground or with the use of the hazmat PPE.

A.8.1.3.1 Manufacturers only accept hazmat PPE after exposure on a case-by-case basis, regardless of whether or not decontamination has occurred, especially for limited use garments. Be sure to coordinate with the manufacturer to received returned goods authorization before shipment.

This annex is not a part of the requirements of this NFPA document but is included for informational purposes only.

B.1 The Selection Process.

The selection of PPE for a specific response or operational mission should account for the specific hazard levels as well as an understanding for the specific types of available protective ensembles that can provide appropriate levels of protection. Selection of appropriate hazardous materials or CBRN PPE depends on a thorough hazard and risk assessment that identifies the specific exposure threats and conditions at the response or operations scene. See Figure B.1.
STEP 5

Gas/vapor threat?  
Yes → Liquified gas?  
Yes → Flame threat?  
Yes → NFPA 1991 with optional flash fire and liquefied gas protection  
No → NFPA 1991 with optional liquefied gas protection

Liquified gas?  
No → Nontoxic for skin?  
Yes → Flame threat?  
Yes → Choose structural fire-fighting or similar flash fire protective clothing  
No → Barrier protective clothing may not be needed

Nontoxic for skin?  
No → IDLH (>10,000 ppm)?  
Yes → Flame threat?  
Yes → NFPA 1991 with optional flash fire protection  
No → NFPA 1991

IDLH (>10,000 ppm)?  
No → IDLH (>350 ppm)?  
Yes → Flame threat?  
Yes → NFPA 1994 Class 1 with optional flash fire protection  
No → NFPA 1994 Class 1

No → Go to Step 5A
The selection process follows with the hazard and risk information through a series of decisions to determine which type of ensemble provides the needed minimum protection. Decisions are set as part of the logical approach where depending on the answers provided, a certain pathway is taken that ultimately ends in a recommended protective ensemble that meets a specific NFPA standard.

**B.1.1 Primary Assumptions.** To select appropriate chemical, biological, or CBRN PPE, several assumptions must be made to make the selection process more manageable. The assumptions include the following:

1) The selection process is limited to chemical or biological protective clothing for emergency response or other operators and technicians involved in hazardous materials or CBRN operations.
2) Individuals involved in the selection process have training in hazardous materials operations at an appropriate level for the selection of PPE.
3) Individuals involved in the selection also have knowledge of the types of chemical or biological protective clothing used as part of ensembles.
4) At least some forms of clothing and equipment that meet the NFPA standards are available for use.

B.1.2 Key Information Needed. To make specific selection decisions, the following information is needed:
5) Type of hazards present in the response area
6) Expected form of exposure to the type of hazard
7) Expected severity of the hazards or potential consequences of exposure
8) Portions of the body that are likely to come in contact with the hazard
9) Type of response environment and presence of other hazards (heat, cold, physical, etc.)
10) Length of time of the work to be performed while wearing PPE

B.1.3 Decision Logic: General Approach for Selection Decisions. Information gained primarily from the hazard assessment is used to answer a series of questions that result in specific decisions. Depending on the answer, other questions are asked, and those answers lead to different paths that ultimately end with a specific, recommended PPE. This process is known as a decision logic, and it begins with asking the most significant questions first so that better-performing PPE will be selected first to ensure appropriate levels of protection to operators and technicians.

Many types of PPE can be considered. In several cases, more than one form of PPE can be recommended. However, one possible outcome from the decision logic is not to enter the situation because adequate protection cannot be guaranteed.

Many other conditions and circumstances can affect the choice of PPE and must be taken into account. The following attempts to identify the most important factors that go into PPE selection.
B.1.4 Step 1: Perform Hazard and Risk Assessment. PPE selection starts with a
detailed hazard and risk assessment that includes a characterization of the site where the
PPE will be used. The hazard assessment is intended to identify all primary hazards that
can create potential harm to the responding operators or technicians.

Hazard and risk assessments also take into consideration the likelihood and the
consequences of exposure to a specific hazard. Both of these factors combined establish
the potential risk. For example, a low risk might exist for a hazard that is infrequently
encountered and produces only moderate effects. Conversely, exposure to a highly
hazardous substance that can produce immediate acute effects would be charged as a
high risk.

Hazards can be characterized in a number of ways. For this document, hazards are
identified as specific to the substance, the working environment, and the type of work
performed.

1) Chemical, Biological, and Radiological Hazards. The principal hazards during
hazardous materials or CBRN responses include hazards posed by specific
substances in the response environment. Chemical substances are of varying
toxicity and harmful effects where exposure can occur in a variety of forms:

a) Gas or vapor
b) Liquid or aerosol
c) Solid

Biological substances can be presented as either liquids or aerosols, although some
forms of solid biotoxins or spores exist.

Radiological substances can be experienced as electromagnetic radiation or as
contaminated gases, liquids, or solids.

Risk escalates with increasing volume and concentration, or strength, of the
substance or hazard combined with the length of time exposure occurs.

2) Environmental Hazards. The environment where responders must work can equally
affect the hazards present. Environmental factors include the following:

a) The size of the space — confined spaces represent special hazards because the
environment limits the dilution or release of the substance and creates other hazards
such as slips and falls and limited ease of escape.
b) The ambient temperature will affect how quickly volatile substances evaporate. High temperatures can lead to heat stress; cold environments can create hypothermic conditions.

c) The physical environment can lead to hazards that affect response activity and can compromise the barrier materials or integrity of the ensemble. Some aspects of the physical environment can allow substances to accumulate in certain areas, which creates higher risk.

3) Work/Task Hazards. The type of work can also contribute to hazards at the response scene. Wearing PPE for extended periods of time while undertaking moderate to hard work can create heat stress. In addition, the types of activities required can place strains on the individual operator or technician that lead to mistakes or possible injuries. Work required on elevated platforms can lead to falls or objects dropped on others below.

B.1.5 Step 2: Determine Known Threats. After information is obtained from the hazard and risk assessment, the very first decision to make is whether the hazards are identifiable. If the hazards are unknown than a separate decision has to be made whether entry into the site is actually needed.

1) If there is no significant consequence for not responding, then no entry should be made.

2) Even if there is potential loss of life or significant loss of property, any decision to enter a response area where the hazards are not completely characterized brings significant risk and should be avoided until more information is obtained to ensure the safety of the first responders.

3) When entry into the site is determined as necessary, then the highest level of protection should be chosen in the form of an NFPA 1991–certified ensemble with both flash fire escape and liquefied gas protection.

B.1.6 Step 3: Determine Flash Fire Threats. The next key decision is to determine if there is a potential flash fire or explosive situation involved for the particular response or operation.

This decision is best supported by having portable monitoring equipment to measure the lower explosive limit (LEL). If monitoring equipment or circumstances indicate a LEL that is 10 percent or greater, then the environment should be considered a flash fire or
explosive risk. It is possible that certain chemicals and the conditions of their storage for release will make this determination evident automatically.

As part of this decision, it is necessary to determine whether there is also a toxic threat posed by the substances at the response scene.

1) If toxic threats do not exist and there is no threat of an explosion, wear appropriate flame-resistant protective clothing (compliant to either NFPA 1971 or NFPA 2112).

2) If toxic threats do exist, then choose an NFPA 1991 ensemble that also meets the optional flash fire escape requirements.

B.1.7 Step 4: Determine CBRN Threats. If there is the potential for exposure to a CBRN agent, then a series of determinations are needed to present the correct path for choosing appropriate PPE.

The first determination as part of this decision process is to identify whether the agent is chemical, biological, or radiological/nuclear.

1) If the agent is radiological/nuclear in nature and limited to contaminated particles that are of relatively low radiation levels, then choose an NFPA 1994 Class 4 or Class 4R ensemble.

2) If the agent is chemical, then follow Step 5 or Step 6 to make decisions for vapor/gas or liquid threats.

3) If the agent is biological, then follow Step 7 to make decisions for biological threats.

B.1.8 Step 5: Determine Gas/Vapor Chemical Threats. If the hazard/risk assessment identifies chemical agents or substances where exposure can occur either as a gas or a vapor, then the following decision logic takes one of four paths, depending on the chemical gas or vapor concentration:

1) The first path is for environments that present an immediately dangerous to life and health (IDLH) concentration or conditions that warrant the wearing of self-contained breathing apparatus (SCBA). IDLH conditions include environments that involve potentially flammable vapor, liquefied gases, and oxygen deficiencies. This path is based on gas/vapor concentrations that are over 10,000 ppm or 1 percent.

2) The second path is also IDLH but exists for substances at lower concentrations (gas/vapor concentrations that are over 350 ppm but equal to or below 10,000 ppm).

3) The third path is also IDLH but exists for substances at even lower concentrations (gas/vapor concentrations that are over 40 ppm but equal to or below 350 ppm).
4) The fourth path is for environments that are not determined to be IDLH and where either air-purifying respirators (APR) or powered air purifying respirators (PAPR) are considered acceptable. For this path, gas/vapor concentrations are at 40 ppm or below.

5) **IDLH, Higher Concentrations.** The following choices are made along the IDLH pathway.

   a) If the substance is a liquefied gas and is flammable, then choose an NFPA 1991 ensemble with the optional liquefied gas protection and flash fire protection.
   
   b) If the substance is a liquefied gas but is not flammable, then choose an NFPA 1991 ensemble with the optional liquefied gas protection.
   
   c) If the gas or vapor is not skin toxic, then choose structural firefighting clothing or other flash fire protective clothing that conforms to NFPA 1971 or NFPA 2112, respectively.
   
   d) If the substance is flammable vapor at a concentration over 10,000 ppm or 1 percent, then choose an NFPA 1991 ensemble that also meets the optional flash fire protection requirements.
   
   e) If the substance is vapor at a concentration over 10,000 ppm or 1 percent that is not flammable, then choose an NFPA 1991 ensemble.
   
   f) If the substance is flammable vapor at a concentration over 350 ppm but at or less than 10,000 ppm or 1 percent, then choose either an NFPA 1994 Class 1 ensemble that also meets the optional flash fire protection requirements.
   
   g) If the substance is vapor at a concentration over 350 ppm but at or less than 10,000 ppm or 1 percent that is not flammable, then choose an NFPA 1994 Class 1 ensemble.

6) **IDLH, Lower Concentrations.** Some circumstances exist where the principal threat is a gas or vapor but the concentration is deemed relatively low. In these cases, apply the following choices:

   a) If the substance is flammable vapor at a concentration over 40 ppm but at or less than 350 ppm, then choose an NFPA 1994 Class 2 or Class 2R ensemble that also meets the optional flash fire protection.
   
   b) If the substance is vapor at a concentration over 40 ppm but at or less than 350 ppm that is not flammable, then choose an NFPA 1994 Class 2 ensemble.
c) If heavy work is expected or the ensemble might be reused, then choose an NFPA 1994 Class 2R “ruggedized” ensemble.

7) Non-IDLH. Where relatively low vapor and/or liquid exposures are expected, such as might occur during decontamination, then a lower level of protective ensemble can be used. Where it is acceptable to wear either APR or PAPR, apply the following choices:
   a) If the substance is below IDLH conditions and flame hazard exists, then choose an NFPA 1994 Class 3 or Class 3R ensemble that also meets the optional flash fire protection.
   b) If the substance is below IDLH conditions and there is no flame hazard, then choose an NFPA 1994 Class 3 or Class 3R ensemble.
   c) If the above conditions exist and heavy work is expected or the ensemble might be reused, then choose an NFPA 1994 Class 3R “ruggedized” ensemble.

B.1.9 Step 6: Determine Liquid/Particulate Chemical Threats. Some assessments will show that gas or vapor hazards do not exist, and the principal hazards are from either liquid or particulate exposure. Liquid exposures might be at various levels depending on the volume, frequency, applied pressure, and length of liquid contact. Severe liquid splash or exposure conditions include high volumes of liquid, frequent splashes, liquid spraying under pressure, or an expected extended exposure to liquid. In contrast, liquid exposure might involve relatively low volumes or, less likely, infrequent contact. In these situations, apply the following choices:
   1) If severe liquid splash or repeated/extended exposure liquid hazards exist, then choose an NFPA 1992 or NFPA 1994 Class 2 or Class 2R ensemble.
   2) If low volume or infrequent liquid exposure hazards exist, then choose an NFPA 1994 Class 3 or Class 3R “ruggedized” ensemble.
   3) If exposure is only expected from solid particles, then choose an NFPA 1994 Class 4 or Class 4R ensemble.
   4) If the above conditions exist and heavy work is expected or the ensemble might be reused, then choose Type R “ruggedized” ensembles.

B.1.10 Step 7: Determine Biological Threats. Biological threat might include bloodborne pathogens in the form of infected blood, body fluids, or other liquids; types of aerosols; or contaminated solid particles or spores. Where biological-only hazards are encountered, apply the following choices:
1) If the primary hazard is from airborne or aerosolized biological substances that are considered dangerous for skin contact, then choose an NFPA 1994 Class 4 or Class 4R ensemble.

2) If the primary hazard is from airborne or aerosolized biological substances that are not transmissible through skin contact, then choose an appropriate respirator such as an air-purifying respirator (APR) with P100 filters or a powered air-purifying respirator (PAPR) with HEPA filter.

3) If the primary hazard is from highly hazardous liquidborne biological substances, then choose either an NFPA 1994 Class 4 or Class 4R or a single-use or multiple-use NFPA 1999 ensemble.

4) If the primary hazard is from potentially infectious blood or body fluids, then choose protective NFPA 1999 garments, gloves, footwear, and face/eyewear to protect the portions of the wearer’s body where exposure is expected.

5) If the above conditions exist and heavy work is expected or the ensemble might be reused, then choose NFPA 1994 Type R “ruggedized” or NFPA 1999 multiple-use ensembles.

B.1.11 Other Considerations for PPE Selection. The preceding steps in the decision logic cover general selection of PPE for hazardous materials and CBRN incidents. The results of the branched decision making are one or more ensembles certified to a given NFPA standard or class in that standard. In many cases, an organization might not have all types of ensembles available. When this occurs, a higher-performing ensemble can be selected. Table B.1.11 provides a hierarchy for each of the major categories of protection.

<table>
<thead>
<tr>
<th>Level</th>
<th>Chemical Vapors</th>
<th>Chemical Liquids</th>
<th>Biological Liquids</th>
<th>Biological Aerosols</th>
<th>Radiological Particles</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>NFPA 1994 C1</td>
<td>NFPA 1994 C1</td>
<td>NFPA 1994 C1</td>
<td>NFPA 1994 C1</td>
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</tbody>
</table>
Chemical resistance data for ensembles for protection against either chemical vapors or liquids can be an additional factor for the selection of an appropriate protective ensemble. NFPA ensembles are tested to a limited number of chemicals; there might be no data for the encountered chemical(s) for all of the relevant exposed materials used in the construction of the ensemble that include the garment or suit, hood, gloves, footwear, and seams joining these materials or items. Where possible, chemical resistance data for the respective ensemble should be consulted, but it is important that these data apply to all portions of the ensemble that might be exposed to the chemical(s).

Other factors to consider might not be part of NFPA standards. Certain incidents might cover unique hazards or needs. As part of the selection, other considerations include the following:

1) **Stealth**

2) **Equipment compatibility**

3) **Differences in design and conformity levels**

   a) **Stealth.** For some missions, particularly law enforcement, it might be important that the ensemble provide stealth characteristics so that the responder is difficult to see. In these cases, it is important that the ensemble is a dull, dark color and not reflective. It is also important that the ensemble not create excessive noise during movement. NFPA 1994 includes an optional category for the classes of ensembles that can be specified if these ensemble characteristics are needed. In addition, tactical operation requirements of law enforcement will dictate ensembles that are form fitting and offer the greatest levels of mobility, functionality, tactility, and dexterity. For these reasons, encapsulating ensembles are generally not considered acceptable for tactical law enforcement or similar operations.

   b) **Equipment Compatibility.** Ensembles consist of the garment or suit along with an attached or unattached hood, gloves, and footwear as well as a respirator. Yet, depending on the mission, there might also be a requirement for other equipment to be worn by the operator or technician such as a cooling vest, body armor,
helmet, communications equipment, or hydration system. The ability of the 
ensemble to accommodate these additional items is another consideration that 
must be weighed in selecting an ensemble. 
Some equipment compatibility will depend on the sizes of ensembles that are 
offered. While the NFPA standards specify minimum sizes for the suit, gloves, 
and footwear, some products might be offered in a larger number of sizes or 
allow for features that permit adjustment of the ensemble such as side torso 
take-up straps or internal harnesses.

**c) Differences in Design and Conformity Levels.** Lastly, not all ensembles that meet 
a given standard are alike. Each ensemble is required to meet the minimum 
design, performance, documentation, and labeling requirements of specific NFPA 
standards. Relatively few requirements exist for how the ensemble must be 
designed, which can lead to different features in the configuration of the 
ensemble (e.g., whether the zipper is placed on the front or back of the ensemble 
and the type of interface that is used to join a glove to a suit or garment sleeve). 
In addition, most products exceed the performance requirement of the respective 
NFPA standard. These differences might mean additional chemicals for which 
the ensemble barrier materials have been tested, increased physical properties, 
or greater levels of integrity. Differences in products can be ascertained by 
examining the technical data package that is provided with each ensemble.
Annex C Informational References

C.1 Referenced Publications. The documents or portions thereof listed in this annex are referenced within the informational sections of this recommended practice and are not part of the recommendations of this document unless also listed in Chapter 2 for other reasons.

C.1.1 NFPA Publications. National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471.
NFPA 2112, Standard on Flame-Resistant Clothing for Protection of Industrial Personnel Against Short-Duration Thermal Exposures from Fire, 2018 edition.

C.1.2 Other Publications.
C.1.2.2 EPA Publications. U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention, 7101M, 1200 Pennsylvania Avenue, NW, Washington, DC 20460.


**C.1.2.4 Other Publications.**

American Conference of Governmental Industrial Hygienists, “Threshold Limit Values (TLVs) and Biological Exposure Indices (BEIs),” 2016, https://www.acgih.org/forms/store/ProductFormPublic/2016-tlvs-and-beis


**C.2 Informational References.** The following documents or portions thereof are listed here as informational resources only. They are not a part of the recommendations of this document.

**C.2.1 ASTM Publications.** ASTM International, 100 Bar Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959.


C.3 References for Extracts in Informational Sections. (Reserved)
January 4, 2018

Mr. Richard Davis  
Dr. Dong Zeng  
FM Global  
1151 Boston-Providence Turnpike  
PO Box 9102  
Norwood, MA  02062-9102

Messrs. Davis and Zeng:

I am transmitting to you herewith the following action of the Standards Council  
(December 5-6, 2017):

The Council reviewed the request of Richard Davis and Dr. Dong Zeng, FM Global, to develop a project addressing test methods for determining the flammability of interior/exterior wall panels.

After a review of all material submitted, the Council took action to direct the Technical Committee on Fire Tests to review the Factory Mutual Report that was recently released on this subject and report back to the Council at the April 2018 meeting with findings.

Standards Council Member Dan O’Connor recused himself from deliberation and vote on the motion. Standards Council Member Gary Keith requested to be recorded as abstaining on the Council’s motion.

Very truly yours,

Linda Fuller, Senior Manager, Standards Operations  
Codes and Standards Administration  

C:  D. Baio, D. Fleming, P. Foley, R. Solomon, T. Vecchiarelli  
TC Fire Tests (FIZ-AAA)  

17-12-40
### New Project Initiation Form
(To be completed by proponent of new project/document)

**A. Explain the Scope of the new project/document:**

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.

**B. Provide an explanation and any evidence of the need for the new project/document:**

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.

**C. Identify intended users of the new project/document:**

Wall assembly manufacturers, architects, engineers, testing laboratories.

**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:**

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.

**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:**

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.

**F. Identify other related documents and projects on the subject both within NFPA and external to NFPA:**

NFPA 285, FM Approval Standard 4880

**G. Identify the technical expertise and interest necessary to develop the project/document, and if the committee membership currently contains this expertise and interest:**

The existing Fire Test Committee possesses the expertise to review and maintain such a document.
<table>
<thead>
<tr>
<th></th>
<th>Provide an estimate on the amount of time needed to develop the new project/document:</th>
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<tr>
<td></td>
<td>1-2 years. The majority of the test method is currently part of FM Approval Standard 4880.</td>
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<table>
<thead>
<tr>
<th></th>
<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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<tr>
<td></td>
<td>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.</td>
</tr>
</tbody>
</table>


Please send your request to:
NFPA
Codes and Standards Administration
1 Batterymarch Park
Quincy, MA 02169
Stds_admin@nfpa.org
Rev. 10/09

Signature: [Signature]
Name: [Name]
Affiliation: [Affiliation]
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 submission indicates 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:

1. Developing a scope for personnel supporting active fire service operations not subject to Immediate Dangerous to Life or Health (IDLH) environments;
2. Performing a Job Task Analysis related to the proposed support position; and
3. 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 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:

*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 to Professional Qualifications for Fire Service Support Personnel by October 13, 2017 at: stds_admin@nfpa.org.

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 the 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

attachment 18-4-25
Page 4 of 8
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).
Maynard, Mary

From: Davis, Richard <richard.davis@fmglobal.com>  
Sent: Friday, July 21, 2017 3:50 PM  
To: stds_admin  
Subject: Public Input on the Development of a Proposed Standard on fire test for wall panels

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/m²) 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/m²).
   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
TO: Standards Council

CC: Dawn Michele Bellis

FROM: Tracy Vecchiarelli, on behalf of the Fire Test Committee

DATE: March 22, 2018

SUBJECT: Project Request

The NFPA Fire Test Committee was directed by the NFPA Standards Council (December 5-6, 2017 meeting) to review the FM report on determining flammability of interior/exterior wall panels. The TC reviewed the report and had a thorough discussion on the topic. A motion was made, and passed by simple majority, to re-submit the project request to the Standards Council. Should the project be approved, the TC notes that: (1) window openings will need to be addressed, and (2) the application of the new document will be mandated by the Codes.
January 4, 2018

Mr. Richard Davis  Via Email: Richard.davis@fmglobal.com
Dr. Dong Zeng          Dong.Zeng@fmglobal.com
FM Global
1151 Boston-Providence Turnpike
PO Box 9102
Norwood, MA  02062-9102

Messrs. Davis and Zeng:

I am transmitting to you herewith the following action of the Standards Council
(December 5-6, 2017):

The Council reviewed the request of Richard Davis and Dr. Dong Zeng, FM Global, to
develop a project addressing test methods for determining the flammability of
interior/exterior wall panels.

After a review of all material submitted, the Council took action to direct the Technical
Committee on Fire Tests to review the Factory Mutual Report that was recently released on
this subject and report back to the Council at the April 2018 meeting with findings.

Standards Council Member Dan O’Connor recused himself from deliberation and vote on
the motion. Standards Council Member Gary Keith requested to be recorded as abstaining
on the Council’s motion.

Very truly yours,

Linda Fuller, Senior Manager, Standards Operations
Codes and Standards Administration

c:  D. Baio, D. Fleming, P. Foley, R. Solomon, T. Vecchiarelli
    TC Fire Tests (FIZ-AAA)

17-12-40
New Project Initiation Form  
(To be completed by proponent of new project/document)  
Additional pages may be attached if necessary.

<table>
<thead>
<tr>
<th>a.</th>
<th>Explain the Scope of the new project/document:</th>
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<tbody>
<tr>
<td></td>
<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>
</tr>
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<tr>
<th>b.</th>
<th>Provide an explanation and any evidence of the need for the new project/document:</th>
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<tbody>
<tr>
<td></td>
<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.</td>
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<td></td>
<td>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>
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<th>c.</th>
<th>Identify intended users of the new project/document:</th>
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<tr>
<td></td>
<td>Wall assembly manufacturers, architects, engineers, testing laboratories.</td>
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<tr>
<th>d.</th>
<th>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:</th>
</tr>
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<tbody>
<tr>
<td></td>
<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>
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<table>
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<tr>
<th>e.</th>
<th>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:</th>
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<tbody>
<tr>
<td></td>
<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>
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<tr>
<th>f.</th>
<th>Identify other related documents and projects on the subject both within NFPA and external to NFPA:</th>
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<tr>
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<td>NFPA 285, FM Approval Standard 4880</td>
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<tr>
<th>g.</th>
<th>Identify the technical expertise and interest necessary to develop the project/document, and if the committee membership currently contains this expertise and interest:</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>The existing Fire Test Committee possesses the expertise to review and maintain such a document.</td>
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<td>h.</td>
<td>Provide an estimate on the amount of time needed to develop the new project/document:</td>
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<td>1-2 years. The majority of the test method is currently part of FM Approval Standard 4880.</td>
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<th>i.</th>
<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></td>
<td>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.</td>
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1.

2.

3.

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 submitter has indicated the need for a recognized uniform 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 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 to Professional Qualifications for Fire Service Support Personnel by October 13, 2017 at: stds_admin@nfpa.org

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?
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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.

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Maynard, Mary

Subject: FW: [NFPA Today] - Seeking public comments on the development of a proposed standard on fire test for wall panels

From: dhefpe [mailto:nfpa@jiveon.com]
Sent: Tuesday, August 22, 2017 9:44 PM
To: Baio, Debbie <dbaio@NFPA.org>
Subject: Re: [NFPA Today] - Seeking public comments on the development of a proposed standard on fire test for wall panels

NFPA Xchange

Seeking public comments on the development of a proposed standard on fire test for wall panels

new comment by Douglas Evans - View all comments on this blog post

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).

Reply to this email to respond to Douglas Evans's comment.

Following Seeking public comments on the development of a proposed standard on fire test for wall panels in these streams: Inbox

This email was sent by NFPA Xchange because you are a registered user. You may unsubscribe instantly from NFPA Xchange, or adjust email frequency in your email preferences.
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:
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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,

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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:

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

To members of the NFPA Standards Council:

The Chair of the Technical Committee for Electrical Equipment in Chemical Atmospheres, Mr. Bill Fiske, approached me on his own accord with a correlating issue between NFPA 70, National Electrical Code®, NFPA 499, Recommended Practice for the Classification of Combustible Dusts and of Hazardous (Classified) Locations for Electrical Installations in Chemical Process Areas; and the series of NFPA Combustible Dust Documents, specifically NFPA 652, Standard on the Fundamentals of Combustible Dusts and NFPA 484, Standard for Combustible Metals.

Currently NEC Article 506 contains requirements for zone electrical classifications. Section 8.5.6.5 in NFPA 652, 2016 Edition disallows the use of NEC Article 506, which then prohibits the use of zone electrical classifications for combustible dusts. This affects electrical installations and electrical equipment according to users of the NEC. Additionally, anyone classifying areas for electrical installations in accordance with the recommendations in NFPA 499 would not be able to use zone classifications as NFPA 499 extracts and expands on the concepts in NEC Article 506.

Members of the responsible panels and Technical Committee agree that a task group is needed to correlate the definitions, requirements, and scopes to provide clear guidance of responsibility for determining when combustible dusts are a hazard to ensure of the standards are complementary to one other and to resolve this conflict.

Sincerely,

[Signature]

Alexander Ing,
Associate Engineer
Staff Liaison NFPA 499
Combustible Metals and Metal Dusts

**NFPA 484 Standard for Combustible Metals**

Document scope: 1.1* Scope. This standard shall apply to the production, processing, finishing, handling, recycling, storage, and use of all metals and alloys that are in a form that is capable of combustion or explosion.

1.1.1 The procedures in Chapter 4 shall be used to determine whether a metal is in a noncombustible form.

1.1.2 Combustible Metal Powder or Dust.

1.1.2.1 This standard also shall apply to operations where metal or metal alloys are subjected to processing or finishing operations that produce combustible powder or dust.

1.1.2.2 Operations where metal or metal alloys are subjected to processing or finishing operations that produce combustible powder or dust shall include, but shall not be limited to, machining, sawing, grinding, buffing, and polishing.

1.1.3* Metals, metal alloy parts, and those materials, including scrap, that exhibit combustion characteristics of alkali metals, aluminum, magnesium, tantalum, titanium, or zirconium shall be subject to the requirements of the metal whose combustion characteristics they most closely match.

1.1.4 Metals, metal alloy parts, and those materials, including scrap, that do not exhibit combustion characteristics of alkali metals, aluminum, magnesium, niobium, tantalum, titanium, or zirconium are subject to the requirements of Chapter 14.

1.1.5* This standard shall not apply to the transportation of metals in any form on public highways and waterways or by air or rail.

1.1.6 This standard shall not apply to the primary production of aluminum, magnesium, and lithium.

1.1.7 This standard shall apply to laboratories that handle, use, or store more than 0.23 kg (1/2 lb) of alkali metals or 0.907 kg (2 lb) aggregate of other combustible metals, excluding alkali metals.

1.1.8 All alkali metals and metals that are in a form that is water reactive shall be subject to this standard.

1.1.9* If the quantity of a combustible metal listed in Table 1.1.9 is exceeded in an occupancy, the requirements of this document shall apply.

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Fundamentals of Combustible Dusts

**NFPA 652 Standard on the Fundamentals of Combustible Dust**

Document Scope: 1.1 Scope. This standard shall provide the basic principles of and requirements for identifying and managing the fire and explosion hazards of combustible dusts and particulate solids.
Electrical Equipment in Chemical Atmospheres

NFPA 499 Recommended Practice for the Classification of Combustible Dusts and of Hazardous (Classified) Locations for Electrical Installations in Chemical Process Areas

Document scope: 1.1 Scope.

1.1.1 This recommended practice provides information on the classification of combustible dusts and of hazardous (classified) locations for electrical installations in chemical process areas and other areas where combustible dusts are produced or handled.

1.1.2 This recommended practice provides information on combustible dusts as it relates to the proper selection of electrical equipment in hazardous (classified) locations in accordance with NFPA 70, National Electrical Code.

1.1.3 The tables of selected combustible dusts contained in this document are not intended to be all-inclusive.