Use either the term "Fire Apparatus Access Road" or "Fire Department Access Road" throughout the document. The two terms are utilized in different locations even in the same chapter creating the potential for confusion.

Statement of Problem and Substantiation for Public Input

Chapter 1 under permits uses the term "Fire Apparatus Access Road." Chapter 2 definitions only has a definition for "Fire Department Access Road." Chapter 18 utilizes both "Fire Apparatus Access Road" and "Fire Department Access Road." The document should standardize on one term throughout the Code and provide a definition for the term. The proponent of this PI prefers "Fire Apparatus Access Road" but that is just a personal preference as it seems to better convey the intent of providing the road for FD apparatus.

Submitter Information Verification

Submitter Full Name: Anthony Apfelbeck
Organization: Altamonte Springs Building/Fire Safety Division
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jan 17 13:33:12 EST 2018
Committee:

Committee Statement

Resolution: FR-1-NFPA 1-2018
Statement: The Code currently uses multiple different terms inconsistently throughout to refer to fire apparatus access roads. The document should standardize this by using one term throughout the Code and provide a definition for the term. The change to "fire apparatus access road" creates consistency in the terminology throughout the Code.
Type your content here ...
Replace “Marijuana” with “Cannabis” Throughout the Chapter 38.

Statement of Problem and Substantiation for Public Input

Cannabis is the generic term for products produced by extraction and should reflect that in the title.

Submitter Information Verification

Submitter Full Name: Kelly Nicolello
Organization: UL LLC
Street Address:  
City:  
State:  
Zip:  
Submittal Date: Mon Jun 25 15:28:15 EDT 2018
Committee:  

Committee Statement

Resolution: FR-25-NFPA 1-2018  
Statement: Cannabis is the term used and accepted in the industry and is most inclusive of the other products that fall under the requirements as addressed by this Code.
Type your content here ...

Make revisions to Chapter 52 to import applicable ESS requirements from the latest version of NFPA 855 and delete unnecessary requirements.

Statement of Problem and Substantiation for Public Input

NFPA 855 is not complete but will be by NFPA 1 second draft meeting. Recommend the Technical Committee resolve the Global Input as a Committee Input and allow extract material to be added at either public comment or second draft. Export references from NFPA 855 and insert them into chapter 52.2

Submitter Information Verification

Submitter Full Name: Kelly Nicolello
Organization: UL LLC
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jun 25 15:38:55 EDT 2018
Committee:

Committee Statement

Resolution: CI-35-NFPA 1-2018
Statement: NFPA 855 is not complete but will be by NFPA 1 second draft meeting. This will allow the material to be extracted at the second draft meeting.
Review TIA 1145 issued on the 2015 Edition of NFPA 1 and re-insert deleted language as appropriate.

Statement of Problem and Substantiation for Public Input

NFPA 1 currently provides no requirements regarding consumer fireworks facilities despite the fact that consumer fireworks are permitted in 49 of the 50 states. TIA 1145 was processed at the direction of the Standards Council due to the Council’s desire for additional testing regarding sprinkler performance when protecting consumer fireworks. Such testing is scheduled to be performed under the direction of Factory Mutual. The tests may not be completed by the First Draft Meeting but are scheduled to be completed by the Second Draft meeting. Based upon the premise that the testing will be completed, Public Inputs have been submitted to NFPA 1124 to re-establish Chapters 6 and 7. With NFPA 1124 on the same revision cycle as NFPA 1, the changes should also be made to NFPA 1.

Related Public Inputs for This Document

<table>
<thead>
<tr>
<th>Related Input</th>
<th>Relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Input No. 138-NFPA 1-2018 [Section No. A.1.3.2.2]</td>
<td></td>
</tr>
</tbody>
</table>

Submitter Information Verification

Submitter Full Name: William Koffel
Organization: Koffel Associates, Inc.
Affiliation: American Pyrotechnics Association
Street Address: 
City: 
State: 
Zip: 
Submittal Date: Wed Jun 27 10:46:36 EDT 2018
Committee: 

Committee Statement

Resolution: NFPA 1124 has been moved to the A2021 revision cycle. The Committee reviewed the submitter’s request but no action can be taken with NFPA 1 at this time.
Public Input No. 90-NFPA 1-2018 [ Global Input ]

Type your content here

Proposal:
Global Input Remove ANSI from in front of all UL standards referenced in NFPA 1.

Reasoning Statement: Many years ago, UL preferred the ANSI/UL reference because there was a transition of traditional UL standards towards an ANSI standards development process. Now, years later, a large majority of UL Standards are ANSI approved and follow the ANSI development and maintenance process. However, sometimes readers are confused because they don’t understand the standards are actually UL standards, not developed by ANSI. There are many other references to standards promulgated by other standards development organizations where they are considered ANSI approved but do not include ANSI in the reference.

Statement of Problem and Substantiation for Public Input

Reasoning Statement: Many years ago, UL preferred the ANSI/UL reference because there was a transition of traditional UL standards towards an ANSI standards development process. Now, years later, a large majority of UL Standards are ANSI approved and follow the ANSI development and maintenance process. However, sometimes readers are confused because they don’t understand the standards are actually UL standards, not developed by ANSI. There are many other references to standards promulgated by other standards development organizations where they are considered ANSI approved but do not include ANSI in the reference.

Submitter Information Verification

Submitter Full Name: Kelly Nicolello
Organization: UL LLC
Street Address: 
City: 
State: 
Zip: 
Submittal Date: Mon Jun 25 13:52:07 EDT 2018
Committee:

Committee Statement

Resolution: FR-47-NFPA 1-2018
Statement: Many years ago, UL preferred the ANSI/UL reference because there was a transition of traditional UL standards towards an ANSI standards development process. Now, years later, a large majority of UL Standards are ANSI approved and follow the ANSI development and maintenance process. However, sometimes readers are confused because they don’t understand the standards are actually UL standards, not developed by ANSI. There are many other references to standards promulgated by other standards development organizations where they are considered ANSI approved but do not include ANSI in the reference.
Public Input No. 91-NFPA 1-2018 [ Global Input ]

Type your content here ...

Remove the terms “Standard for” or “Subject” from in front of all UL standards referenced in NFPA 1.

Statement of Problem and Substantiation for Public Input

The terms are redundant and unnecessary. This change results in the proper short form name of the referenced documents.

Submitter Information Verification

Submitter Full Name: Kelly Nicolello
Organization: UL LLC
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jun 25 13:56:13 EDT 2018
Committee:

Committee Statement

Resolution: FR-48-NFPA 1-2018
Statement: The terms are redundant and unnecessary. This change results in the proper short form name of the referenced UL documents.
1.2 * Purpose.
The purpose of this Code is to prescribe minimum requirements necessary to establish a reasonable level of fire and life safety and property protection from the hazards created by fire, explosion, and security threats and dangerous conditions.

Statement of Problem and Substantiation for Public Input

This proposal expands the scope of the fire code to recognize and address occupant risks associated with intruders who seek to kill or injury occupants while maintaining the original intent of building, fire, and life safety codes.

Related Public Inputs for This Document

<table>
<thead>
<tr>
<th>Related Input</th>
<th>Relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Input No. 95-NFPA 1-2018 [Section No. 4.1.1]</td>
<td></td>
</tr>
<tr>
<td>Public Input No. 96-NFPA 1-2018 [Section No. 4.1.3]</td>
<td></td>
</tr>
<tr>
<td>Public Input No. 97-NFPA 1-2018 [Section No. A.4.1.1]</td>
<td></td>
</tr>
</tbody>
</table>

Submitter Information Verification

Submitter Full Name: Kelly Nicolello
Organization: UL LLC
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jun 25 13:58:17 EDT 2018
Committee:

Committee Statement

Resolution: FR-49-NFPA 1-2018
Statement: New Annex text provides clarification on the application of the Fire Code with regards to addressing security. Today, there is an ever growing need for model codes to balance the fire related provisions for building safety, life safety, fire fighter safety with the security. This language clarifies that it is not the primary consideration of this Code to address security threat mitigation. It may be addressed indirectly through other provisions. See also the new text for Section 4.1.6. It should be noted that this issue is very important to the development of NFPA 1, 101 and 5000. NFPA 1 will continue to address this topic through the revision cycle as well as monitor any developments of NFPA 101 and NFPA 5000 for consistency.
Public Input No. 38-NFPA 1-2018 [Section No. 1.3.1]

1.3.1
This Code shall apply to both new and existing conditions, unless otherwise specified in any portion of this code.

Statement of Problem and Substantiation for Public Input

This change is submitted to address the requirements of Chapter 54 which is now mandatory. Refer to my next public input concerning Chapter 54.

Related Public Inputs for This Document

<table>
<thead>
<tr>
<th>Related Input</th>
<th>Relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Input No. 39-NFPA 1-2018 [Section No. 54.1.2]</td>
<td></td>
</tr>
<tr>
<td>Public Input No. 40-NFPA 1-2018 [New Section after 54.1.2]</td>
<td></td>
</tr>
</tbody>
</table>

Submitter Information Verification

Submitter Full Name: Robert Vaughn
Organization: Fire Protection Engineering
Affiliation: Savannah River Site
Street Address:
City:
State:
Zip:
Submittal Date: Mon Feb 05 13:10:46 EST 2018
Committee:

Committee Statement

Resolution: The current Code language addresses the concern of the submitter. The application of a specific Chapter should be clarified within the provisions of that Chapter, such as Chapter 54.
Public Input No. 17-NFPA 1-2018 [ Section No. 1.4.3 ]

1.4.3 Modifications.

The AHJ is authorized to modify any of the provisions of this Code upon application in writing by the owner, a lessee, or a duly authorized representative where there are practical difficulties in the way of carrying out the provisions of the Code, provided that, in the judgement of the AHJ, the intent of the Code shall be complied with, public safety secured, and substantial justice done.

Statement of Problem and Substantiation for Public Input

Section 1.4.2 has clear language that states the AHJ is the one that determines if the criteria for an Alternative has been satisfied. That language is lacking in section 1.4.3 for modifications. This PI inserts similar language in section 1.4.3 to ensure this issue has clarity.

Submitter Information Verification

Submitter Full Name: Anthony Apfelbeck
Organization: Altamonte Springs Building/Fire Safety Division
Street Address: 
City: 
State: 
Zip: 
Submittal Date: Wed Jan 24 09:57:47 EST 2018
Committee: 

Committee Statement

Resolution: FR-2-NFPA 1-2018
Statement: Section 1.4.2 has clear language that states the AHJ is the one that determines if the criteria for an Alternative has been satisfied. That language is lacking in section 1.4.3 for modifications. This revision inserts similar language in section 1.4.3 to ensure this issue has clarity. The new annex text provides some added clarity to the language in section 1.4.3 to convey the spirit and intent of the section. The added language will assist the AHJ in interpreting this section to determine how far it is appropriate to go in providing modification allowances.
1.7.2* Minimum Qualifications to Enforce this Code.

The AHJ shall establish minimum qualifications for all persons assigned the responsibility of enforcing this Code.

1.7.2.1

Fire inspectors and plans examiners shall meet the minimum professional qualifications established in NFPA 1031.

1.7.2.2

The AHJ shall be authorized to approve alternative qualifications for personnel conducting fire inspections and plan examination under section 1.7.2.1, if the AHJ determines the individual possesses the knowledge, skills, and abilities to perform the job performance requirements of the position.

1.7.2.3

Fire marshals shall meet the minimum professional qualifications established in NFPA 1037.

1.7.2.4

The AHJ shall be authorized to approve alternative qualifications for personnel performing the position of fire marshal under section 1.7.2.3, if the AHJ determines the individual possesses the knowledge, skills, and abilities to perform the job performance requirements of the position.

Statement of Problem and Substantiation for Public Input

This PI was modified as a result of the Pre ROP meeting to ensure the numbering meets the MOS and to reference the sections each paragraph is creating an exception for.

Submitter Information Verification

Submitter Full Name: Anthony Apfelbeck
Organization: Altamonte Springs Building/Fire Safety Division
Street Address: 
City: 
State: 
Zip: 
Submittal Date: Fri Jan 19 14:04:26 EST 2018
Committee: 

Committee Statement

Resolution: FR-51-NFPA 1-2018
Statement: This revision adds references to the Code section above for which it corresponds to. No technical changes have been made. The changes add clarity to the intent of the Code.
Public Input No. 8-NFPA 1-2018 [ Section No. 1.7.3 ]

1.7.3 Interpretations and Rules and Regulations.

1.7.3.1
The AHJ is authorized to render interpretations of this Code and to make and enforce rules and supplemental regulations in order to carry out the application and intent of its provisions.

1.7.3.2
Such interpretations, rules, and regulations shall be in conformance with the intent and purpose of this Code and shall be available to the public during normal business hours.

Statement of Problem and Substantiation for Public Input

Section 1.7.3 covers both Rules and Regulations along with Interpretations. Therefore, both Rules and Regulations and Interpretations should be in the title of section 1.7.3

Submitter Information Verification

Submitter Full Name: Anthony Apfelbeck
Organization: Altamonte Springs Building/Fire Safety Division
Street Address: 
City: 
State: 
Zip: 
Submittal Date: Fri Jan 19 14:06:54 EST 2018
Committee: 

Committee Statement

Resolution: FR-3-NFPA 1-2018
Statement: Section 1.7.3 covers both Rules and Regulations along with Interpretations. Therefore, both Rules, Regulations and Interpretations should be in the title of section 1.7.3
Public Input No. 9-NFPA 1-2018 [ Sections 1.7.7, 1.7.8 ]

Sections 1.7.7, 1.7.8

1.7.7 Inspection.

1.7.7.1 The AHJ shall be authorized to inspect, at all reasonable times, any building or premises for dangerous or hazardous conditions or materials as set forth in this Code.

1.7.7.2 The AHJ shall have authority to order any person(s) to remove or remedy such dangerous or hazardous condition or material. Any person(s) failing to comply with such order shall be in violation of this Code.

1.7.7.3 To the full extent permitted by law, any AHJ engaged in fire prevention and inspection work shall be authorized at all reasonable times to enter and examine any building, structure, marine vessel, vehicle, or premises for the purpose of making fire safety inspections.

1.7.7.4 Before entering, the AHJ shall obtain the consent of the occupant thereof or obtain a court warrant authorizing entry for the purpose of inspection except in those instances where an emergency exists.

1.7.7.5 As used in 1.7.7.4, emergency shall mean circumstances that the AHJ knows, or has reason to believe, exist and that can constitute imminent danger.

1.7.7.6 Persons authorized to enter and inspect buildings, structures, marine vessels, vehicles, and premises as herein set forth shall be identified by credentials issued by the governing authority.

1.7.8 Authority to Order Corrections and Abate

1.7.8.1 The AHJ shall have authority to order any person(s) to remove or remedy such dangerous or hazardous condition or material. Any person(s) failing to comply with such order shall be in violation of this Code.

1.7.8.2 Where conditions exist and are deemed hazardous to life or property by the AHJ, the AHJ shall have the authority to summarily abate such hazardous conditions that are in violation of this Code.

Statement of Problem and Substantiation for Public Input

Section 1.7.7.2 is currently under "Inspection" but it not really a right of entry/authority to inspect issue. It is an authority to order corrections to violations. The content is more in line with the existing 1.7.8 language. Therefore, the current 1.7.7.2 has been relocated to be with 1.7.8 in a new subsection. No content is being proposed to be rewritten with this PI.

Submitter Information Verification

Submitter Full Name: Anthony Apfelbeck
Organization: Altamonte Springs Building/Fire Safety Division
Street Address:
City:
State:
Zip:
Submittal Date: Fri Jan 19 14:13:08 EST 2018
Committee:
Committee Statement

Resolution: FR-4-NFPA 1-2018
Statement: Re: 1.7.8.1 - Section 1.7.7.2 is currently under "Inspection" but it not really a right of entry/authority to inspect issue. It is an authority to order corrections to violations. The content is more in line with the existing 1.7.8 language. Therefore, the current 1.7.7.2 has been relocated to be with 1.7.8 in a new subsection. No new content is being added, rather it is being relocated.

Re: 1.7.8.3 - This revision clarifies the action permitted by the AHJ regarding the disconnection of utilities. As submitted, it could have been understood that the AHJ, themselves, was disconnecting the utilities. While the ability to secure utilities is implied by section 1.7.8 and the Imminent Dangers and Evacuations section, it is not clearly called out in the Code. This lack of specificity has made it difficult for some jurisdictions to act under the fire code due to reluctance of City/County Attorneys not having a specific "utilities" language provisions to point to in the Code. It is located in section 1.7.8, in lieu of the Imminent Danger and Evacuations section, as there may be circumstances where utilities need to be secured due to a life or fire hazard but an Imminent Danger may not clearly exist. Annex text is added to address differing types of utilities.
1.7.8.1 Where such hazardous conditions exist, abatement actions take by the AHJ shall include the authority to disconnect utilities to a structure or property.

A.1.7.8.1 Utility types could include, but not be limited to, electric, gas, water, sanitary sewer or other types of utility services provided by private or public utilities.

Statement of Problem and Substantiation for Public Input

While the ability to secure utilities is implied by section 1.7.8 and the Imminent Dangers and Evacuations section, it is not clearly called out in the Code. This lack of specificity has made it difficult for some jurisdictions to act under the fire code due to reluctance of City/County Attorneys not having a specific "utilities" language provisions to point to in the Code. This PI provides that needed clarity. It is proposed for section 1.7.8, in lieu of the Imminent Danger and Evacuations section as there may be circumstances where utilities need to be secured due to a life or fire hazard but an Imminent Danger may not clearly exist. However, similar utility language could also be placed in both 1.7.8 and the Imminent Dangers and Evacuations section to cover the authority under both sections. That might be a better solution.

This PI was modified as a result of a suggestion from the TC at the PreROP meeting. Annex text was added at the request of the TC to address differing types of utilities.

Related Public Inputs for This Document

<table>
<thead>
<tr>
<th>Related Input</th>
<th>Relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Input No. 15-NFPA 1-2018 [New Section after 1.7.16.1]</td>
<td>Similar Issue</td>
</tr>
</tbody>
</table>

Submitter Information Verification

Submitter Full Name: Anthony Apfelbeck  
Organization: Altamonte Springs Building/Fire Safety Division
Street Address:  
City:  
State:  
Zip:  
Submittal Date: Wed Jan 17 13:59:56 EST 2018
Committee:  

Committee Statement

Resolution: FR-4-NFPA 1-2018
Statement:  
Re: 1.7.8.1 - Section 1.7.7.2 is currently under "Inspection" but it not really a right of entry/authority to inspect issue. It is an authority to order corrections to violations. The content is more in line with the existing 1.7.8 language. Therefore, the current 1.7.7.2 has been relocated to be with 1.7.8 in a new subsection. No new content is being added, rather it is being relocated.

Re: 1.7.8.3 - This revision clarifies the action permitted by the AHJ regarding the disconnection of utilities. As submitted, it could have been understood that the AHJ, themselves, was disconnecting the utilities. While the ability to secure utilities is implied by section 1.7.8 and the Imminent Dangers and Evacuations section, it is not clearly called out in the Code. This lack of specificity has made it difficult for some jurisdictions to act under the fire code due to reluctance of City/County Attorneys not having a specific "utilities" language provisions to point to in the Code. It is located in section 1.7.8, in lieu of the Imminent Danger and Evacuations section, as there may be circumstances where utilities need to be secured due to a life or fire hazard but an Imminent Danger may not clearly exist. Annex
text is added to address differing types of utilities.
1.7.11.2 Evidence.
The AHJ shall have the authority to take custody of all physical evidence relating to the origin and cause of
a fire, explosion, release of hazardous materials, or other hazardous condition.

Statement of Problem and Substantiation for Public Input
Added the term "origin" into the section as fire investigations cover both the origin and cause.

Submitter Information Verification
Submitter Full Name: Anthony Apfelbeck
Organization: Altamonte Springs Building/Fire Safety Division
Street Address:
City:
State:
Zip:
Submittal Date: Fri Jan 19 14:20:26 EST 2018
Committee:

Committee Statement
Resolution: FR-6-NFPA 1-2018
Statement: Added the term "origin" into the section as fire investigations cover both the origin and cause.
1.7.11.4 Trade Secret.
Information that could be related to trade secrets or processes shall not be made part of the public record except as could be directed by a court of law or applicable public records laws.

Statement of Problem and Substantiation for Public Input

Usually, inspection, plans review and other records are regulated by FOIA laws or other public records laws. These laws must be complied with and are separate from a court order.

Submitter Information Verification

<table>
<thead>
<tr>
<th>Submitter Full Name:</th>
<th>Anthony Apfelbeck</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organization:</td>
<td>Altamonte Springs Building/Fire Safety Division</td>
</tr>
<tr>
<td>Street Address:</td>
<td></td>
</tr>
<tr>
<td>City:</td>
<td></td>
</tr>
<tr>
<td>State:</td>
<td></td>
</tr>
<tr>
<td>Zip:</td>
<td></td>
</tr>
<tr>
<td>Submittal Date:</td>
<td>Fri Jan 19 14:22:49 EST 2018</td>
</tr>
<tr>
<td>Committee:</td>
<td></td>
</tr>
</tbody>
</table>

Committee Statement

<table>
<thead>
<tr>
<th>Resolution:</th>
<th>FR-7-NFPA 1-2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Statement:</td>
<td>Existing public record laws address the provisions in current section 1.11.7.4, thus the requirements are no longer needed in the Code.</td>
</tr>
</tbody>
</table>
Public Input No. 12-NFPA 1-2018 [Sections 1.7.12.8, 1.7.12.9]

### Sections 1.7.12.8, 1.7.12.9

**1.7.12.8**
The AHJ shall be authorized to require permits for conditions listed in 1.7.12.2, 1.7.12.5, and 1.7.12.6, unless otherwise permitted by 1.7.12.8.1.

**1.7.12.8.1**
The AHJ is authorized to exempt detached one- and two-family dwellings and accessory structures from the permit requirement of 1.7.12.8.

### Statement of Problem and Substantiation for Public Input

The existing 1.7.12.9 is an exception to 1.7.12.8. Therefore, it is more appropriate to renumber 1.7.12.9 to 1.7.12.8.1.

### Submitter Information Verification

**Submitter Full Name:** Anthony Apfelbeck  
**Organization:** Altamonte Springs Building/Fire Safety Division  
**Street Address:**  
**City:**  
**State:**  
**Zip:**  
**Submittal Date:** Fri Jan 19 14:34:24 EST 2018

### Committee Statement

**Resolution:** The proposed change is not needed and it goes against the NFPA Manual of Style. Current Code text is acceptable.
Insert a new section and renumber the remaining:

1.7.16.2 When, in the opinion of the AHJ, an imminent danger exists, the AHJ shall be authorized to disconnect utilities to a building.

Statement of Problem and Substantiation for Public Input

While the ability to secure utilities is implied by section 1.7.8 and the generic Imminent Dangers and Evacuations section of 1.7.16, it is not clearly called out in the Code. This lack of specificity has made it difficult for some jurisdictions to act under the fire code due to reluctance of City/County Attorneys not having a specific "utilities" language provisions to point to in the Code. This PI provides the clarity when an imminent danger exists. A similar PI was submitted to 1.7.8.

Related Public Inputs for This Document

<table>
<thead>
<tr>
<th>Related Input</th>
<th>Relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Input No. 4-NFPA 1-2018 [New Section after 1.7.8]</td>
<td></td>
</tr>
<tr>
<td>Public Input No. 4-NFPA 1-2018 [New Section after 1.7.8]</td>
<td></td>
</tr>
</tbody>
</table>

Submitter Information Verification

Submitter Full Name: Anthony Apfelbeck
Organization: Altamonte Springs Building/Fire Safety Division
Street Address: 
City: 
State: 
Zip: 
Submittal Date: Mon Jan 22 13:26:54 EST 2018
Committee: 

Committee Statement

Resolution: FR-8-NFPA 1-2018
Statement: This revision clarifies the action permitted by the AHJ regarding the disconnection of utilities. As submitted, it could have been understood that the AHJ themselves was disconnecting the utilities.
TITLE OF NEW CONTENT
Type your content here ...
The Fire Marshal, or his/her designee, shall have the authority to authorize
disconnection of utility service to the building, space, structure or system regulated by this code and the
codes referenced in case of emergency where necessary to eliminate an immediate hazard to life or
property, or as otherwise authorized.

Statement of Problem and Substantiation for Public Input
On more than one occasion we have run into situations where we felt there was an immediate hazard to life or
property. In these cases we felt the best option would be to disconnect utilities. We were unable to do it because
the fire code does not specifically give that as an option. I feel if the code addresses it specifically it will give AHJ's
a much stronger foot to stand on.

Submitter Information Verification
Submitter Full Name: Tammy Zurla
Organization: Hillsborough County Fire Rescue
Street Address:
City:
State:
Zip:
Submital Date: Wed Jan 17 13:53:15 EST 2018
Committee:

Committee Statement
Resolution: FR-8-NFPA 1-2018
Statement: This revision clarifies the action permitted by the AHJ regarding the disconnection of utilities. As
submitted, it could have been understood that the AHJ themselves was disconnecting the utilities.
1.7.17.1 The AHJ shall have the authority to require standby fire personnel, emergency medical service personnel or an approved fire watch when potentially hazardous conditions or a reduction in a life safety feature exist due to the type of performance, display, exhibit, occupancy, contest, or activity; an impairment to a fire protection feature; or the number of persons present.

Statement of Problem and Substantiation for Public Input

While emergency medical service standby may be implied by section 1.7.17, it is not clearly called out. In addition, in many jurisdictions, EMS is not provided by the fire department so the umbrella of "fire personnel", in the existing language, would not apply to EMS personnel. In many large events or special events, the need for EMS personnel standby is greater than it is for fire standby. The code should clearly call out the authority of the AHJ to require such standby services.

Submitter Information Verification

Submitter Full Name: Anthony Apfelbeck
Organization: Altamonte Springs Building/Fire Safety Division
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jan 24 10:22:47 EST 2018
Committee:

Committee Statement

Resolution: FR-9-NFPA 1-2018
Statement: While emergency medical service standby may be implied by section 1.7.17, it is not clearly called out. In addition, in many jurisdictions, EMS is not provided by the fire department so the umbrella of "fire personnel", in the existing language, would not apply to EMS personnel. In many large events or special events, the need for EMS personnel standby is greater than it is for fire standby. The code should clearly call out the authority of the AHJ to require such standby services. The term 'emergency medical personnel' was added to the remaining sections in 1.7.17 for consistency.
1.11 Records and Reports.

1.11.1
A record of examinations, approvals, equivalencies, and alternates, permits, and inspection testing and maintenance reports shall be maintained by the AHJ and shall be available for public inspection during business hours in accordance with applicable laws.

1.11.1.1
Records shall be permitted to be submitted, stored, accessed and shared electronically on approved media and in an approved format. Data and records shall be secured from unconditional public access.

1.11.2
The AHJ shall keep a record of all fire prevention inspections, including the date of such inspections and a summary of any violations found to exist, the date of the services of notices, and a record of the final disposition of all violations.

1.11.3 Emergency Response Records.

1.11.3.1
The fire department shall keep a record of fire and other emergency responses occurring within its jurisdiction and of facts concerning the same, including statistics as to the extent and damage caused by such fires or emergencies.

1.11.3.2
The fire department shall report its incident record data, collected in accordance with 1.11.3, to the recognized state agency responsible for collecting such data.

1.11.4
All records required to be kept shall be maintained until their usefulness has been served or as required by law.

Statement of Problem and Substantiation for Public Input

ITM reporting for existing fire protection systems is an effective tool for some AHJs to track the maintenance and status of systems in their jurisdictions. The records and reports generated by contractors for building owners that are stored on site, or in a cloud should be secure and access to the documents remain open to meet open records laws, but the information contained within should be limited. Personal and other confidential information should be addressed. This PI uses some material from NFPA 25, NFPA 950 and NFPA 951, but none of these standards or guidelines have the exact language or are developed to extract at this time. The fire code needs to provide some limited guidance on how to handle electronic data, reports and other materials coming from electronic data submissions.

Related Public Inputs for This Document

<table>
<thead>
<tr>
<th>Related Input</th>
<th>Relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Input No. 146-NFPA 1-2018 [Section No. 13.1.6]</td>
<td></td>
</tr>
</tbody>
</table>

Submitter Information Verification

Submitter Full Name: Jeffrey Hugo
Organization: National Fire Sprinkler Associ
Affiliation: NFSA
Street Address:
City:
State:
<table>
<thead>
<tr>
<th>Committee Statement</th>
</tr>
</thead>
</table>

**Resolution:** Maintenance of inspection, testing and maintenance records is a responsibility of a building owner, not the AHJ. The Code should not mandate how to protect electronic records with a reference to NFPA 730/731 for data security. The proposed second sentence in Section 1.11.1.1 is not clear. Record retention may also be governed by local states and jurisdictions.
Public Input No. 20-NFPA 1-2018 [ New Section after 1.11.2 ]

Add a new section as follows:
1.11.3 The AHJ shall keep a record of all permits and plans reviewed, including the dates of such reviews and a summary of any comments, denials or approvals.

Statement of Problem and Substantiation for Public Input

Section 1.11.2 addresses records for inspections. However, there is no similar language in the 1.11 Records and Reports section addressing plan reviews or permits. This PI inserts a new section addressing records retention for these types of records.

Submitter Information Verification

Submitter Full Name: Anthony Apfelbeck
Organization: Altamonte Springs Building/Fire Safety Division
Street Address: City: State: Zip:
Submittal Date: Wed Jan 24 10:32:31 EST 2018
Committee:

Committee Statement

Resolution: FR-10-NFPA 1-2018
Statement: Section 1.11.2 addresses records for inspections. However, there is no similar language in the 1.11 Records and Reports section addressing plan reviews or permits. This PI inserts a new section addressing records retention for these types of records.
Permits shall be required in accordance with Table 1.12.8(a) through Table 1.12.8(d).

### Table 1.12.8(a) Permit Requirements

<table>
<thead>
<tr>
<th>Operations and Materials</th>
<th>Permit Required</th>
<th>Cross Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aerosol products</td>
<td>To store or handle an aggregate quantity of Level 2 or Level 3 aerosol products in excess of 500 lb (226.8 kg)</td>
<td>61.1.2</td>
</tr>
<tr>
<td>Aircraft fuel servicing</td>
<td>To provide aircraft fuel servicing</td>
<td>42.10.1.2</td>
</tr>
<tr>
<td>Aircraft hangars</td>
<td>For servicing or repairing aircraft</td>
<td>21.1.1</td>
</tr>
<tr>
<td>Aircraft refueling vehicles</td>
<td>To operate aircraft refueling vehicles</td>
<td>42.10.1.2</td>
</tr>
<tr>
<td>Airport terminal buildings</td>
<td>For construction and alteration</td>
<td>21.2.2.1</td>
</tr>
<tr>
<td>Ammonium nitrate</td>
<td>For storage</td>
<td>Chapter 74</td>
</tr>
<tr>
<td>Amusement parks</td>
<td>For construction, alteration, or operation of amusement park fire protection safety features</td>
<td>10.15.1</td>
</tr>
<tr>
<td>Asbestos removal</td>
<td>For the removal of asbestos</td>
<td>16.8.2</td>
</tr>
<tr>
<td>Automatic fire suppression systems</td>
<td>For installation, modification, or removal from service of any automatic fire suppression system*</td>
<td>13.1.1.1; 50.4.2</td>
</tr>
<tr>
<td>Automobile wrecking yards</td>
<td>To operate automobile wrecking yards</td>
<td>22.2</td>
</tr>
<tr>
<td>Automotive fuel servicing</td>
<td>To provide automotive fuel servicing</td>
<td>42.2.2.1; 42.11.2.2.4; 42.11.3.1</td>
</tr>
<tr>
<td>Battery systems</td>
<td>To install or operate stationary lead-acid battery systems having an electrolyte capacity of more than 100 gal (378.5 L) in sprinklered buildings or 50 gal (189.3 L) in nonsprinklered buildings</td>
<td>52.2</td>
</tr>
<tr>
<td>Candles, open flames, and portable cooking</td>
<td>To use in connection with assembly areas, dining areas of restaurants, or drinking establishments</td>
<td>17.3.2; 20.1.1.1</td>
</tr>
<tr>
<td>Carnivals and fairs</td>
<td>To conduct a carnival or fair</td>
<td>10.15.1</td>
</tr>
<tr>
<td>Cellulose nitrate film</td>
<td>To store, handle, use, or display</td>
<td>20.15.7.2</td>
</tr>
<tr>
<td>Cellulose nitrate plastic</td>
<td>To store or handle more than 25 lb (11.3 kg)</td>
<td>43.1.1.4</td>
</tr>
<tr>
<td>Change of occupancy</td>
<td>For the change of occupancy classification of an existing building</td>
<td>1.7.11.5</td>
</tr>
<tr>
<td>Cleanrooms</td>
<td>For construction, alteration, or operation</td>
<td>23.3</td>
</tr>
<tr>
<td>Combustible fibers</td>
<td>For storage or handling of combustible fibers greater than 100 ft³ (2.8 m³)</td>
<td>45.1.3</td>
</tr>
<tr>
<td>Combustible material storage</td>
<td>To store more than 2500 ft³ (70.8 m³) gross volume</td>
<td>10.19.2; 19.1.1; 31.2</td>
</tr>
<tr>
<td>Commercial rubbish-handling operation</td>
<td>To operate</td>
<td>19.1.1</td>
</tr>
<tr>
<td>Compressed gases</td>
<td>1. To store, use, or handle compressed gases in excess of the amounts listed in Table 1.12.8(b)</td>
<td>63.1.2</td>
</tr>
<tr>
<td></td>
<td>2. When the compressed gases in use or storage exceed the amounts listed in Table 1.12.8(b), a permit is required to install, repair damage to, abandon, remove, place temporarily out of service, close, or substantially modify a compressed gas system</td>
<td></td>
</tr>
</tbody>
</table>
3. For additional permit requirements for compressed gases facility closures, see 63.1.2

<table>
<thead>
<tr>
<th>Activity</th>
<th>Description</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction</td>
<td>For the construction of a building or structure</td>
<td>1.7.11.8</td>
</tr>
<tr>
<td>Covered mall buildings</td>
<td>Annual requirement for facilities that utilize mall area for exhibits or displays with 4 conditions</td>
<td>20.1.5.5.1</td>
</tr>
<tr>
<td>Crop maze</td>
<td>To operate a crop maze</td>
<td>10.14.11.1</td>
</tr>
<tr>
<td>Cryogens</td>
<td>To produce, store, or handle cryogens in excess of amounts listed in Table 1.12.8(c)</td>
<td>63.1.2</td>
</tr>
</tbody>
</table>

**Exception:** Where federal or state regulations apply or for fuel systems of a vehicle.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Description</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cutting and welding operation</td>
<td>For operations within a jurisdiction</td>
<td>41.1.5; 41.3.2.2; 41.3.2.2.2</td>
</tr>
<tr>
<td>Display fireworks (1.3G)</td>
<td>For possession, transportation, storage, manufacture, sale, handling, and discharge of display fireworks within the jurisdiction</td>
<td>65.2.3; 65.5.2</td>
</tr>
<tr>
<td>Drycleaning plants</td>
<td>To engage in business of drycleaning or to change to a more hazardous cleaning solvent</td>
<td>24.2</td>
</tr>
<tr>
<td>Dust-producing operations</td>
<td>To operate a grain elevator, flour mill, starch mill, feed mill, or plant pulverizing aluminum, coal, cocoa, magnesium, spices, sugar, or other similar combustible material</td>
<td>40.2</td>
</tr>
<tr>
<td>Energy storage systems, including battery stationary storage systems and capacitor energy storage systems</td>
<td>To install and operate energy storage systems exceeding Table 52; 1, 2.</td>
<td></td>
</tr>
</tbody>
</table>

1 and Table 52.

3.

1. Manufacture, sell, dispose, purchase, storage, use, possess, or transport of explosives within the jurisdiction | 65.9.2 |

2. For additional permit requirements for blasting operations, see 65.9.2

<table>
<thead>
<tr>
<th>Activity</th>
<th>Description</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fire alarm and detection systems and related equipment</td>
<td>For installation, modification, or removal from service of any fire alarm and detection systems and related equipment*</td>
<td>13.1.1.1</td>
</tr>
<tr>
<td>Fire apparatus access roads</td>
<td>For the construction of a fire apparatus access road</td>
<td>18.1.2</td>
</tr>
<tr>
<td>Fire hydrants and water-control valves</td>
<td>To use a fire hydrant or operate a water-control valve intended for fire suppression purposes</td>
<td>13.1.1.1</td>
</tr>
<tr>
<td>Fire pumps and related equipment</td>
<td>For installation, modification to, or removal from service of any fire pumps, jockey pumps, controllers, and generators*</td>
<td>13.1.1.1</td>
</tr>
<tr>
<td>Flame effects</td>
<td>Use of flame effects before an audience</td>
<td>65.4.2</td>
</tr>
<tr>
<td>Flammable and combustible liquids</td>
<td>1. To use or operate, repair, or modify a pipeline for the on-site transportation of flammable or combustible liquids</td>
<td>66.1.5</td>
</tr>
</tbody>
</table>

---

2. To store, handle, or use Class I liquids in excess of 5 gal (18.9 L) in a building or in excess of 10 gal (37.9 L) outside of a building

---

**Page 28 of 290**
**Exception to item (2): A permit is not required for the following:**

- (a) The storage or use of Class I liquids in the fuel tank of a motor vehicle, aircraft, motorboat, mobile power plant, or mobile heating plant unless such storage in the opinion of the chief would cause an unsafe condition
- (b) The storage or use of paints, oils, varnishes, or similar flammable mixtures when such liquids are stored for maintenance, painting, or similar purposes for a period of not more than 30 days

**3. To store, handle, or use Class II or Class III-A liquids in excess of 25 gal (94.6 L) in a building or in excess of 60 gal (227.1 L) outside a building**

**Exception to item (3): Fuel oil used in connection with oil-burning equipment**

- 4. To remove Class I or Class II liquids from an underground storage tank used for fueling motor vehicles by any means other than the approved, stationary on-site pumps normally used for dispensing purposes
- 5. To install, construct, alter, or operate tank vehicles, equipment, tanks, plants, terminals, wells, fuel-dispensing stations, refineries, distilleries, and similar facilities where flammable and combustible liquids are produced, processed, transported, stored, dispensed, or used
- 6. To install, alter, clean, repair, line with a protective coating, remove, abandon, place temporarily out of service, or otherwise dispose of a flammable or combustible liquid tank
- 7. To change the type of contents stored in a flammable or combustible liquid tank to a material other than those for which the tank was designed and constructed

### Fruit ripening
- To operate a fruit-ripening process 63.1.2

### General storage
- To store materials indoors or outdoors, representing a broad range of combustibles, including plastics, rubber tires, and roll paper 34.1.2

### Grandstands, bleachers, and folding and telescopic seating
- For construction, location, erection, or placement of grandstands, bleachers, and folding and telescopic seating 25.1.2

### Hazardous materials
- 1. To store, transport on site, dispense, use, or handle hazardous materials in excess of the amounts listed in Table 1.12.8(d) Chapter 60
- 2. To install, repair, abandon, remove, place temporarily out of service, close, or substantially modify a storage facility or other area regulated by Chapter 60 when the hazardous materials in use or storage exceed the amounts listed in Table 1.12.8(d)

### High-piled combustible storage
- To use any building or portion thereof as a high-piled storage area exceeding 500 ft² (46.45 m²) 20.15.8.2

### High-powered rocketry
- For the manufacture, sale, and use of high-powered rocketry 65.8.2; 65.7.2

### Hot work operations
- To conduct hot work 17.3.2; 41.1.5; 41.3.4
<table>
<thead>
<tr>
<th>Activity</th>
<th>Description</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Industrial ovens and furnaces</strong></td>
<td>For operation of industrial ovens and furnaces covered by Chapter 51</td>
<td>51.1.2</td>
</tr>
<tr>
<td>Laboratories</td>
<td>For construction, alteration, or operation</td>
<td>26.3</td>
</tr>
<tr>
<td><strong>Liquefied petroleum gases</strong></td>
<td>1. To store, use, handle, or dispense LP-Gas of 125 gal (0.5 m³) aggregate capacity or greater</td>
<td>42.11.2, 2.4</td>
</tr>
<tr>
<td></td>
<td>2. To install or modify LP-Gas systems</td>
<td>69.1.2</td>
</tr>
<tr>
<td><strong>Liquid- or gas-fueled vehicles</strong></td>
<td>To display, compete, or demonstrate liquid- or gas-fueled vehicles or equipment in assembly buildings</td>
<td>20.1.5.5.1</td>
</tr>
<tr>
<td><strong>Lumberyards and woodworking plants</strong></td>
<td>For storage of lumber exceeding 100,000 board ft</td>
<td>31.2</td>
</tr>
<tr>
<td><strong>Marijuana growing, processing, or extraction facilities</strong></td>
<td>For the construction, alteration, or operation of a marijuana growing, processing, or extraction facility</td>
<td>38.2</td>
</tr>
<tr>
<td><strong>Marine craft fuel servicing</strong></td>
<td>To provide marine craft fuel servicing</td>
<td>42.9.1.4</td>
</tr>
<tr>
<td><strong>Means of egress</strong></td>
<td>For the modification of a means of egress system in an existing building</td>
<td>1.7.11.6</td>
</tr>
<tr>
<td><strong>Membrane structures, tents, and canopies — permanent</strong></td>
<td>For construction, location, erection, or placement</td>
<td>25.1.2</td>
</tr>
<tr>
<td><strong>Membrane structures, tents, and canopies — temporary</strong></td>
<td>To erect or operate an air-supported temporary membrane structure or tent having an area in excess of 200 ft² (18.6 m²) or a canopy in excess of 400 ft² (37.2 m²)</td>
<td>25.1.2</td>
</tr>
<tr>
<td><strong>Mobile cooking operations</strong></td>
<td>To conduct mobile cooking operations</td>
<td>50.7</td>
</tr>
<tr>
<td><strong>Motion picture and television production studio soundstages and approved production facilities</strong></td>
<td>To design, construct, operate, and maintain soundstages and approved production facilities used in motion picture and television industry productions</td>
<td>32.2</td>
</tr>
<tr>
<td><strong>Oil- and gas-fueled heating appliances</strong></td>
<td>To install oil- and gas-fired heating appliances</td>
<td>11.5.1.8</td>
</tr>
<tr>
<td><strong>Open burning</strong></td>
<td>1. To conduct open burning</td>
<td>10.11.1</td>
</tr>
<tr>
<td></td>
<td>2. For additional permit requirements for open burning, see 10.11.1</td>
<td></td>
</tr>
<tr>
<td><strong>Open fires</strong></td>
<td>1. For kindling or maintaining an open fire</td>
<td>10.11.1</td>
</tr>
<tr>
<td></td>
<td>2. For additional permit requirements for open fires, see 10.11.4†</td>
<td></td>
</tr>
<tr>
<td><strong>Organic coatings</strong></td>
<td>For operation and maintenance of a facility that manufactures organic coatings</td>
<td>43.1.1.4</td>
</tr>
<tr>
<td><strong>Organic peroxide formulations</strong></td>
<td>To store, transport on site, use, or handle materials in excess of amounts listed in Tables 1.12.8(c) and (d)</td>
<td>Chapter 75</td>
</tr>
<tr>
<td><strong>Outside storage of tires</strong></td>
<td>To store more than 500 tires outside</td>
<td>33.1.2</td>
</tr>
<tr>
<td><strong>Oxidizers</strong></td>
<td>To store, transport on site, use, or handle materials in excess of amounts listed in Tables 1.12.8(c) and (d)</td>
<td>Chapter 70</td>
</tr>
<tr>
<td><strong>Parade floats</strong></td>
<td>To use a parade float for public performance, presentation, spectacle, entertainment, or parade</td>
<td>10.17.1</td>
</tr>
<tr>
<td><strong>Places of assembly</strong></td>
<td>To operate a place of assembly</td>
<td>10.15.1; 20.1.1.1</td>
</tr>
<tr>
<td><strong>Pyrotechnic articles</strong></td>
<td>For the manufacture, storage, sale, or use of pyrotechnic articles within the jurisdiction</td>
<td>65.2.3; 65.3.3; 65.5.2</td>
</tr>
<tr>
<td>Activity</td>
<td>Description</td>
<td>Code</td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>------------------------------------------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>Pyrotechnics before a proximate audience</td>
<td>For the display and use of pyrotechnic materials before a proximate audience</td>
<td>65.3.3</td>
</tr>
<tr>
<td>Pyroxylin plastics</td>
<td>For storage, handling, assembly, or manufacture of pyroxylin plastics</td>
<td>43.1.1.4</td>
</tr>
<tr>
<td>Private fire hydrants</td>
<td>For installation, modification, or removal from service of any private fire hydrants</td>
<td>13.1.1.1</td>
</tr>
<tr>
<td>Refrigeration equipment</td>
<td>To install or operate a mechanical refrigeration unit or system regulated by this Code</td>
<td>53.1.3</td>
</tr>
<tr>
<td>Repair garages and service stations</td>
<td>For operation of service stations and repair garages</td>
<td>30.1.1.3; 30.2.1.1</td>
</tr>
<tr>
<td>Rocketry manufacturing</td>
<td>For the manufacture of model rocket motors</td>
<td>65.7.2</td>
</tr>
<tr>
<td>Rooftop heliports</td>
<td>For construction, modification, or operation of a rooftop heliport</td>
<td>21.3.2.1</td>
</tr>
<tr>
<td>Solvent extraction</td>
<td>For storage, use, and handling</td>
<td>44.3</td>
</tr>
<tr>
<td>Spraying or dipping of flammable finish</td>
<td>For installation or modification of any spray room, spray booth, or preparation work station, or to conduct a spraying or dipping operation utilizing flammable or combustible liquids or powder coating</td>
<td>43.1.1.4</td>
</tr>
<tr>
<td>Standpipe systems</td>
<td>For installation, modification, or removal from service of any standpipe system *</td>
<td>13.1.1.1</td>
</tr>
<tr>
<td>Special outdoor events</td>
<td>For the location and operation of special outdoor events</td>
<td>10.15.1</td>
</tr>
<tr>
<td>Tar kettles</td>
<td>To place a tar kettle, a permit must be obtained prior to the placement of a tar kettle</td>
<td>16.7.1.2; 17.3.2</td>
</tr>
<tr>
<td>Tire storage</td>
<td>To use an open area or portion thereof to store tires in excess of 500 tires</td>
<td>33.1.2; 34.1.2</td>
</tr>
<tr>
<td>Torch-applied roofing operation</td>
<td>For the use of a torch for application of roofing materials</td>
<td>16.6.1</td>
</tr>
<tr>
<td>Water supply system for fire flow</td>
<td>For the construction of a water supply system for fire flow</td>
<td>18.1.2</td>
</tr>
<tr>
<td>Wildland fire–prone areas</td>
<td>For use of hazardous areas within fire-prone areas</td>
<td>17.3.2</td>
</tr>
<tr>
<td>Wood products</td>
<td>To store wood chips, hogged material, wood by-products, lumber, or plywood in excess of 200 ft³ (5.7 m³)</td>
<td>31.2</td>
</tr>
</tbody>
</table>

*Maintenance performed in accordance with this Code is not considered a modification and does not require a permit.
†Cooking and recreational fires are exempt and do not require a permit.

Table 1.12.8(b) Permit Amounts for Compressed Gases

<table>
<thead>
<tr>
<th>Type of Gas</th>
<th>Amount*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ft³</td>
</tr>
<tr>
<td>Corrosive</td>
<td>200</td>
</tr>
<tr>
<td>Flammable</td>
<td>200</td>
</tr>
<tr>
<td>Highly toxic</td>
<td>Any amount</td>
</tr>
<tr>
<td>Inert and simple asphyxiant</td>
<td>6000</td>
</tr>
<tr>
<td>Oxidizing (including oxygen)</td>
<td>504</td>
</tr>
<tr>
<td>Pyrophoric</td>
<td>Any amount</td>
</tr>
<tr>
<td>Toxic</td>
<td>Any amount</td>
</tr>
<tr>
<td>Unstable (reactive)</td>
<td>Any amount</td>
</tr>
</tbody>
</table>

Note: See Chapters 41, 42, 60, 63, and 69 for additional requirements and exceptions.

*Cubic feet measured at normal temperature and pressure.
### Table 1.12.8(d) Permit Amounts for Hazardous Materials

<table>
<thead>
<tr>
<th>Type of Material</th>
<th>Inside Building</th>
<th>Outside Building</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrosive</td>
<td>Over 1</td>
<td>Over 1</td>
</tr>
<tr>
<td>Flammable</td>
<td>Over 1</td>
<td>60</td>
</tr>
<tr>
<td>Toxic/highly toxic</td>
<td>Over 1</td>
<td>Over 1</td>
</tr>
<tr>
<td>Nonflammable</td>
<td>60</td>
<td>500</td>
</tr>
<tr>
<td>Oxidizer (includes oxygen)</td>
<td>10</td>
<td>50</td>
</tr>
</tbody>
</table>

Note: See Chapter 63.

<table>
<thead>
<tr>
<th>Type of Material</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cellulose nitrate</td>
<td>25 lb</td>
</tr>
<tr>
<td>Combustible fiber</td>
<td>100 ft³</td>
</tr>
<tr>
<td>Combustible liquids</td>
<td>See Table 1.12.8(a)</td>
</tr>
<tr>
<td>Corrosive gases</td>
<td>See Table 1.12.8(b)</td>
</tr>
<tr>
<td>Corrosive liquids</td>
<td>See Table 1.12.8(b)</td>
</tr>
<tr>
<td>Corrosive solids</td>
<td>55 gal</td>
</tr>
<tr>
<td>Corrosive solids</td>
<td>500 lb</td>
</tr>
<tr>
<td>Cryogens</td>
<td>See Table 1.12.8(c)</td>
</tr>
<tr>
<td>Display fireworks (1.3G)</td>
<td>Any amount</td>
</tr>
<tr>
<td>Explosives</td>
<td>Any amount</td>
</tr>
<tr>
<td>Flammable gases</td>
<td>See Table 1.12.8(b)</td>
</tr>
<tr>
<td>Flammable liquids</td>
<td>See Table 1.12.8(a)</td>
</tr>
<tr>
<td>Flammable solids</td>
<td>100 lb</td>
</tr>
<tr>
<td>Highly toxic gases</td>
<td>See Table 1.12.8(b)</td>
</tr>
<tr>
<td>Highly toxic liquids</td>
<td>See Table 1.12.8(b)</td>
</tr>
<tr>
<td>Highly toxic solids</td>
<td>See Table 1.12.8(b)</td>
</tr>
<tr>
<td>LP-Gas</td>
<td>See Table 1.12.8(b)</td>
</tr>
<tr>
<td>Nitrate film (cellulose)</td>
<td>Any amount</td>
</tr>
<tr>
<td>Organic peroxides:</td>
<td>See Table 1.12.8(a)</td>
</tr>
<tr>
<td>Class I</td>
<td>Any amount</td>
</tr>
<tr>
<td>Class II</td>
<td>Any amount</td>
</tr>
<tr>
<td>Class III</td>
<td>10 lb</td>
</tr>
<tr>
<td>Class IV</td>
<td>20 lb</td>
</tr>
<tr>
<td>Class V</td>
<td>Not required</td>
</tr>
<tr>
<td>Unclassified detonable</td>
<td>Any amount</td>
</tr>
<tr>
<td>Oxidizing gases</td>
<td>See Table 1.12.8(b)</td>
</tr>
<tr>
<td>Oxidizing liquids:</td>
<td>See Table 1.12.8(a)</td>
</tr>
<tr>
<td>Class 4</td>
<td>Any amount</td>
</tr>
<tr>
<td>Class 3</td>
<td>1 gal</td>
</tr>
<tr>
<td>Class 2</td>
<td>10 gal</td>
</tr>
<tr>
<td>Class 1</td>
<td>55 gal</td>
</tr>
<tr>
<td>Oxidizing solids:</td>
<td>See Table 1.12.8(a)</td>
</tr>
<tr>
<td>Class 4</td>
<td>Any amount</td>
</tr>
<tr>
<td>Class 3</td>
<td>10 lb</td>
</tr>
<tr>
<td>Class 2</td>
<td>100 lb</td>
</tr>
<tr>
<td>Class 1</td>
<td>500 lb</td>
</tr>
</tbody>
</table>

Page 32 of 290
<table>
<thead>
<tr>
<th>Type of Material</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pyrophoric gases</td>
<td>See Table 1.12.8(b)</td>
</tr>
<tr>
<td>Pyrophoric liquids</td>
<td>Any amount</td>
</tr>
<tr>
<td>Pyrophoric solids</td>
<td>Any amount</td>
</tr>
<tr>
<td>Toxic gases</td>
<td>See Table 1.12.8(b)</td>
</tr>
<tr>
<td>Toxic liquids</td>
<td>10 gal</td>
</tr>
<tr>
<td></td>
<td>38 L</td>
</tr>
<tr>
<td>Toxic solids</td>
<td>100 lb</td>
</tr>
<tr>
<td></td>
<td>45 kg</td>
</tr>
<tr>
<td>Unstable (reactive) gases</td>
<td>See Table 1.12.8(b)</td>
</tr>
<tr>
<td>Unstable (reactive) liquids:</td>
<td></td>
</tr>
<tr>
<td>Class 4</td>
<td>Any amount</td>
</tr>
<tr>
<td>Class 3</td>
<td>Any amount</td>
</tr>
<tr>
<td>Class 2</td>
<td>5 gal</td>
</tr>
<tr>
<td></td>
<td>19 L</td>
</tr>
<tr>
<td>Class 1</td>
<td>10 gal</td>
</tr>
<tr>
<td></td>
<td>38 L</td>
</tr>
<tr>
<td>Unstable (reactive) solids:</td>
<td></td>
</tr>
<tr>
<td>Class 4</td>
<td>Any amount</td>
</tr>
<tr>
<td>Class 3</td>
<td>Any amount</td>
</tr>
<tr>
<td>Class 2</td>
<td>50 lb</td>
</tr>
<tr>
<td></td>
<td>22.7 kg</td>
</tr>
<tr>
<td>Class 1</td>
<td>100 lb</td>
</tr>
<tr>
<td></td>
<td>45 kg</td>
</tr>
<tr>
<td>Water reactive liquids:</td>
<td></td>
</tr>
<tr>
<td>Class 3</td>
<td>Any amount</td>
</tr>
<tr>
<td>Class 2</td>
<td>5 gal</td>
</tr>
<tr>
<td></td>
<td>19 L</td>
</tr>
<tr>
<td>Class 1</td>
<td>10 gal</td>
</tr>
<tr>
<td></td>
<td>38 L</td>
</tr>
<tr>
<td>Water reactive solids:</td>
<td></td>
</tr>
<tr>
<td>Class 3</td>
<td>Any amount</td>
</tr>
<tr>
<td>Class 2</td>
<td>50 lb</td>
</tr>
<tr>
<td></td>
<td>22.7 kg</td>
</tr>
<tr>
<td>Class 1</td>
<td>100 lb</td>
</tr>
<tr>
<td></td>
<td>45 kg</td>
</tr>
</tbody>
</table>

Note: See Chapter 60 for additional requirements and exceptions.

Statement of Problem and Substantiation for Public Input

The purpose of this proposal is to correlate NFPA Energy Storage System requirements with the new NFPA 855, Standard for the Installation of Stationary Energy Storage Systems.

Related Public Inputs for This Document

<table>
<thead>
<tr>
<th>Related Input</th>
<th>Relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Input No. 131-NFPA 1-2018 [Section No. 52.1]</td>
<td>Part of ESS related package</td>
</tr>
</tbody>
</table>

Submitter Information Verification

Submitter Full Name: Robert Davidson
Committee Statement

Resolution: CI-35-NFPA 1-2018
Statement: NFPA 855 is not complete but will be by NFPA 1 second draft meeting. This will allow the material to be extracted at the second draft meeting.
Permits shall be required in accordance with Table 1.12.8(a) through Table 1.12.8(d).

### Table 1.12.8(a) Permit Requirements

<table>
<thead>
<tr>
<th>Operations and Materials</th>
<th>Permit Required</th>
<th>Cross Reference Section Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aerosol products</td>
<td>To store or handle an aggregate quantity of Level 2 or Level 3 aerosol products in excess of 500 lb (226.8 kg)</td>
<td>61.1.2</td>
</tr>
<tr>
<td>Aircraft fuel servicing</td>
<td>To provide aircraft fuel servicing</td>
<td>42.10.1.2</td>
</tr>
<tr>
<td>Aircraft hangars</td>
<td>For servicing or repairing aircraft</td>
<td>21.1.1</td>
</tr>
<tr>
<td>Aircraft refueling vehicles</td>
<td>To operate aircraft refueling vehicles</td>
<td>42.10.1.2</td>
</tr>
<tr>
<td>Airport terminal buildings</td>
<td>For construction and alteration</td>
<td>21.2.2.1</td>
</tr>
<tr>
<td>Ammonium nitrate</td>
<td>For storage</td>
<td>Chapter 74</td>
</tr>
<tr>
<td>Amusement parks</td>
<td>For construction, alteration, or operation of amusement park fire protection safety features</td>
<td>10.15.1</td>
</tr>
<tr>
<td>Asbestos removal</td>
<td>For the removal of asbestos</td>
<td>16.8.2</td>
</tr>
<tr>
<td>Automatic fire suppression systems</td>
<td>For installation, modification, or removal from service of any automatic fire suppression system*</td>
<td>13.1.1.1; 50.4.2</td>
</tr>
<tr>
<td>Automobile wrecking yards</td>
<td>To operate automobile wrecking yards</td>
<td>22.2</td>
</tr>
<tr>
<td>Automotive fuel servicing</td>
<td>To provide automotive fuel servicing</td>
<td>42.2.2.1; 42.11.2.2.4; 42.11.3.1</td>
</tr>
<tr>
<td>Battery systems</td>
<td>To install or operate stationary lead-acid battery systems having an electrolyte capacity of more than 100 gal (378.5 L) in sprinklered buildings or 50 gal (189.3 L) in nonsprinklered buildings</td>
<td>52.2</td>
</tr>
<tr>
<td>Candles, open flames, and portable cooking</td>
<td>To use in connection with assembly areas, dining areas of restaurants, or drinking establishments</td>
<td>17.3.2; 20.1.1.1</td>
</tr>
<tr>
<td>Carnivals and fairs</td>
<td>To conduct a carnival or fair</td>
<td>10.15.1</td>
</tr>
<tr>
<td>Cellulose nitrate film</td>
<td>To store, handle, use, or display</td>
<td>20.15.7.2</td>
</tr>
<tr>
<td>Cellulose nitrate plastic</td>
<td>To store or handle more than 25 lb (11.3 kg)</td>
<td>43.1.1.4</td>
</tr>
<tr>
<td>Change of occupancy</td>
<td>For the change of occupancy classification of an existing building</td>
<td>1.7.11.5</td>
</tr>
<tr>
<td>Cleanrooms</td>
<td>For construction, alteration, or operation</td>
<td>23.3</td>
</tr>
<tr>
<td>Combustible fibers</td>
<td>For storage or handling of combustible fibers greater than 100 ft³ (2.8 m³)</td>
<td>45.1.3</td>
</tr>
<tr>
<td>Combustible material storage</td>
<td>To store more than 2500 ft³ (70.8 m³) gross volume</td>
<td>10.19.2; 19.1.1; 31.2</td>
</tr>
<tr>
<td>Commercial rubbish-handling operation</td>
<td>To operate</td>
<td>19.1.1</td>
</tr>
<tr>
<td>Compressed gases</td>
<td>1. To store, use, or handle compressed gases in excess of the amounts listed in Table 1.12.8(b)</td>
<td>63.1.2</td>
</tr>
<tr>
<td>Operations and Materials</td>
<td>Permit Required</td>
<td>Cross Reference</td>
</tr>
<tr>
<td>-------------------------------------------------</td>
<td>---------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Construction</td>
<td>For the construction of a building or structure</td>
<td>1.7.11.8</td>
</tr>
<tr>
<td>Covered mall buildings</td>
<td>Annual requirement for facilities that utilize mall area for exhibits or displays with 4 conditions</td>
<td>20.1.5.5.1</td>
</tr>
<tr>
<td>Crop maze</td>
<td>To operate a crop maze</td>
<td>10.14.11.1</td>
</tr>
<tr>
<td>Cryogens</td>
<td>To produce, store, or handle cryogens in excess of amounts listed in Table 1.12.8(c)</td>
<td>63.1.2</td>
</tr>
<tr>
<td>Cutting and welding operation</td>
<td>For operations within a jurisdiction</td>
<td>41.1.5; 41.3.2.2; 41.3.2.2.2</td>
</tr>
<tr>
<td>Display fireworks (1.3G)</td>
<td>For possession, transportation, storage, manufacture, sale, handling, and discharge of display fireworks within the jurisdiction</td>
<td>65.2.3; 65.5.2</td>
</tr>
<tr>
<td>Drycleaning plants</td>
<td>To engage in business of drycleaning or to change to a more hazardous cleaning solvent</td>
<td>24.2</td>
</tr>
<tr>
<td>Dust-producing operations</td>
<td>To operate a grain elevator, flour mill, starch mill, feed mill, or plant pulverizing aluminum, coal, cocoa, magnesium, spices, sugar, or other similar combustible material</td>
<td>40.2</td>
</tr>
<tr>
<td>Energy storage systems, including battery stationary storage systems and capacitor energy storage systems</td>
<td>To install and operate energy storage systems exceeding Table 52.2.1 and Table 52.3.1</td>
<td>52.1.2</td>
</tr>
<tr>
<td>Exhibit and trade shows</td>
<td>For operation of all exhibits and trade shows held within a jurisdiction</td>
<td>20.1.5.5.1</td>
</tr>
<tr>
<td>Explosives</td>
<td>1. Manufacture, sell, dispose, purchase, storage, use, possess, or transport of explosives within the jurisdiction</td>
<td>65.9.2</td>
</tr>
<tr>
<td>Fire alarm and detection systems and related equipment</td>
<td>For installation, modification, or removal from service of any fire alarm and detection systems and related equipment</td>
<td>13.1.1.1</td>
</tr>
</tbody>
</table>

2. When the compressed gases in use or storage exceed the amounts listed in Table 1.12.8(b), a permit is required to install, repair damage to, abandon, remove, place temporarily out of service, close, or substantially modify a compressed gas system.

3. For additional permit requirements for compressed gases facility closures, see 63.1.2.
<table>
<thead>
<tr>
<th>Operations and Materials</th>
<th>Permit Required</th>
<th>Cross Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fire apparatus access roads</td>
<td>For the construction of a fire apparatus access road</td>
<td>18.1.2</td>
</tr>
<tr>
<td>Fire hydrants and water-control valves</td>
<td>To use a fire hydrant or operate a water-control valve intended for fire suppression purposes</td>
<td>13.1.1.1</td>
</tr>
<tr>
<td>Fire pumps and related equipment</td>
<td>For installation of, modification to, or removal from service of any fire pumps, jockey pumps, controllers, and generators*</td>
<td>13.1.1.1</td>
</tr>
<tr>
<td>Flame effects</td>
<td>Use of flame effects before an audience</td>
<td>65.4.2</td>
</tr>
<tr>
<td>Flammable and combustible liquids</td>
<td>1. To use or operate, repair, or modify a pipeline for the on-site transportation of flammable or combustible liquids</td>
<td>66.1.5</td>
</tr>
<tr>
<td></td>
<td>2. To store, handle, or use Class I liquids in excess of 5 gal (18.9 L) in a building or in excess of 10 gal (37.9 L) outside of a building</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Exception to item (2): A permit is not required for the following:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(a) The storage or use of Class I liquids in the fuel tank of a motor vehicle, aircraft, motorboat, mobile power plant, or mobile heating plant unless such storage in the opinion of the chief would cause an unsafe condition</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(b) The storage or use of paints, oils, varnishes, or similar flammable mixtures when such liquids are stored for maintenance, painting, or similar purposes for a period of not more than 30 days</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. To store, handle, or use Class II or Class III-A liquids in excess of 25 gal (94.6 L) in a building or in excess of 60 gal (227.1 L) outside a building</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Exception to item (3): Fuel oil used in connection with oil-burning equipment</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. To remove Class I or Class II liquids from an underground storage tank used for fueling motor vehicles by any means other than the approved, stationary on-site pumps normally used for dispensing purposes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5. To install, construct, alter, or operate tank vehicles, equipment, tanks, plants, terminals, wells, fuel-dispensing stations, refineries, distilleries, and similar facilities where flammable and combustible liquids are produced, processed, transported, stored, dispensed, or used</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6. To install, alter, clean, repair, line with a protective coating, remove, abandon, place temporarily out of service, or otherwise dispose of a flammable or combustible liquid tank</td>
<td></td>
</tr>
<tr>
<td>Operations and Materials</td>
<td>Permit Required</td>
<td>Cross Reference</td>
</tr>
<tr>
<td>--------------------------</td>
<td>---------------------------------------------------------------------------------</td>
<td>-----------------</td>
</tr>
<tr>
<td>Fruit ripening</td>
<td>To operate a fruit-ripening process</td>
<td>63.1.2</td>
</tr>
<tr>
<td>General storage</td>
<td>To store materials indoors or outdoors, representing a broad range of combustibles, including plastics, rubber tires, and roll paper</td>
<td>34.1.2</td>
</tr>
<tr>
<td>Grandstands, bleachers, and folding and telescopic seating</td>
<td>For construction, location, erection, or placement of grandstands, bleachers, and folding and telescopic seating</td>
<td>25.1.2</td>
</tr>
<tr>
<td>Hazardous materials</td>
<td>1. To store, transport on site, dispense, use, or handle hazardous materials in excess of the amounts listed in Table 1.12.8(d)</td>
<td>Chapter 60</td>
</tr>
<tr>
<td></td>
<td>2. To install, repair, abandon, remove, place temporarily out of service, close, or substantially modify a storage facility or other area regulated by Chapter 60 when the hazardous materials in use or storage exceed the amounts listed in Table 1.12.8(d)</td>
<td></td>
</tr>
<tr>
<td>High-piled combustible storage</td>
<td>To use any building or portion thereof as a high-piled storage area exceeding 500 ft² (46.45 m²)</td>
<td>20.15.8.2</td>
</tr>
<tr>
<td>High-powered rocketry</td>
<td>For the manufacture, sale, and use of high-powered rocketry</td>
<td>65.8.2; 65.7.2</td>
</tr>
<tr>
<td>Hot work operations</td>
<td>To conduct hot work</td>
<td>17.3.2; 41.1.5; 41.3.4</td>
</tr>
<tr>
<td>Industrial ovens and furnaces</td>
<td>For operation of industrial ovens and furnaces covered by Chapter 51</td>
<td>51.1.2</td>
</tr>
<tr>
<td>Laboratories</td>
<td>For construction, alteration, or operation</td>
<td>26.3</td>
</tr>
<tr>
<td>Liquefied petroleum gases</td>
<td>1. To store, use, handle, or dispense LP-Gas of 125 gal (0.5 m³) (water capacity) aggregate capacity or greater</td>
<td>42.11.2.2.4</td>
</tr>
<tr>
<td></td>
<td>2. To install or modify LP-Gas systems</td>
<td>69.1.2</td>
</tr>
<tr>
<td>Liquid- or gas-fueled vehicles</td>
<td>To display, compete, or demonstrate liquid- or gas-fueled vehicles or equipment in assembly buildings</td>
<td>20.1.5.5.1</td>
</tr>
<tr>
<td>Lumberyards and woodworking plants</td>
<td>For storage of lumber exceeding 100,000 board ft</td>
<td>31.2</td>
</tr>
<tr>
<td>Marijuana growing, processing, or extraction facilities</td>
<td>For the construction, alteration, or operation of a marijuana growing, processing, or extraction facility</td>
<td>38.2</td>
</tr>
<tr>
<td>Marine craft fuel servicing</td>
<td>To provide marine craft fuel servicing</td>
<td>42.9.1.4</td>
</tr>
<tr>
<td>Means of egress</td>
<td>For the modification of a means of egress in an existing building</td>
<td>1.7.11.6</td>
</tr>
<tr>
<td>Operations and Materials</td>
<td>Permit Required</td>
<td>Cross Reference</td>
</tr>
<tr>
<td>----------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------</td>
<td>--------------------------------</td>
</tr>
<tr>
<td>Membrane structures, tents, and canopies — permanent</td>
<td>For construction, location, erection, or placement</td>
<td>25.1.2</td>
</tr>
</tbody>
</table>
| Membrane structures, tents, and canopies — temporary     | To erect or operate an air-supported temporary membrane structure or tent having an area in excess of 200 ft² (18.6 m²) or a canopy in excess of 400 ft² (37.2 m²)  
  *Exception: Temporary membrane structures, tents, or canopy structures used exclusively for camping.* | 25.1.2                        |
| Mobile cooking operations                                | To conduct mobile cooking operations                                            | 50.7                          |
| Motion picture and television production studio soundstages and approved production facilities | To design, construct, operate, and maintain soundstages and approved production facilities used in motion picture and television industry productions | 32.2                          |
| Oil- and gas-fueled heating appliances                   | To install oil- and gas-fired heating appliances                                 | 11.5.1.8                      |
| Open burning                                             | 1. To conduct open burning                                                      | 10.11.1                       |
|                                                          | 2. For additional permit requirements                                           |                               |
|                                                          | For open burning, see 10.11.1                                                  |                               |
| Open fires                                               | 1. For kindling or maintaining an open fire                                     | 10.11.1                       |
|                                                          | 2. For additional permit requirements                                           |                               |
|                                                          | For open fires, see 10.11.4†                                                  |                               |
| Organic coatings                                         | For operation and maintenance of a facility that manufactures organic coatings  | 43.1.1.4                      |
| Organic peroxide formulations                            | To store, transport on site, use, or handle materials in excess of amounts listed in Tables 1.12.8(c) and (d) | Chapter 75                    |
| Outside storage of tires                                 | To store more than 500 tires outside                                           | 33.1.2                        |
| Oxidizers                                                | To store, transport on site, use, or handle materials in excess of amounts listed in Tables 1.12.8(c) and (d) | Chapter 70                    |
| Parade floats                                            | To use a parade float for public performance, presentation, spectacle, entertainment, or parade | 10.17.1                       |
| Places of assembly                                       | To operate a place of assembly                                                 | 10.15.1; 20.1.1.1             |
| Pyrotechnic articles                                     | For the manufacture, storage, sale, or use of pyrotechnic articles within the jurisdiction | 65.2.3; 65.3.3; 65.5.2         |
| Pyrotechnics before a proximate audience                | For the display and use of pyrotechnic materials before a proximate audience  | 65.3.3                        |
| Pyroxylin plastics                                       | For storage, handling, assembly, or manufacture of pyroxylin plastics          | 43.1.1.4                      |
### Operations and Materials

<table>
<thead>
<tr>
<th>Operations and Materials</th>
<th>Permit Required</th>
<th>Cross Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private fire hydrants</td>
<td>For installation, modification, or removal from service of any private fire hydrants</td>
<td>13.1.1.1</td>
</tr>
<tr>
<td>Refrigeration equipment</td>
<td>To install or operate a mechanical refrigeration unit or system regulated by this Code</td>
<td>53.1.3</td>
</tr>
<tr>
<td>Repair garages and service stations</td>
<td>For operation of service stations and repair garages</td>
<td>30.1.1.3; 30.2.1.1</td>
</tr>
<tr>
<td>Rocketry manufacturing</td>
<td>For the manufacture of model rocket motors</td>
<td>65.7.2</td>
</tr>
<tr>
<td>Rooftop heliports</td>
<td>For construction, modification, or operation of a rooftop heliport</td>
<td>21.3.2.1</td>
</tr>
<tr>
<td>Solvent extraction</td>
<td>For storage, use, and handling</td>
<td>44.3</td>
</tr>
<tr>
<td>Spraying or dipping of flammable finish</td>
<td>For installation or modification of any spray room, spray booth, or preparation work station, or to conduct a spraying or dipping operation utilizing flammable or combustible liquids or powder coating</td>
<td>43.1.1.4</td>
</tr>
<tr>
<td>Standpipe systems</td>
<td>For installation, modification, or removal from service of any standpipe system*</td>
<td>13.1.1.1</td>
</tr>
<tr>
<td>Special outdoor events</td>
<td>For the location and operation of special outdoor events</td>
<td>10.15.1</td>
</tr>
<tr>
<td>Tar kettles</td>
<td>To place a tar kettle, a permit must be obtained prior to the placement of a tar kettle</td>
<td>16.7.1.2; 17.3.2</td>
</tr>
<tr>
<td>Tire storage</td>
<td>To use an open area or portion thereof to store tires in excess of 500 tires</td>
<td>33.1.2; 34.1.2</td>
</tr>
<tr>
<td>Torch-applied roofing operation</td>
<td>For the use of a torch for application of roofing materials</td>
<td>16.6.1</td>
</tr>
<tr>
<td>Valet trash collection service</td>
<td>For the operation of service that collects valet trash collection</td>
<td>10.19.1</td>
</tr>
<tr>
<td>Water supply system for fire flow</td>
<td>For the construction of a water supply system for fire flow</td>
<td>18.1.2</td>
</tr>
<tr>
<td>Wildland fire-prone areas</td>
<td>For use of hazardous areas within fire-prone areas</td>
<td>17.3.2</td>
</tr>
<tr>
<td>Wood products</td>
<td>To store wood chips, hogged material, wood by-products, lumber, or plywood in excess of 200 ft³ (5.7 m³)</td>
<td>31.2</td>
</tr>
</tbody>
</table>

*Maintenance performed in accordance with this Code is not considered a modification and does not require a permit.

†Cooking and recreational fires are exempt and do not require a permit.

Table 1.12.8(b) Permit Amounts for Compressed Gases

<table>
<thead>
<tr>
<th>Type of Gas</th>
<th>Amount*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ft³</td>
</tr>
<tr>
<td>Corrosive</td>
<td>200</td>
</tr>
<tr>
<td>Flammable</td>
<td>200</td>
</tr>
</tbody>
</table>
### Table 1.12.8(c) Permit Amounts for Cryogens

<table>
<thead>
<tr>
<th>Type of Gas</th>
<th>Inside Building</th>
<th>Outside Building</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highly toxic</td>
<td>Any amount</td>
<td></td>
</tr>
<tr>
<td>Inert and simple asphyxiant</td>
<td>6000 ft³, 169.9 m³</td>
<td></td>
</tr>
<tr>
<td>Oxidizing (including oxygen)</td>
<td>504 ft³, 14.3 m³</td>
<td></td>
</tr>
<tr>
<td>Pyrophoric</td>
<td>Any amount</td>
<td></td>
</tr>
<tr>
<td>Toxic</td>
<td>Any amount</td>
<td></td>
</tr>
<tr>
<td>Unstable (reactive)</td>
<td>Any amount</td>
<td></td>
</tr>
</tbody>
</table>

Note: See Chapters 41, 42, 60, 63, and 69 for additional requirements and exceptions.

* Cubic feet measured at normal temperature and pressure.

### Table 1.12.8(d) Permit Amounts for Hazardous Materials

<table>
<thead>
<tr>
<th>Type of Material</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cellulose nitrate</td>
<td>25 lb</td>
</tr>
<tr>
<td>Combustible fiber</td>
<td>100 ft³</td>
</tr>
<tr>
<td>Combustible liquids</td>
<td>See Table 1.12.8(a)</td>
</tr>
<tr>
<td>Corrosive gases</td>
<td>See Table 1.12.8(b)</td>
</tr>
<tr>
<td>Corrosive liquids</td>
<td>55 gal</td>
</tr>
<tr>
<td>Corrosive solids</td>
<td>500 lb</td>
</tr>
<tr>
<td>Cryogens</td>
<td>See Table 1.12.8(c)</td>
</tr>
<tr>
<td>Display fireworks (1.3G)</td>
<td>Any amount</td>
</tr>
<tr>
<td>Explosives</td>
<td>Any amount</td>
</tr>
<tr>
<td>Flammable gases</td>
<td>See Table 1.12.8(b)</td>
</tr>
<tr>
<td>Flammable liquids</td>
<td>See Table 1.12.8(a)</td>
</tr>
<tr>
<td>Flammable solids</td>
<td>100 lb</td>
</tr>
<tr>
<td>Highly toxic gases</td>
<td>See Table 1.12.8(b)</td>
</tr>
<tr>
<td>Highly toxic liquids</td>
<td>Any amount</td>
</tr>
<tr>
<td>Highly toxic solids</td>
<td>Any amount</td>
</tr>
<tr>
<td>LP-Gas</td>
<td>See Table 1.12.8(b)</td>
</tr>
<tr>
<td>Nitrate film (cellulose)</td>
<td>Any amount</td>
</tr>
<tr>
<td>Organic peroxides:</td>
<td>See Table 1.12.8(a)</td>
</tr>
<tr>
<td>Class I</td>
<td>Any amount</td>
</tr>
<tr>
<td>Class II</td>
<td>Any amount</td>
</tr>
<tr>
<td>Class III</td>
<td>10 lb</td>
</tr>
<tr>
<td>Class IV</td>
<td>20 lb</td>
</tr>
<tr>
<td>Class V</td>
<td>Not required</td>
</tr>
<tr>
<td>Unclassified detonable</td>
<td>Any amount</td>
</tr>
<tr>
<td>Type of Material</td>
<td>U.S. Unit</td>
</tr>
<tr>
<td>----------------------------------------</td>
<td>-----------</td>
</tr>
<tr>
<td>Oxidizing gases</td>
<td></td>
</tr>
<tr>
<td>Oxidizing liquids:</td>
<td></td>
</tr>
<tr>
<td>Class 4</td>
<td></td>
</tr>
<tr>
<td>Class 3</td>
<td>1 gal</td>
</tr>
<tr>
<td>Class 2</td>
<td>10 gal</td>
</tr>
<tr>
<td>Class 1</td>
<td>55 gal</td>
</tr>
<tr>
<td>Oxidizing solids:</td>
<td></td>
</tr>
<tr>
<td>Class 4</td>
<td></td>
</tr>
<tr>
<td>Class 3</td>
<td>10 lb</td>
</tr>
<tr>
<td>Class 2</td>
<td>100 lb</td>
</tr>
<tr>
<td>Class 1</td>
<td>500 lb</td>
</tr>
<tr>
<td>Pyrophoric gases</td>
<td></td>
</tr>
<tr>
<td>Pyrophoric liquids</td>
<td></td>
</tr>
<tr>
<td>Pyrophoric solids</td>
<td></td>
</tr>
<tr>
<td>Toxic gases</td>
<td></td>
</tr>
<tr>
<td>Toxic liquids</td>
<td>10 gal</td>
</tr>
<tr>
<td>Toxic solids</td>
<td>100 lb</td>
</tr>
<tr>
<td>Unstable (reactive) gases</td>
<td></td>
</tr>
<tr>
<td>Unstable (reactive) liquids:</td>
<td></td>
</tr>
<tr>
<td>Class 4</td>
<td></td>
</tr>
<tr>
<td>Class 3</td>
<td></td>
</tr>
<tr>
<td>Class 2</td>
<td>5 gal</td>
</tr>
<tr>
<td>Class 1</td>
<td>10 gal</td>
</tr>
<tr>
<td>Unstable (reactive) solids:</td>
<td></td>
</tr>
<tr>
<td>Class 4</td>
<td></td>
</tr>
<tr>
<td>Class 3</td>
<td></td>
</tr>
<tr>
<td>Class 2</td>
<td>50 lb</td>
</tr>
<tr>
<td>Class 1</td>
<td>100 lb</td>
</tr>
<tr>
<td>Water reactive liquids</td>
<td></td>
</tr>
<tr>
<td>Class 3</td>
<td></td>
</tr>
<tr>
<td>Class 2</td>
<td>5 gal</td>
</tr>
<tr>
<td>Class 1</td>
<td>10 gal</td>
</tr>
<tr>
<td>Water reactive solids</td>
<td></td>
</tr>
<tr>
<td>Class 3</td>
<td></td>
</tr>
<tr>
<td>Class 2</td>
<td>50 lb</td>
</tr>
<tr>
<td>Class 1</td>
<td>100 lb</td>
</tr>
</tbody>
</table>

Note: See Chapter 60 for additional requirements and exceptions.

Statement of Problem and Substantiation for Public Input

This PI addresses the permit requirements referenced in PI 77. The underline of the language other than for valet trash service is an error by TerraView.

Related Public Inputs for This Document

<table>
<thead>
<tr>
<th>Related Input</th>
<th>Relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Input No. 77-NFPA 1-2018 [New Section after 10.18.7]</td>
<td>Core Code Language</td>
</tr>
<tr>
<td>Public Input No. 79-NFPA 1-2018 [New Section after 3.3.282]</td>
<td>Definition</td>
</tr>
</tbody>
</table>
Submitter Information Verification

Submitter Full Name: Anthony Apfelbeck
Organization: Altamonte Springs Building/Fire Safety Division
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jun 18 14:19:54 EDT 2018
Committee:

Committee Statement

Resolution: FR-60-NFPA 1-2018
Statement: Adding permitting requirements corresponding to new sections on valet trash, additive manufacturing and on demand fuel delivery. Further changes will be made at the Second Draft stage as needed.
2.3.6 ASTM Publications.
ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959.


ASTM D323, Standard Method of Test for Vapor Pressure of Petroleum Products (Reid Method), 2015a.


ASTM E2174, Standard Practice for On-Site Inspection of Installed Fire Stops, 2014b.
Statement of Problem and Substantiation for Public Input

date updates

Submitter Information Verification

Submitter Full Name: Marcelo Hirschler
Organization: GBH International
Street Address: 
City: 
State: 
Zip: 
Submittal Date: Fri Jun 01 17:37:55 EDT 2018
Committee:

Committee Statement

Resolution: CI-52-NFPA 1-2018
Statement: This Committee Input incorporates the referenced updates that were received in public inputs in addition to newly referenced documents as a result of pending First Revisions. The Technical Committee will review the edition date of the referenced publications in Section 2.3 at the Second Draft stage and update to the most current edition as necessary.
Public Input No. 64-NFPA 1-2018 [Section No. 2.3.11]

2.3.11 IIAR Publications.

International Institute of Ammonia Refrigeration, 1001 N. Fairfax Street, Suite 503, Alexandria, VA 22314.


Statement of Problem and Substantiation for Public Input

Updates NFPA 1 to the latest IIAR standards and adds IIAR 6 and 9, which are nearly complete.

Related Public Inputs for This Document

<table>
<thead>
<tr>
<th>Related Input</th>
<th>Relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Input No. 62-NFPA 1-2018 [Chapter 53]</td>
<td></td>
</tr>
</tbody>
</table>

Submitter Information Verification

Submitter Full Name: Jeffrey Shapiro
Organization: International Code Consultants
Affiliation: International Institute of Ammonia Refrigeration
Street Address: 
City: 
State: 
Zip: 
Submittal Date: Wed May 30 18:08:04 EDT 2018
Committee: 

Committee Statement

Resolution: CI-52-NFPA 1-2018
Statement: This Committee Input incorporates the referenced updates that were received in public inputs in addition to newly referenced documents as a result of pending First Revisions. The Technical Committee will review the edition date of the referenced publications in Section 2.3 at the Second Draft stage and update to the most current edition as necessary.
2.3.17 UL Publications.
Underwriters Laboratories Inc., 333 Pfingsten Road, Northbrook, IL 60062-2096.

ANSI/UL 8, Standard for Water Based Agent Fire Extinguishers, 2011.
<table>
<thead>
<tr>
<th>UL Standard</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>UL 1363</td>
<td>Standard for Relocatable Power Taps, 2014, 2018</td>
</tr>
<tr>
<td>UL 1363A</td>
<td>Outline of Investigation for Special Purpose Relocatable Power Taps, 2010</td>
</tr>
<tr>
<td>UL 1564</td>
<td>Standard for Industrial Battery Chargers, 2015, revised 2017</td>
</tr>
<tr>
<td>ANSI/UL 1746</td>
<td>Standard for External Corrosion Protection Systems for Steel Underground Storage Tanks, 2014</td>
</tr>
<tr>
<td>UL 1803</td>
<td>Standard for Factory Follow-up on Third Party Certified Portable Fire Extinguishers, 2012, revised 2017</td>
</tr>
<tr>
<td>UL 2080</td>
<td>Standard for Fire Resistant Tanks for Flammable and Combustible Liquids, 2000</td>
</tr>
<tr>
<td>ANSI/UL 2085</td>
<td>Standard for Protected Aboveground Tanks for Flammable and Combustible Liquids, 1997, revised 2010</td>
</tr>
<tr>
<td>UL 2245</td>
<td>Standard for Below-Grade Vaults for Flammable Liquid Storage Tanks, 2006</td>
</tr>
<tr>
<td>ANSI/UL 2586</td>
<td>Standard for Hose Nozzle Valves, 2011, revised 2014</td>
</tr>
<tr>
<td>UL 9540</td>
<td>Outline of Investigation for Energy Storage Systems and Equipment, 2014</td>
</tr>
</tbody>
</table>

**Statement of Problem and Substantiation for Public Input**

Update the publishing dates for each of the UL standards listed to reflect the most up to date edition.

**Submitter Information Verification**

**Submitter Full Name:** Kelly Nicolello  
**Organization:** UL LLC  
**Street Address:**  
**City:**  
**State:**  
**Zip:**  
**Submittal Date:** Mon Jun 25 14:01:19 EDT 2018

**Committee Statement**

**Resolution:** CI-52-NFPA 1-2018
**Statement:** This Committee Input incorporates the referenced updates that were received in public inputs in addition to newly referenced documents as a result of pending First Revisions. The Technical Committee will review the edition date of the referenced publications in Section 2.3 at the Second Draft stage and update to the most current edition as necessary.
**Statement of Problem and Substantiation for Public Input**

Update the publishing dates for each of the UL standards listed to reflect the most up to date edition.

**Submitter Information Verification**

<table>
<thead>
<tr>
<th>Submitter Full Name</th>
<th>Kelly Nicolello</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organization</td>
<td>UL LLC</td>
</tr>
<tr>
<td>Street Address</td>
<td></td>
</tr>
<tr>
<td>City</td>
<td></td>
</tr>
<tr>
<td>State</td>
<td></td>
</tr>
<tr>
<td>Zip</td>
<td></td>
</tr>
<tr>
<td>Submittal Date</td>
<td>Mon Jun 25 14:35:13 EDT 2018</td>
</tr>
<tr>
<td>Committee</td>
<td></td>
</tr>
</tbody>
</table>

**Committee Statement**

<table>
<thead>
<tr>
<th>Resolution</th>
<th>CI-52-NFPA 1-2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Statement</td>
<td>This Committee Input incorporates the referenced updates that were received in public inputs in addition to newly referenced documents as a result of pending First Revisions. The Technical Committee will review the edition date of the referenced publications in Section 2.3 at the Second Draft stage and update to the most current edition as necessary.</td>
</tr>
</tbody>
</table>
Public Input No. 2-NFPA 1-2018 [Section No. 3.3.159]

3.3.159 Imminent Danger.
A condition, use, or practice in an occupancy or structure that poses a danger that could reasonably be expected to cause death, serious physical harm, or serious property loss.

A.3.3.159 A use of a building or portion of a building that is inconsistent with the approved use under the Certificate of Occupancy could qualify as an imminent danger.

Statement of Problem and Substantiation for Public Input
The current language in this definition is not clear as to if an unapproved use could create an imminent danger. Adding "use" would give clear authority to the AHJ in dealing with situations where the use of a structure has been changed and is no longer consistent with the approved use in the Certificate of Occupancy. A prime example of this type of illegal change of use would be the Ghost Ship fire. The added annex text provides greater clarity to the intent.

Submitter Information Verification
Submitter Full Name: Anthony Apfelbeck
Organization: Altamonte Springs Building/Fire Safety Division
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jan 17 13:52:31 EST 2018
Committee:

Committee Statement
Resolution: FR-11-NFPA 1-2018
Statement: The current language in this definition is not clear as to if an unapproved use could create an imminent danger. Adding "use" would give clear authority to the AHJ in dealing with situations where the use of a structure has been changed and is no longer consistent with the approved use in the Certificate of Occupancy. Changing 'danger' to 'hazard' to not use part of the defining term. The added annex text provides greater clarity to the intent.
Public Input No. 82-NFPA 1-2018 [Section No. 3.3.169]

3.3.169 Liquid.
A material that has a melting point that is equal to or less than 68°F (20°C) and a boiling point that is greater than 68°F (20°C) and 14.7 psia (101.3 kPa). When not otherwise identified, the term liquid shall mean both flammable and combustible liquids. [5000, 2018] See 4.6.1.

3.3.169.1 Combustible Liquid.
Any liquid that has a closed-cup flash point at or above 100°F (37.8°C), as determined by the test procedures and apparatus set forth in Section 4.4 of NFPA 30. Combustible liquids are classified according to Section 4.3 of NFPA 30. [30, 2018] See 4.6.2.

3.3.169.2* Flammable Liquid.
Any liquid that has a closed-cup flash point below 100°F (37.8°C), as determined by the test procedures and apparatus set forth in Section 4.4 of NFPA 30 and a Reid vapor pressure that does not exceed an absolute pressure of 40 psi (276 kPa) at 100°F (37.8°C), as determined by ASTM D 323, Standard Test Method for Vapor Pressure of Petroleum Products (Reid Method). Flammable liquids are classified according to Section 4.3 of NFPA 30. [30, 2018] See 4.6.3.

3.3.169.3 Highly Volatile Liquid.
A liquid with a boiling point of less than 68°F (20°C).

3.3.169.4 Stable Liquid.
Any liquid not defined as unstable. [30, 2018]

Statement of Problem and Substantiation for Public Input

In NFPA 30 all the information about definitions, classification of liquids and determination of flash points is contained in the body of the code and not in the section on definitions (which is unenforceable and shall not contain requirements). This public input, and its companion in chapter 4, simply moves the sections and maintains the language as an extract from NFPA 30.

Although this section states that the definition of liquid has been extracted from NFPA 5000, in fact the information in NFPA 30 is more complete and will help the user to understand how to classify a substance as a liquid, once contained in the body of the fire code.

Related Public Inputs for This Document

<table>
<thead>
<tr>
<th>Related Input</th>
<th>Relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Input No. 81-NFPA 1-2018 [Section No. 4.5]</td>
<td></td>
</tr>
</tbody>
</table>

Submitter Information Verification

Submitter Full Name: Marcelo Hirschler
Organization: GBH International
Street Address: 
City: 
State: 
Zip: 
Submittal Date: Mon Jun 18 17:11:47 EDT 2018
Committee: 

Committee Statement

Resolution: Proposed change is not consistent with how NFPA 1 is organized. The definitions in Chapter 3 clarify the application of requirements in NFPA 1 application to flammable and combustible liquids. The
organization of NFPA 30, in this case, should not govern the organization of NFPA 1. Making this change with these three specific definitions could also cause inconsistency with other hazardous materials definitions.
Public Input No. 79-NFPA 1-2018 [New Section after 3.3.282]

Insert a new 3.3.282 and renumber the remaining.

3.3.282 Valet trash collection. A service that collects occupant-generated combustible trash or recyclable materials from dwelling units, where the trash is left outside of dwelling units for scheduled pickup.

Statement of Problem and Substantiation for Public Input

This PI provides a definition for the PI addressing valet trash collection in Chapter 10.

Related Public Inputs for This Document

<table>
<thead>
<tr>
<th>Related Input</th>
<th>Relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Input No. 80-NFPA 1-2018 [Section No. 1.12.8]</td>
<td></td>
</tr>
</tbody>
</table>

Submitter Information Verification

Submitter Full Name: Anthony Apfelbeck
Organization: Altamonte Springs Building/Fire Safety Division
Street Address: City: State: Zip:
Submittal Date: Mon Jun 18 14:16:05 EDT 2018
Committee:

Committee Statement

Resolution: FR-59-NFPA 1-2018
Statement: This revision provides a definition for newly added Section 10.19 addressing valet trash collection.
4.1.1 * Goals.
The goals of this Code shall be to provide a reasonable level of safety, property protection, and public welfare from the hazards created by fire, explosion, security threats, and other hazardous conditions.

Statement of Problem and Substantiation for Public Input
This proposal expands the scope of the fire code to recognize and address occupant risks associated with intruders who seek to kill or injure occupants while maintaining the original intent of building, fire, and life safety codes. This language will ensure that long-standing model code requirements that allow rapid evacuation and a safe means of egress for building occupants are not compromised by implementation of security or lockdown measures.

Related Public Inputs for This Document

<table>
<thead>
<tr>
<th>Related Input</th>
<th>Relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Input No. 92-NFPA 1-2018 [Section No. 1.2]</td>
<td></td>
</tr>
<tr>
<td>Public Input No. 96-NFPA 1-2018 [Section No. 4.1.3]</td>
<td></td>
</tr>
<tr>
<td>Public Input No. 97-NFPA 1-2018 [Section No. A.4.1.1]</td>
<td></td>
</tr>
</tbody>
</table>

Submitter Information Verification
Submitter Full Name: Kelly Nicolello
Organization: UL LLC
Street Address: 
City: 
State: 
Zip: 
Submittal Date: Mon Jun 25 14:40:18 EDT 2018
Committee: 

Committee Statement
Resolution: FR-50-NFPA 1-2018
Statement: New text provides clarification on the application of the Fire Code with regards to addressing security. Today, there is an ever-growing need for model codes to balance the fire-related provisions for building safety, life safety, fire fighter safety with the security. This language clarifies that it is not the primary consideration of this Code to address security threat mitigation. It may be addressed indirectly through other provisions. See also the new text for Section A.1.1. It should be noted that this issue is very important to the development of NFPA 1, 101, and 5000. NFPA 1 will continue to address this topic through the revision cycle as well as monitor any developments of NFPA 101 and NFPA 5000 for consistency.
Public Input No. 96-NFPA 1-2018 [Section No. 4.1.3]

4.1.3 Safety.
This Code shall provide for life safety by reducing the probability of injury or death from fire, explosions, security threats, or events involving hazardous materials.

4.1.3.1 Safety from Fire.
4.1.3.1.1 Safety-from-Fire Goals.
The fire safety goals of this Code shall be as follows:
(1) To provide an environment for the occupants in a building or facility and for the public near a building or facility that is reasonably safe from fire and similar emergencies
(2) To protect fire fighters and emergency responders
4.1.3.1.2 Safety-from-Fire Objectives.
4.1.3.1.2.1 Buildings and facilities shall be designed, constructed, and maintained to protect occupants who are not intimate with the initial fire development for the amount of time needed to evacuate, relocate, or defend in place.
4.1.3.1.2.2 Buildings shall be designed and constructed to provide reasonable safety for fire fighters and emergency responders during search and rescue operations.
4.1.3.1.2.3 Buildings shall be designed, located, and constructed to reasonably protect adjacent persons from injury or death as a result of a fire.
4.1.3.1.2.4 Buildings shall be designed, located, and constructed to provide reasonable access to the building for emergency responders.
4.1.3.1.2.5 Operations shall be conducted at facilities in a safe manner that minimizes, reduces, controls, or mitigates the risk of fire injury or death for the operators, while protecting the occupants not intimate with initial fire development for the amount of time needed to evacuate, relocate, or defend in place.

4.1.3.2 Safety During Building Use.
4.1.3.2.1 Safety-During-Building-Use Goal.
The safety-during-building-use goal of this Code shall be to provide an environment for the occupants of the building that is reasonably safe during the normal use of the building.
4.1.3.2.2 Safety-During-Building-Use Objectives.
4.1.3.2.2.1 Buildings shall be designed and constructed to reduce the probability of death or injury of persons from falling during normal use of the building.
4.1.3.2.2.2 Buildings shall be designed and constructed to provide for reasonably safe crowd movement during emergency and nonemergency conditions.
4.1.3.2.2.3 Buildings shall be designed and constructed to provide reasonable life safety for occupants and workers during construction and demolition.
4.1.3.2.2.4 Buildings shall be designed and constructed to provide reasonable notification to occupants of fire and other emergency situations.
4.1.3.2.5
Buildings shall be designed and constructed to provide reasonable signage and lighting to identify hazards, exits, means of egress, and other building safety features.

4.1.3.3 Safety from Hazardous Materials.

4.1.3.3.1 Safety-from-Hazardous-Materials Goal.
The safety-from-hazardous-materials goal of this Code shall be to provide an environment for the occupants in a building or facility and to those adjacent to a building or facility that is reasonably safe from exposures to adverse affects from hazardous materials present therein.

4.1.3.3.2 Safety-from-Hazardous-Materials Objectives.

4.1.3.3.2.1 The storage, use, or handling of hazardous materials in a building or facility shall be accomplished in a manner that provides a reasonable level of safety for occupants and for those adjacent to a building or facility from health hazards, illness, injury, or death during normal storage, use, or handling operations and conditions.

4.1.3.3.2.2 The storage, use, or handling of hazardous materials in a building or facility shall be accomplished in a manner that provides a reasonable level of safety for occupants and for those adjacent to a building or facility from illness, injury, or death due to the following conditions:

(1) An unplanned release of the hazardous material
(2) A fire impinging upon the hazardous material or the involvement of the material in a fire
(3) The application of an external force on the hazardous material that is likely to result in an unsafe condition

Statement of Problem and Substantiation for Public Input

This proposal expands the scope of the fire code to recognize and address occupant risks associated with intruders who seek to kill or injury occupants while maintaining the original intent of building, fire, and life safety codes. This language will ensure that long standing model code requirements that allow rapid evacuation and a safe means of egress for building occupants are not compromised by implementation of security or lockdown measures.

Related Public Inputs for This Document

<table>
<thead>
<tr>
<th>Related Input</th>
<th>Relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Input No. 95-NFPA 1-2018 [Section No. 4.1.1]</td>
<td></td>
</tr>
<tr>
<td>Public Input No. 92-NFPA 1-2018 [Section No. 1.2]</td>
<td></td>
</tr>
<tr>
<td>Public Input No. 97-NFPA 1-2018 [Section No. A.4.1.1]</td>
<td></td>
</tr>
</tbody>
</table>

Submitter Information Verification

Submitter Full Name: Kelly Nicolello
Organization: UL LLC
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jun 25 14:43:00 EDT 2018
Committee:

Committee Statement

Resolution: FR-50-NFPA 1-2018
**Statement:** New text provides clarification on the application of the Fire Code with regards to addressing security. Today, there is an ever growing need for model codes to balance the fire related provisions for building safety, life safety, fire fighter safety with the security. This language clarifies that it is not the primary consideration of this Code to address security threat mitigation. It may be addressed indirectly through other provisions. See also the new text for Section A.1.1. It should be noted that this issue is very important to the development of NFPA 1, 101 and 5000. NFPA 1 will continue to address this topic through the revision cycle as well as monitor any developments of NFPA 101 and NFPA 5000 for consistency.
4.5 General Requirements.

4.5.1 Authority Having Jurisdiction (AHJ).

4.5.1.1 The AHJ shall determine whether the provisions of this Code are met.

4.5.1.2 Where it is evident that a reasonable degree of safety is provided, any requirement shall be permitted to be modified if its application would be hazardous under normal occupancy conditions in the judgment of the AHJ.

4.5.2 Historic Structures and Cultural Resource Buildings.

The provisions of this Code shall be permitted to be modified by the AHJ for buildings or structures identified and classified as historic structures in accordance with Section 20.17.

4.5.3 Provisions in Excess of Code Requirements.

Nothing in this Code shall be construed to prohibit a better type of building construction, an additional means of egress, or an otherwise more safe condition than that specified by the minimum requirements of this Code.

4.5.4 Conditions for Occupancy.

No new construction or existing building shall be occupied in whole or in part in violation of the provisions of this Code unless the following conditions exist:

(1) A plan of correction has been approved.

(2) The occupancy classification remains the same.

(3) No serious life safety hazard exists as judged by the AHJ.

4.5.5 Warrant of Fitness.

4.5.5.1 Where compliance with this Code is effected by means of a performance-based design, the owner shall annually certify compliance with the conditions and limitations of the design by submitting a warrant of fitness acceptable to the AHJ.

4.5.5.2 The warrant of fitness shall attest that the building features, systems, and use have been inspected and confirmed to remain consistent with design specifications outlined in the documentation required by 5.1.8 and 5.7.3 and that they continue to satisfy the goals and objectives specified in Section 4.1. (See 5.1.11.)

4.5.6 Construction, Repair, and Improvement Operations.

4.5.6.1 Buildings or portions of buildings shall be permitted to be occupied during construction, repair, alterations, or additions only where required means of egress and required fire protection features are in place and continuously maintained for the portion occupied or where alternative life safety measures and building protection measures acceptable to the AHJ are in place.

4.5.6.2 Escape Facilities.

4.5.6.2.1 In buildings under construction, adequate escape facilities shall be maintained at all times for the use of construction workers.

4.5.6.2.2 Escape facilities shall consist of doors, walkways, stairs, ramps, fire escapes, ladders, or other approved means or devices arranged in accordance with the general principles of the Code insofar as they can reasonably be applied to buildings under construction.
4.5.6.3
Flammable, hazardous, or explosive substances or equipment for repairs or alterations shall be permitted in a building while the building is occupied if the condition of use and safeguards provided do not create any additional danger or impediment to egress beyond the normally permissible conditions in the building and is such that materials are safeguarded when the building is unoccupied.

4.5.7* Changes of Occupancy.

4.5.7.1
In any building or structure, whether or not a physical alteration is needed, a change from one occupancy classification to another shall be permitted only where such a structure, building, or portion thereof conforms with the requirements of this Code that apply to new construction for the proposed new use, except as follows:

(1) Where, in the opinion of the AHJ, the proposed occupancy or change in use is not more hazardous than the existing use, based on life safety and fire risk, the AHJ shall be permitted to approve such change of occupancy provided compliance with the requirements of this Code for buildings of like occupancy or use are specifically incorporated to safeguard the life, health, and welfare of persons.

(2) Change of tenants or ownership shall not be construed to be a change of occupancy classification where the nature of use and assigned occupancy classification remain the same.

4.5.7.2
Where specifically permitted elsewhere in the Code, existing construction features shall be permitted to be continued in use in conversions.

4.5.8 Maintenance, Inspection, and Testing.

4.5.8.1
Whenever or wherever any device, equipment, system, condition, arrangement, level of protection, fire-resistant construction, or any other feature is required for compliance with the provisions of this Code, such device, equipment, system, condition, arrangement, level of protection, fire-resistant construction, or other feature shall thereafter be continuously maintained. Maintenance shall be provided in accordance with applicable NFPA requirements or requirements developed as part of a performance-based design, or as directed by the AHJ. [101:4.6.12.1]

4.5.8.2
No existing life safety feature shall be removed or reduced where such feature is a requirement for new construction. [101:4.6.12.2]

4.5.8.3*
Existing life safety features obvious to the public, if not required by the Code, shall be either maintained or removed. [101:4.6.12.3]

4.5.8.4*
Existing life safety features that exceed the requirements for new buildings shall be permitted to be decreased to those required for new buildings. [101:4.6.7.4]

4.5.8.5*
Existing life safety features that do not meet the requirements for new buildings, but that exceed the requirements for existing buildings, shall not be further diminished. [101:4.6.7.5]

4.5.8.6
Any device, equipment, system, condition, arrangement, level of protection, fire-resistant construction, or any other feature requiring periodic testing, inspection, or operation to ensure its maintenance shall be tested, inspected, or operated as specified elsewhere in this Code or as directed by the AHJ. [101:4.6.12.4]

4.5.8.7
Maintenance, inspection, and testing shall be performed under the supervision of a responsible person who shall ensure that testing, inspection, and maintenance are made at specified intervals in accordance with applicable NFPA standards or as directed by the AHJ. [101:4.6.12.5]

4.5.9 Noncombustible Material.
4.5.9.1
A material that complies with any one of the following shall be considered a noncombustible material:

(1) * The material, in the form in which it is used and under the conditions anticipated, will not ignite, burn, support combustion, or release flammable vapors when subjected to fire or heat.

(2) The material is reported as passing ASTM E136, *Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 Degrees C.*

(3) The material is reported as complying with the pass/fail criteria of ASTM E136 when tested in accordance with the test method and procedure in ASTM E2652, *Standard Test Method for Behavior of Materials in a Tube Furnace with a Cone-shaped Airflow Stabilizer, at 750 Degrees C.*

4.5.9.2
Where the term *limited-combustible* is used in this Code, it shall also include the term *noncombustible.*

4.5.10 Limited-Combustible Material.

A material shall be considered a limited-combustible material where both of the following conditions of 4.5.10.1, and 4.5.10.2, and the conditions of either 4.5.10.3 or 4.5.10.4, are met. [5000:7.1.4.2]

4.5.10.1
The material does not comply with the requirements for a noncombustible material in accordance with 4.5.9. [5000:7.1.4.2(1)]

4.5.10.2
The material, in the form in which it is used, exhibits a potential heat value not exceeding 3500 Btu/lb (8141 kJ/kg) where tested in accordance with NFPA 259. [5000:7.1.4.2(2)]

4.5.10.3
The material has a structural base of a noncombustible material with a surfacing not exceeding a thickness of 1/8 in. (3.2 mm) where the surfacing exhibits a flame spread index not greater than 50 when tested in accordance with ASTM E84, *Standard Test Method for Surface Burning Characteristics of Building Materials,* or ANSI/UL 723, *Standard for Test for Surface Burning Characteristics of Building Materials.* [5000:7.1.4.2.1]

4.5.10.4
The material is composed of materials which, in the form and thickness used, neither exhibit a flame spread index greater than 25 nor evidence of continued progressive combustion when tested in accordance with ASTM E84 or ANSI/UL 723, and are of such composition that all surfaces that would be exposed by cutting through the material on any plane would neither exhibit a flame spread index greater than 25 nor evidence of continued progressive combustion when tested in accordance with ASTM E84 or ANSI/UL 723. [5000:7.1.4.2.2]

4.5.10.5
An alternate approach for a material to be considered a limited combustible material is where the material is tested in accordance with ASTM E2965, *Standard Test for Determination of Low Levels of Heat Release Rate for Materials and Products Using an Oxygen Combustion Calorimeter,* at an incident heat flux of 75 kW/m² for a 20-minute exposure, the peak heat release rate does not exceed 150 kW/m² for longer than 10 seconds, and the total heat released does not exceed 8 MJ/m². [5000:7.1.4.2.3]
4.5.10.6
Where the term *limited-combustible* is used in this Code, it shall also include the term *noncombustible*.

[5000:7.1.4.2.4]

4.6 Liquids

4.6.1 Liquid. Any material that has a fluidity greater than that of 300 penetration asphalt when tested in accordance with ASTM D5/D5M, Standard Test Method for Penetration of Bituminous Materials, or is a viscous substance for which a specific melting point cannot be determined but that is determined to be a liquid in accordance with ASTM D4359, Standard Test for Determining Whether a Material is a Liquid or a Solid. [NFPA 30; 4.2.5].

4.6.2 Combustible Liquid. Any liquid that has a closed-cup flash point at or above 100°F (37.8°C), as determined by the test procedures and apparatus set forth in Section 4.4 on NFPA 30. Combustible liquids are classified according to Section 4.3 of NFPA 30. [NFPA 30; 4.2.2].

4.6.3 Flammable Liquid. Any liquid that has a closed-cup flash point below 100°F (37.8°C), as determined by the test procedures and apparatus set forth in Section 4.4 of NFPA 30 and a Reid vapor pressure that does not exceed an absolute pressure of 40 psi (276 kPa) at 100°F (37.8°C), as determined by ASTM D323, Standard Test Method for Vapor Pressure of Petroleum Products (Reid Method). Flammable liquids are classified according to Section 4.3 of NFPA 30 [NFPA 30; 4.2.3].

---

Statement of Problem and Substantiation for Public Input

In NFPA 30 all the information about definitions, classification of liquids and determination of flash points is contained in the body of the code and not in the section on definitions (which is unenforceable and shall not contain requirements). This public input, and its companion in chapter 3, simply moves the sections and maintains the language as an extract from NFPA 30.

Related Public Inputs for This Document

<table>
<thead>
<tr>
<th>Related Input</th>
<th>Relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Input No. 82-NFPA 1-2018 [Section No. 3.3.169]</td>
<td></td>
</tr>
</tbody>
</table>

Submitter Information Verification

<table>
<thead>
<tr>
<th>Submitter Full Name: Marcelo Hirschler</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organization: GBH International</td>
</tr>
<tr>
<td>Street Address:</td>
</tr>
<tr>
<td>City:</td>
</tr>
<tr>
<td>State:</td>
</tr>
<tr>
<td>Zip:</td>
</tr>
<tr>
<td>Submittal Date: Mon Jun 18 17:04:33 EDT 2018</td>
</tr>
<tr>
<td>Committee:</td>
</tr>
</tbody>
</table>

Committee Statement

Resolution: See action on PI-82. In addition, there are a number of proposed changes to the terminology in NFPA 30 thus it is not clear the result of the work in the source document. No changes should be made at this time and the definitions should remain in Chapter 3.
Public Input No. 18-NFPA 1-2018 [ Section No. 10.3.1 ]

10.3.1
No new construction or existing building shall be occupied in whole or in part in violation of the provisions of this Code or the Certificate of Occupancy issued under the Building Code.

Statement of Problem and Substantiation for Public Input

The Certificate of Occupancy is typically the mechanism that is utilized to demonstrate the building can be occupied and that the occupancy is restricted to certain conditions. When the conditions of the CO are violated, a building can quickly become hazardous to the occupants, inadequately protected based on the design and a hazard to firefighters. While the CO is issued under the Building Code authority, this code references the importance of the fire code AHJ in the CO approval process in section 1.7.14. Therefore, the fire code AHJ should have an ability to pursue an illegal occupancy under the fire code when such occupancy is in conflict with the CO. This PI accomplishes this objective by referencing the Certificate of Occupancy in section 10.3.1

Submitter Information Verification

Submitter Full Name: Anthony Apfelbeck
Organization: Altamonte Springs Building/Fire Safety Division
Street Address: 
City:  
State: 
Zip: 
Submittal Date: Wed Jan 24 10:09:59 EST 2018
Committee:

Committee Statement

Resolution: FR-12-NFPA 1-2018
Statement: The Certificate of Occupancy is typically the mechanism that is utilized to demonstrate the building can be occupied and that the occupancy is restricted to certain conditions. When the conditions of the CO are violated, a building can quickly become hazardous to the occupants, inadequately protected based on the design and a hazard to firefighters. While the CO is issued under the Building Code authority, this code references the importance of the fire code AHJ in the CO approval process in section 1.7.14. Therefore, the fire code AHJ should have an ability to pursue an illegal occupancy under the fire code when such occupancy is in conflict with the CO.
10.3.2.1.1
Existing buildings that are occupied at the time of adoption of this Code shall be permitted to remain in use provided that the following conditions are met:

(1) The occupancy classification remains the same has been legally approved and is unchanged from the time of the legal approval.

(2) No condition deemed hazardous to life or property exists that would constitute an imminent danger.

Statement of Problem and Substantiation for Public Input

The current section 10.3.2 is really a modifier to section 10.3.1. It is not intended to be standalone text on equal footing to 10.3.1. Therefore, it should be numbered as a subsection of 10.3.1. Hence, the suggested change to 10.3.1.1. The current language in 10.3.2, which states "shall remain in use" is incorrect. There is no code mandate or intent in the code that a use must occur. The intent is only to allow a use to continue to occur. Therefore, the "be permitted to" language has been added to the first sentence. Regarding (1), the language currently states the "occupancy classification remains the same." The question is...remains the same as what? When CO was issued? The day before the new code went into effect? Is unchanged during the term the new code is in effect? This section is too nebulous for such an important issue. The key issue is if the occupancy that is currently in place was previously legally approved? If it was previously legally approved, then the use should be able to continue. This PI adds language to clarify that legal occupancy is the key aspect of this evaluation for compliance with this section.

Submitter Information Verification

Submitter Full Name: Anthony Apfelbeck
Organization: Altamonte Springs Building/Fire Safety Division
Street Address: 
City: 
State: 
Zip: 
Submittal Date: Fri Feb 02 15:54:07 EST 2018
Committee:

Committee Statement

Resolution: FR-13-NFPA 1-2018
Statement: The current language in 10.3.2, which states "shall remain in use" is incorrect. There is no code mandate or intent in the code that a use must occur. The intent is only to allow a use to continue to occur. Therefore, the "be permitted to" language has been added to the first sentence. Regarding (1), the language currently states the "occupancy classification remains the same." The question is...remains the same as what? When CO was issued? The day before the new code went into effect? Is unchanged during the term the new code is in effect? This section is too nebulous for such an important issue. The key issue is if the occupancy that is currently in place was previously approved? If it was previously legally approved, then the use should be able to continue. This revision adds language to clarify that approved occupancy is the key aspect of this evaluation for compliance with this section.
10.10.2
The AHJ shall have the authority to prohibit any or all open flames, use or sale of fireworks, candles, and open, recreational, and cooking fires or other sources of ignition, or establish special regulations on the use of any form of fire or smoking material where circumstances make such conditions hazardous.

A.10.10.2 Hazardous conditions could include extreme drought or red flag type conditions that can result in rapidly developing wildfires.

Statement of Problem and Substantiation for Public Input

The use of consumer fireworks during periods of drought or high-fire danger is a demonstrated ignition source that should be able to be controlled by the AHJ. Consumer firework use is already regulated in NFPA 1 for other specific hazards such as crop mazes. This PI is comparable to those existing provisions in NFPA 1 so it should not run afoul of the Standards Council action regarding consumer fireworks.

This PI was modified as a result of requests by the TC. Annex text was added to clarify justification for such prohibitions and "consumer" was struck before fireworks to ensure all fireworks were addressed.

Submitter Information Verification

Submitter Full Name: Anthony Apfelbeck
Organization: Altamonte Springs Building/Fire Safety Division
Street Address: 
City: 
State: 
Zip: 
Submittal Date: Wed Jan 24 10:58:05 EST 2018
Committee: 

Committee Statement

Resolution: FR-14-NFPA 1-2018
Statement: The use of consumer fireworks during periods of drought or high-fire danger is a demonstrated ignition source that should be able to be controlled by the AHJ. Consumer firework use is already regulated in NFPA 1 for other specific hazards such as crop mazes. This PI is comparable to those existing provisions in NFPA 1. Annex text was added to clarify the justification for such prohibitions.
10.10.10* Discontinuance.
The AHJ shall be authorized to require any fire or smoke to be immediately discontinued if the fire or smoke generated by such fire is determined to constitute a hazardous condition.

A.10.10.10 Smoke can potential create its own hazardous conditions such as blocking visibility on roadways.

Statement of Problem and Substantiation for Public Input
As currently written, this section does not read correctly. It currently states that fire or smoke can be discontinued if the fire is dangerous. How does one discontinue smoke and even if one can order smoke to be discontinued, it can only be done if the fire itself is dangerous, not if the smoke is creating a dangerous condition. This PI revises the language to clarify that the smoke itself can be a hazardous condition and warrant the fire to be discontinued.

This PI was modified per the suggestions by the TC at the PreROP meeting to include added language for the annex. This has been added in this PI.

Submitter Information Verification
Submitter Full Name: Anthony Apfelbeck
Organization: Altamonte Springs Building/Fire Safety Division
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jan 24 11:05:19 EST 2018
Committee:

Committee Statement
Resolution: FR-15-NFPA 1-2018
Statement: As currently written, this section does not read correctly. It currently states that fire or smoke can be discontinued if the fire is dangerous. How does one discontinue smoke and even if one can order smoke to be discontinued, it can only be done if the fire itself is dangerous, not if the smoke is creating a dangerous condition. This change revises the language to clarify that the smoke itself can be a hazardous condition and warrant the fire to be discontinued.
Public Input No. 59-NFPA 1-2018 [ New Section after 10.11.1 ]

Required Room Identification for Fire Alarm Components
Any building equipped with an addressable fire alarm system in which a fire alarm location is given shall have each room or space equipped with a fire alarm component labeled in a similar manner that the room is labeled on the fire alarm system.

Statement of Problem and Substantiation for Public Input
Many times fire alarms are received and the location is given, yet the building is not adequately labeled throughout, which delays finding the area where a fire alarm, trouble, or other issue is taking place.

Submitter Information Verification
Submitter Full Name: Ben Bowers
Organization: USC Fire Safety
Affiliation: NFPA Fire Inspector II Certification
Street Address:
City:
State:
Zip:
Submittal Date: Fri May 04 12:59:09 EDT 2018
Committee:

Committee Statement
Resolution: The information is available but to mandate this requirement with labeling can be done by the AHJ at their request. It is too far reaching to be a minimum requirement in the Code. There is confusion with the proposed text as to the intent of the provision. Further clarification is requested as to the intent and the location of the proposed text. The text may belong more in NFPA 72 with the option for NFPA 1 to extract.
**TITLE OF NEW CONTENT**
Type your content here ...

10.11.4 Truss Wood/Lightweight Construction

10.11.4.1 Where wood Truss construction materials/design is used signage, should, be posted in case of fire to warn Firefighters of collapse hazard.

10.11.4.2 Affixed to Building where Firefighters can see as they approach. The emblem shall be permanently affixed to the left of the main entrance door at a height between 4 and 6 feet above the ground.

10.11.4.3 The emblem shall be of a bright and reflective color, or made of reflective material.

10.11.4.4 The lettering system below shall be used to identify Truss Construction components that may be harmful. The Lettering system is as follows:

- **“F”** = Shall mean, Floor Truss Construction
- **“R”** = Shall mean, Roof Truss Construction
- **“FR”** = Shall mean, Floor/Roof Truss Construction
- **“T”** = Shall mean, Truss Type Construction

**Statement of Problem and Substantiation for Public Input**
Currently, states have differing ways of communicating the Truss Wood/Lightweight Construction to Firefighters. Having a recommenced standard would help the confusion in determining signage requirements for Firefighter safety.

**Submitter Information Verification**

Submitter Full Name: Keisha Manning  
Organization: SmartSign  
Street Address:  
City:  
State:  
Zip:  
Submittal Date: Tue Jun 26 11:21:58 EDT 2018  
Committee:  

**Committee Statement**

Resolution: The language is adequately addressed in Annex E of the Code.

10.13.3.1 Artificial vegetation and artificial Christmas trees shall be labeled or otherwise identified or certified by the manufacturer as being fire retardant shall meet the flame propagation performance criteria of Test Method 1 or Test Method 2, as appropriate, of NFPA 701. Alternatively, the artificial vegetation shall be tested in accordance with NFPA 289, using the 20 kW ignition source, or in accordance with UL 1975, Standard for Fire Tests for Foamed Plastics Used for Decorative Purposes, and shall have a maximum heat release rate of 100 kW.

10.13.3.2 Such fire retardance shall be demonstrated by each. Each individual decorative vegetation item, including any decorative lighting, shall be labeled to demonstrate compliance with Section 10.13.3.1 in an approved manner.

Statement of Problem and Substantiation for Public Input

The proposed change brings in actual verifiable requirements instead of vague unenforceable criteria. The requirements based on NFPA 701 are similar to those contained in Chapter 12 for furnishings and decorations, and decorative vegetation is a decoration. The requirements based on NFPA 289 or on UL 1975 are recommendations from the annex that are being brought into the body. An associated public input will propose deleting those recommendations from the annex.

The title change is because the term "fire retardance" is a function of the actual criterion.

Related Public Inputs for This Document

<table>
<thead>
<tr>
<th>Related Input</th>
<th>Relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Input No. 74-NFPA 1-2018 [Section No. A.10.13.3]</td>
<td></td>
</tr>
<tr>
<td>Public Input No. 74-NFPA 1-2018 [Section No. A.10.13.3]</td>
<td></td>
</tr>
</tbody>
</table>

Submitter Information Verification

Submitter Full Name: Marcelo Hirschler
Organization: GBH International
Street Address: 
City: 
State: 
Zip: 
Submittal Date: Tue Jun 05 19:22:30 EDT 2018
Committee: 

Committee Statement

Resolution: FR-54-NFPA 1-2018
Statement: The proposed change brings in actual verifiable requirements instead of vague unenforceable criteria. The requirements based on NFPA 701 are similar to those contained in Chapter 12 for furnishings and decorations, and decorative vegetation is a decoration. The requirements based on NFPA 289 or on UL 1975 are recommendations from the annex that are being brought into the body. The title change is because the term "fire retardance" is a function of the actual criterion. (5) is being added to address those artificial vegetation that may be all noncombustible.

Annex: This public input is associated with the public input 73 on section 10.13.3 and it eliminates the
recommended requirement, which is being moved to the body of the code. The other change proposed is to state that the method with the newspaper, that remains in this annex, is a qualitative test.
10.13.3.1
Artificial vegetation and artificial Christmas trees shall be labeled or otherwise identified or certified by the manufacturer as being fire retardant. Listed and Labeled to UL 2358 Fire Tests of Pre Lite Artificial Seasonal Use Trees.
ADD UL 2358 to the chapter list of referenced standards

Statement of Problem and Substantiation for Public Input

The purpose of this test method is to determine the ability of pre-lit artificial seasonal use trees (such as Christmas Trees) greater than 30 inches (762 mm) in height and less than 12 ft (3.7 m), pre-lit wreaths greater than 48 inches (122 mm) in height and less than 12 ft (3.7 m), electrically operated or pre-lit statues, and other seasonal decorative products to resist developing rapid heat release when subjected to a flaming ignition source.

Submitter Information Verification

Submitter Full Name: Kelly Nicolello
Organization: UL LLC
Street Address: 
City: 
State: 
Zip: 
Submittal Date: Mon Jun 25 14:51:55 EDT 2018
Committee: 

Committee Statement

Resolution: FR-54-NFPA 1-2018
Statement: The proposed change brings in actual verifiable requirements instead of vague unenforceable criteria. The requirements based on NFPA 701 are similar to those contained in Chapter 12 for furnishings and decorations, and decorative vegetation is a decoration. The requirements based on NFPA 289 or on UL 1975 are recommendations from the annex that are being brought into the body. The title change is because the term “fire retardance” is a function of the actual criterion. (5) is being added to address those artificial vegetation that may be all noncombustible.

Annex: This public input is associated with the public input 73 on section 10.13.3 and it eliminates the recommended requirement, which is being moved to the body of the code. The other change proposed is to state that the method with the newspaper, that remains in this annex, is a qualitative test.
10.13.9.5 Fire retardant treatments for natural cut trees*

Fire retardant treatments intended for application to natural cut trees shall be tested by an approved agency and shall be labeled as complying with both Test Method 1 and Test Method 2 of ASTM E3082.

*A.10.13.9.5 If a fire retardant treatment has been shown by an approved agency to lower the heat release rate of a natural cut tree to less than 100 kW when tested in accordance with section 5.5 of NFPA 289 that treatment should be considered acceptable for this section.

(also, add ASTM E3082, Standard Test Methods for Determining the Effectiveness of Fire Retardant Treatments for Natural Christmas Trees, 2017, to section 2 on referenced standards)

Statement of Problem and Substantiation for Public Input

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

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

NFPA has developed a procedure within NFPA 289 (a heat release test for full scale individual fuel items) to also test Christmas tree treatments. The test in NFPA 289 (section 5.5) is similar (but not identical) to the full scale test in ASTM E3082 (Test Method 2) and does not have pass fail criteria. Therefore the pass fail criteria recommended are those used when testing to NFPA 289 in more than one section of the NFPA 1, namely a peak heat release rate not exceeding 100 kW.

NFPA statistics show that, between 2011 and 2015, U.S. fire departments responded to an estimated 200 structure fires, per year, caused by Christmas trees resulting in an annual average of 6 deaths, 16 injuries and $14.8 million in property damage. When comparing Christmas tree fires to other reported home fires, 1 out of every 32 home fires that began with a Christmas tree resulted in a death compared to 1 death out of every 143 reported home fires.

Submitter Information Verification

Submitter Full Name: Marcelo Hirschler
Organization: GBH International
Street Address: 
City: 
State: 
Zip: 
Submittal Date: Fri Jun 01 18:27:22 EDT 2018
Committee: 

Committee Statement

Resolution: The Code does not recognize the use of flame retardant products on natural cut Christmas trees.
Title of New Content

Type your content here ...

Add new 10.14.7 and renumber the rest..

10.14.7 CO Alarm. A minimum of one single station carbon monoxide alarm shall be located in all stock or equipment trailers when they are used for sleeping purposes and contain fuel fired appliances.

Statement of Problem and Substantiation for Public Input

Frequently owners/operators of concession trailers and food trucks will have a large stock or supply trailer parked behind the food concessions and part of the stock/supply trailers have a bunk room for employees to sleep while traveling from location to location. Many of these supply trailers have secondary cooking inside them or have gas generators operating within close proximity.

Submitter Information Verification

Submitter Full Name: Ronald Farr
Organization: Plainwell Fire Department
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jun 25 18:02:12 EDT 2018
Committee:

Committee Statement

Resolution: FR-55-NFPA 1-2018
Statement: Frequently owners/operators of concession trailers and food trucks will have a large stock or supply trailer parked behind the food concessions and part of the stock/supply trailers have a bunk room for employees to sleep while traveling from location to location. Many of these supply trailers have secondary cooking inside them or have gas generators operating within close proximity.
Portable Generators.

10.15.1 Portable generators, manufactured after January 1, 2021, other than vehicle mounted generators, shall be listed and labeled in accordance with the UL 2201 carbon monoxide mitigation requirements.

10.15.2 Portable generators shall be operated and maintained in accordance with the manufacturer's instructions.

10.15.3 Portable generators shall not be refueled while operating.

10.15.4 Portable generators shall only be operated or refueled outdoors a minimum of 10 ft. (1524 m) from any building openings, including windows, doors and air intakes. Portable generators shall not be operated within buildings or enclosed areas, except as permitted in Section 10.15.5.

10.15.5 Portable generators shall be permitted to be operated and refueled in a building or room that has been constructed for such use in accordance with the building code. Portable generators shall be positioned so the exhaust is directed away from openings in buildings, tents and membrane structures.

10.15.6 Portable generators shall be grounded in accordance with NFPA 70.

10.15.7 Extension cords and temporary wiring used to connect portable generators shall comply with Chapter 11 and shall be provided with GFCI protection.

10.15.8 Connections to a premise wiring system shall comply with all of the following:

1. Power shall not be provided in a manner that "back feeds" receptacles or the premise wiring system.

2. Connection to a premise served by commercial power shall be made through a listed transfer switch installed, used and maintained in accordance with NFPA 70.

3. Connections to buildings not served by commercial power shall comply with NFPA 70.

ADD UL 2201 to the chapter list of referenced standards

Add to definitions in chapter 3

- PORTABLE GENERATOR. A portable piece of equipment with an internal combustion engine-driven device that provides electrical power.

Statement of Problem and Substantiation for Public Input

Portable generators have been identified as a major contributor to Carbon Monoxide poisoning of the public who did not understand the hazards of where the generator is placed in relation to where they slept or lived. Portable generators produce significant Carbon Monoxide concentrations to effect death in 50 or so cases over the last few years as called out by CPSB Reports. The amount of Carbon Monoxide produced by a single portable generator is as much as a 1990s vehicle. UL and industry producers have developed UL 2201 which establishes a standard that limits the production of Carbon Monoxide and turns off the generator when levels exceed industry limits.

Related Public Inputs for This Document

<table>
<thead>
<tr>
<th>Related Input</th>
<th>Relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Input No. 100-NFPA 1-2018 [Section No. 11.7.2]</td>
<td></td>
</tr>
<tr>
<td>Public Input No. 101-NFPA 1-2018 [Section No. 11.7]</td>
<td></td>
</tr>
<tr>
<td>Public Input No. 140-NFPA 1-2018 [Section No. 25.1.12]</td>
<td></td>
</tr>
</tbody>
</table>
Committee Statement

Resolution: FR-63-NFPA 1-2018

Statement: Section 10.15 moves the requirements for portable generators from current Section 11.7 for stationary generators and standby power systems, with modifications. The requirements for portable generators have been separated, expanded, and relocated to Chapter 10 with other general fire safety requirements as they are usually not looked at as a building service as addressed in Chapter 11.

Last cycle, a proposed change to increase the separation distance for portable generators was received by the Technical Committee at the Second Draft stage but could not be acted on as it was new material at that time. At this time, the Committee is recommending an increase from 5 ft to 20 ft which is supported by current research as referenced in Public Comment No.75 from the Second Draft agenda of the A2017 cycle and discussed by the Technical Committee. There has been some evidence to suggest that a generator listed in accordance with UL 2201 may be okay at a 5 ft separation distance. At this time there is some concern over how to properly educate the public on the difference between a UL listed generator and a non-UL listed generator. Also, there is concern over how easy it would be to identify a UL listed generator after installation.
Public Input No. 77-NFPA 1-2018 [ New Section after 10.18.7 ]

Add a new 10.19 and renumber the remaining:

10.19 Valet trash collection

10.19.1 Permits. Permits, where required, shall comply with Section 1.12.8.

10.19.2 Combustible trash in exit passageways. Combustible trash or recyclable materials shall not be placed in exit passageways or in elevator lobbies except as permitted by one of the following:

1. Combustible trash or recyclable materials associated with construction, demolition, remodeling, or alterations in accordance with Section 16.2.2.

2. Where approved by the Authority Having Jurisdiction, combustible trash or recyclable materials in exit passageways of Apartment Buildings or Dormitories that is awaiting scheduled valet trash collection in accordance with Sections 10.19.3 and 10.19.4

10.19.3 Valet Trash collection. Trash or recyclable materials awaiting valet trash collection shall only be placed in an exit passageway within 18 hours of scheduled pickup and shall not obstruct the minimum egress width required by Section 14.7.4.

Trash or recyclable materials awaiting valet trash collection shall be placed completely inside of approved containers with a closed lid that complies with Section 10.19.4. Trash or recyclable material placed outside of compliant containers is prohibited.

10.19.4 Valet trash collection containers. Containers used for valet trash collection shall not exceed a capacity of 2.0 cubic feet (15 gallons, 0.06 cubic meters) and shall be provided with tight-fitting or self-closing lids. Containers and lids shall comply with either Section 10.19.4.1 or 10.19.4.2

10.19.4.1 Sprinklered exit passageways. Containers and lids located in an area protected by fire sprinklers shall be constructed entirely of noncombustible materials or materials that meet a peak rate of heat release not exceeding 300 kW/m²  when tested in accordance with ASTM E 1354 at an incident heat flux of 50 kW/m² in the horizontal orientation. Containers and lids shall be listed or bear the label of an approved agency that validates compliance with this requirement. The automatic sprinkler system supplying the sprinklers shall be permitted to comply with NFPA 13 or NFPA 13R.

10.19.4.2 Non-sprinklered exit passageways. Containers and lids located in an area that is not protected by fire sprinklers in accordance with 10.19.4.1 shall be constructed entirely of noncombustible materials or materials that meet a peak rate of heat release not exceeding 150 kW/m² when tested in accordance with ASTM E 1354 at an incident heat flux of 50 kW/m² in the horizontal orientation. Containers and lids shall be listed or bear the label of an approved agency that validates compliance with this requirement.

Wall and ceiling finishes in the area where valet trash collection containers are placed for pickup shall be noncombustible or shall comply with the requirements of Section 12.5.4.3 for Class B interior wall and ceiling finish materials.

Statement of Problem and Substantiation for Public Input

As discussed in the PreROP meeting with the 1 TC, valet trash collection service has become a standard type of service in many upscale apartment occupancies. This service involves occupants placing loaded trash cans of various sizes in exit access corridors and exit balconies. These access accesses may be sprinklered or non, open to the environment or not and have various interior finishes. NFPA 1 does not currently contain any language to regulate this type of activity. This PI attempts to address the various conditions that may be confronted by an AHJ, owner and contractor to allow the practice to continue while mitigating the risk with reasonable protection approaches.

Additional PI's are submitted to address the definition and the permit requirements referenced in this section.

Related Public Inputs for This Document

<table>
<thead>
<tr>
<th>Related Input</th>
<th>Relationship</th>
</tr>
</thead>
</table>

Page 82 of 290
Public Input No. 79-NFPA 1-2018 [New Section after 3.3.282]
Public Input No. 80-NFPA 1-2018 [Section No. 1.12.8]

Submitter Information Verification

Submitter Full Name: Anthony Apfelbeck
Organization: Altamonte Springs Building/Fire Safety Division
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jun 18 13:55:47 EDT 2018
Committee:

Committee Statement

Resolution: FR-58-NFPA 1-2018
Statement: Valet trash collection service has become a standard type of service in many upscale apartment occupancies. This service involves occupants placing loaded trash cans of various sizes in exit access corridors and exit balconies. These corridors may be sprinklered or not, open to the environment or not and have various interior finishes. NFPA 1 does not currently contain any language to regulate this type of activity. This revision address the various conditions that may be confronted by an AHJ, Owner and Contractor to allow the practice to continue while mitigating the risk with reasonable protection approaches. See also companion revisions for permitting and a definition of valet trash collection.
10.19 Indoor Children's Playground Play Structures.

10.19.1 Structures intended as children's playgrounds installed indoors and exceeding 10 ft (3.1 m) in height or 160 ft² (14.9 m²) in area shall comply with the specifications in 10.19.1.1 through 10.19.1.4.

10.19.1.1 Indoor children's playground play structures shall be constructed of noncombustible materials or of combustible materials that comply with the following:

1. Fire retardant–treated wood.
2. Light-transmitting plastics complying with the requirements in 10.19.1.2.
3. Foam plastics (including the pipe foam used in soft-contained play equipment structures) having a maximum heat-release rate not greater than 100 kW when tested in accordance with UL 1975 or NFPA 289 using the 20 kW ignition source.
4. Aluminum composite material (ACM) meeting the requirements of Class A interior finish in accordance with Chapter 10 of NFPA 101 when tested as an assembly in the maximum thickness intended for use.
5. Textiles and films complying with the flame propagation performance criteria contained in Test Method 1 or Test Method 2, as appropriate, of NFPA 701.
6. Plastic materials used to construct rigid components of soft-contained play equipment structures (such as tubes, windows, panels, junction boxes, pipes, slides, and decks) exhibiting a peak rate of heat release not exceeding 400 kW/m² when tested in accordance with ASTM E1354 at an incident heat flux of 0.24 in. 50 kW/m² in the horizontal orientation at a thickness of 0.24 in. (6 mm).
7. Balls used in ball pools, in soft-contained play equipment structures, shall have a maximum heat release rate not greater than 100 kW when tested in accordance with UL 1975 or NFPA 289 using the 20 kW ignition source. The minimum specimen test size shall be 36 in. × 36 in. (0.91 m × 0.91 m) by an average of 21 in. (0.56 m) deep, and the balls shall be held in a box constructed of galvanized steel poultry netting wire mesh.
8. Foam plastics shall be covered by fabric, coating, or film meeting the flame propagation performance criteria contained in Test Method 1 or Test Method 2, as appropriate, of NFPA 701.
9. The floor covering within the children's playground structure shall exhibit a Class I interior floor finish classification, as described in Chapter 10 of NFPA 101, when tested in accordance with NFPA 253 or with ASTM E648, Standard Test Method for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source.
10.19.1.2

Light-transmitting plastics used for children's playgrounds, indoor play structures, shall meet all of the following criteria:

1. They shall have a self-ignition temperature of 650°F (343°C) or greater when tested in accordance with ASTM D1929.

2. They shall have a smoke developed index not greater than 450 when tested in the manner intended for use in accordance with ASTM E84, Standard Test Method of Surface Burning Characteristics of Building Materials, or ANSI/UL 723, Standard for Test for Surface Burning Characteristics of Building Materials, or not greater than 75 when tested in the thickness intended for use in accordance with ASTM D2843, Standard Test Method for Density of Smoke from the Burning or Decomposition of Plastics.

3. They shall meet the criteria of one of the following classifications:

   4. CC1 — Plastic materials that have a burn length of 1 in. (25 mm) or less and flame extinguishment when tested at a nominal thickness of 0.060 in. (1.5 mm), or in the thickness intended for use, in accordance with ASTM D635, Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position.

   5. CC2 — Plastic materials that have a burning rate of $2\frac{1}{2}$ in./min (64 mm/min) or less when tested at a nominal thickness of 0.060 in. (1.5 mm), or at a thickness intended for use, in accordance with ASTM D635.

10.19.1.3

Indoor children's playground

The interior finish materials to be used for structures exceeding 300 ft² (28 m²) in area shall comply with the fire safety requirements contained in NFPA 101 for the corresponding occupancy group and location.

10.19.1.4

Indoor play structures shall have a minimum horizontal separation from other structures of 20 ft (6.1 m).

10.19.1.45

Indoor children's playground structures, play structures complying with the above requirements, shall not exceed 300 ft² (28 m²) in area, unless a special investigation, approved by the AHJ, has demonstrated adequate fire safety.

Statement of Problem and Substantiation for Public Input

Indoor play structures can cover a wide range of activities and are not limited to children's play structures. Some examples of these are: indoor skydiving, permanent haunted houses, very large and tall rock climbing walls in gymnasiums of schools and universities, laser tag facilities with elevated and large structures having massive concealed spaces, indoor archery ranges with foam targets and any number of other indoor activities with recreational structures located within a building. A growing number of structures contain, or are considering, adult play areas. Some of these facilities may be quite large in area and will have the potential for fire safety issues, including ones dealing with concealed spaces and flame spread requirements.

Added interior finish requirements are recommended for structures with large footprints, consistent with NFPA 101. The requirements for the material fire performance are sufficient that the footprint area should be permitted to be increased to 600 square feet rather than restricted to 300 square feet.

Related Public Inputs for This Document

<table>
<thead>
<tr>
<th>Related Input</th>
<th>Relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Input No. 70-NFPA 1-2018 [Section No. 20.1.1.2]</td>
<td></td>
</tr>
</tbody>
</table>

Submitter Information Verification

Submitter Full Name: Marcelo Hirschler
Organization: GBH International

Page 85 of 290
Committee Statement

**Resolution:** Proposed changes to 10.19.1.4.5 are ambiguous with no guidance on what constitutes a special investigation.
Insert a new section as follows:

11.1.2.2.1 Where the AHJ determines that there is sufficient evidence that existing electrical wiring, fixtures, appliances or equipment is potentially unsafe, the AHJ is authorized to require an evaluation of the existing electrical wiring, fixtures, appliances or equipment by an approved qualified individual. The qualified individual shall provide a report to the AHJ with their assessment of the condition of the electrical wiring, fixtures or equipment along with recommendations for any needed repairs to correct the unsafe condition(s).

A.11.2.2.2.1 In most cases, the AHJ for enforcement of NFPA 1 may not have the technical expertise on existing electrical wiring, appliances or equipment in order to effectively evaluate if existing conditions are unsafe and mitigation actions need to be taken by an owner or tenant. This section authorizes the AHJ to require an individual with sufficient expertise to evaluate existing conditions. It is important to note that the AHJ must first have some evidence that the existing electrical wiring, fixtures, appliances or equipment is potentially unsafe in order to require the evaluation. This section is not intended to provide the AHJ with blanket authority to require an evaluation when such evidence is lacking.

Statement of Problem and Substantiation for Public Input

Frequently, the fire code AHJ is put in a position of observing potentially hazardous electrical conditions but they do not have the necessary technical expertise to make an assessment. While an electrical inspector may be available in some jurisdictions to assist the fire code AHJ, that is not always the case. A good solution is requiring an evaluation by a licensed electrician. This PI provides a route for the fire code AHJ to pursue when an electrical concern is identified.

This PI has been modified based on comments received by the TC at the PreROP meeting. This includes addressing the TC's concern that an AHJ could require this evaluation without any cause. The new language requires that the AHJ have some evidence of concern and new annex text was provided to clarify the intent.

Submitter Information Verification

Submitter Full Name: Anthony Apfelbeck
Organization: Altamonte Springs Building/Fire Safety Division
Street Address:  
City:  
State:  
Zip:  
Submittal Date: Wed Jan 24 11:16:33 EST 2018
Committee:  

Committee Statement

Resolution: FR-16-NFPA 1-2018
Statement: The revision modifies the proposed text in the public input by using the term 'qualified person' which is used in the NEC and other NFPA codes and standards. This revision also adds the phrase 'or portion thereof' for clarification on how the section can be applied. Frequently, the Fire Code AHJ is put in a position of observing potentially hazardous electrical conditions but they do not have the necessary technical expertise to make an assessment. While an electrical inspector may be available in some jurisdictions to assist the fire code AHJ, that is not always the case. A good solution is requiring an evaluation by a qualified person. The language requires that the AHJ have some evidence of concern and new annex text clarifies the intent.
Public Input No. 58-NFPA 1-2018 [ New Section after 11.1.4.3 ]

**Portable Appliances and Relocatable Power Taps.**
Clarification of what types of portable appliances are allowed to be plugged into relocatable power taps should be included here. For example, does NFPA support the use of relocatable power taps powering microwaves, refrigerators, coffee pots, etc? Is this all based on the ampacity of the appliance versus the ampacity of the relocatable power taps? I believe this section should be a specific clarification for household appliances.

**Statement of Problem and Substantiation for Public Input**
Clarification regarding household/portable appliances would be clearly stated in the code.

**Submitter Information Verification**
Submitter Full Name: Corey Boynak
Organization: UNLV Fire and Life Safety
Street Address:
City:
State:
Zip:
Submittal Date: Tue Apr 24 12:39:35 EDT 2018
Committee:

**Committee Statement**
Resolution: No specific text is being proposed by the submitter for consideration. The submitter should propose specific text for review and consideration by the NFPA 1 Technical Committee.
Public Input No. 109-NFPA 1-2018 [Section No. 11.1.5]

11.1.5 Extension Cords.

* A portable appliance as used in this section is synonymous to the term portable equipment as used in NFPA 70. Portable equipment in Article 513 and found in the NFPA Glossary of Terms is equipment with electrical components suitable to be moved by a single person without mechanical aids. Sections 11.1.5.1 – 11.1.5.4 establish the service conditions and portable appliances for which extension cords may be used temporarily or permanently.

11.1.5.1 Extension cords shall be plugged directly into an approved receptacle, power tap, or multiplug adapter and shall, except for approved multiplug extension cords, serve only one portable appliance.

11.1.5.2* The ampacity of the extension cords shall not be less than the rated capacity of the portable appliance supplied by the cord.

11.1.5.3 The extension cords shall be maintained in good condition without splices, deterioration, or damage.

11.1.5.4 Extension cords shall be grounded when servicing grounded portable appliances.

11.1.5.5 Extension cords and flexible cords shall not be affixed to structures; extend through walls, ceilings, or floors, or under doors or floor coverings; or be subject to environmental or physical damage.

11.1.5.6 Extension cords shall not be used as a substitute for permanent wiring where receptacles are not spaced in accordance with NFPA 70 requirements.

*The spacing of receptacles varies according to the occupancy type and date of construction. This Section provides that where fixed receptacles do not exist the permanent use of extension cords is not permitted.

Statement of Problem and Substantiation for Public Input

The NEC has for decades limited extension cord use to portable equipment which is synonymous with the NFPA 1 portable appliance. Extension cords meeting the appropriate requirements of the first four sections 11.1.5.1-11.1.5.4 are suitable for continued or permanent use on portable appliances. With the addition of 11.1.5.6 enforcers are ignoring the 5 preceding prescriptive allowances for the use of extension cords, which in the numbering hierarchy of the code says are equal and making a judgmental call that no extension cords may be in use serving lamps, stereos, or small (portable) televisions and other portable equipment.

In 1997 NFPA 1 for the first time in 6.1.5 said simply- “Extension cords shall not be used as a substitute for permanent wiring.” The sections above it were all references to the NEC and not in current language. I suspect if we went into the NEC prior to 1997 we would see that same simple sentence. The 5 sentences about extension cord use were not in the code then.

The 5 paragraphs about extension cords appears for the first time in the 2006 edition of NFPA 1. The previous Section 6.1.5 above becomes 11.1.5 in that edition. The requirements are not joined at this point! They are in Building Services but the 11.1 section is addressing electrical safety and referring to NFPA 70 throughout.

Then in the 2009 edition of NFPA 1 we see the 5 paragraphs renumbered and an non prescriptive requirement for first time joins all of the existing prescriptive requirements for extension cords with the separation from Building Services and the NEC provisions.

It’s simple to understand what the code is saying if you balance portable against permanent. I think the code is prescriptively saying portable devices can be served by extension cords that are continuing or permanent as well a temporary. The recent provision that extension cords not be substituted for permanent needs better clarification and a criteria that is present in the proposed changes. I have an inspector citing extensions cords when the inspector determines they are not necessary- not something that is within inspector responsibility under NFPA 1. This is akin to the inspector picking the paint color of the room- not in the code.
First, realize that 11.1.5.6 said no extension cords-ever as it is being applied in the field that you would not need the preceding 5 sentences. Reason should win out on this logic alone.

Second, what are the first five paragraphs actually saying:

11.1.5.1 says something very important-extension cords must plug into a receptacle but can also also plug into multiplug adapters at the receptacle. In other words- no extension cords into other extension cords. Then it says it serves portable appliances and only one if it’s not a multi-plug cord. This last part is saying that if you have an exterior type orange black and decker brand extension cord with a single female plug you cannot put a multi-plug adapter there and plug in multiple appliances. This is also saying very importantly that extension cords are for portable appliances. Now what is a portable electric appliance- go to the NFPA glossary of terms and you will find a NEC based definition of portable- most logical to apply since we are talking about electricity here- portable is basically something that a person can pick up and move. So a lamp or stereo or paper shredder would be portable. A microwave is portable but if you look at its installation and use instructions it says plug it directly into the wall receptacle just like steam irons, portable heaters, and heating pads say in their instructions. Instructions for these heat producing appliances that I have encountered all say plug directly into a wall receptacle instead of do not use extension cords. This sentence is a good qualifier for all of the rest and especially the last sentence with the word permanent.

11.1.5.2, .3, and .4 say its got to be of the proper rating, in good shape, and with three prongs if the portable appliance has 3 prongs. This is pretty basic but it speaks to getting the properly sized cord for the service provided. We do see what I call lamp cords with a 3 pronged grounded plug squeezed into them and that is wrong.

11.1.5.5 says we don’t put them through walls, under doors, and under rugs- all of those things could crush the insulation and prevent the heat build-up in the cord from dissipating as designed. Good basic statement that is prescriptive and easily determined.

Third and Finally,

Now we get to the last one 11.1.5.6. Extension cords cannot substitute for permanent wiring. This is the one that everyone keys in on, holds as above the others, and gets wrong so that the proposed annex and code language must be added. With the proposed change the substitution of an extension cord for a receptacle is not allowed.

You have to ask when does an extension cord begin to substitute for permanent wiring. Part of it is to determine when the electrical appliance it serves is portable or not. Here is a simple example and measure that inspectors likely encounter all the time: they walk into a sports bar and there are a dozen flat screens. Some of them sit on stands behind the bar and some of them are mounted to the wall. For simplicity sake let’s say all the sets weigh less than 40 lbs. (UPS drivers only pick up 50 lbs.)

1. Because I can pick up and move the ones behind the bar on stands (even if I have to get on a ladder to reach them) they are portable and installation instructions do not say to plug directly into a receptacle (mine don’t)- so if I use an extension cord according to the first 5 sections of 11.1.5 it meets the code because it is not substituting for a receptacle.

2. The same flat screen that is mounted on the wall does not meet the definition of portable. That flat screen must plug directly into a receptacle.

Good example, right? And about that 62 inch flat screen that weighs 80 lbs- can it have an extension cord- use good judgement- does it meet the measure of portable if two people can move it? Maybe, maybe not , look to the NEC definition of portable equipment for guidance.

The proposed annex notes help to clarify what is being controlled and the new language for what constitutes substitution for wall receptacle will result in better application of the above provisions.

Submitter Information Verification

Submitter Full Name: Gregory Cahanin
Organization: Cahanin Fire & Code Consulting
Affiliation: No Affiliation
Street Address:
City:
Committee Statement

Resolution:  FR-62-NFPA 1-2018
Statement:  This revision takes into consideration the concerns of the submitter and adds text to clarify the use of extension cords with portable appliances and ensures that where a fixed receptacle does not exist the permanent use of extension cords cannot be used. Additional annex text is added to clarify the new requirement.
Portable Electric Heater
Tip over switches or devices shall be required on portable electric heaters. Tip over switches or devices will shut off the heater in the event it is unintentionally knocked over while in use.

Statement of Problem and Substantiation for Public Input

Space heaters are obviously known to start fires. Having a tip over switch requirement will prevent the heaters from continually running if accidentally (or intentionally) knocked over. This may provide as an additional safeguard.

Submitter Information Verification

Submitter Full Name: Vanessa Hogan
Organization: UNLV
Affiliation: UNLV / SFM
Street Address:
City:
State:
Zip:
Submittal Date: Fri Feb 23 18:06:37 EST 2018
Committee:

Committee Statement

Resolution: The concern of the submitter is adequately addressed by the requirement that portable heaters are required to be listed, which requires devices to shut off when tipped over.
11.7 Stationary Generators and Standby Power Systems.

11.7.1 Stationary Combustion Engines and Gas Turbines Installation.

Stationary generator sets shall be listed and labeled in accordance with UL 2200 and shall be installed in accordance with NFPA 37 and NFPA 70.

11.7.2 Portable Generators.

ADD UL 2200 to the chapter 2 list of referenced standards

11.7.2.1 Portable generators shall not be operated or refueled within buildings, on balconies, or on roofs.

11.7.2.1.1 Portable generators shall be permitted to be operated or refueled in a building or room that has been constructed for such use in accordance with the building code.

11.7.2.2 Fueling from a container shall be permitted when the engine is shut down and engine surface temperature is below the autoignition temperature of the fuel.

11.7.3 Emergency and Legally Required Standby Power Systems.

11.7.3.1 General.

New stationary generators for emergency use or for legally required standby power required by this Code, the building code, or other codes and standards shall be installed in accordance with NFPA 110.

11.7.3.2 Acceptance.

Newly installed stationary generators for emergency use or for legally required standby power for fire protection systems and features shall demonstrate the capacity of the energy converter, with its controls and accessories, to survive without damage from common and abnormal disturbances in actual load circuits by any of the following means:

(1) By tests on separate prototype models
(2) By acceptance tests on the system components as performed by the component suppliers
(3) By listing for emergency service as a completely factory-assembled and factory-tested apparatus

11.7.4 Stored Electrical Energy Emergency and Legally Required Standby Power System Installation.

Stored electrical energy systems required by this Code, the building code, or other NFPA codes and standards shall be installed in accordance with NFPA 111 and NFPA 70.

11.7.5 Maintenance and Testing.

11.7.5.1 Stationary generators used for emergency or legally required standby power shall be tested and maintained in accordance with NFPA 110 and NFPA 37 and the manufacturer’s instructions.

11.7.5.2 Stationary generators required by this Code, the building code, or other NFPA codes and standards shall be maintained in accordance with NFPA 110.
11.7.5.3

Stored electrical energy systems required by this Code, the building code, or other NFPA codes and standards shall be maintained in accordance with NFPA 111.

Statement of Problem and Substantiation for Public Input

UL 2200 evaluates stationary engine generators for fire, shock, and personal injury hazards and is a reasonable standard for safety working around these systems. Several manufactures have UL 2200 listings.

Related Public Inputs for This Document

<table>
<thead>
<tr>
<th>Related Input</th>
<th>Relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Input No. 99-NFPA 1-2018 [New Section after 10.15]</td>
<td></td>
</tr>
<tr>
<td>Public Input No. 100-NFPA 1-2018 [Section No. 11.7.2]</td>
<td></td>
</tr>
</tbody>
</table>

Submitter Information Verification

Submitter Full Name: Kelly Nicolello
Organization: UL LLC
Street Address:  
City:  
State:  
Zip:  
Submittal Date: Mon Jun 25 15:06:07 EDT 2018
Committee:  

Committee Statement

Resolution: FR-64-NFPA 1-2018
Statement: This revision clarifies the application of Section 11.7. As the requirements for portable generators have been moved to Chapter 10, Section 11.7 is applicable only to stationary generators and standby power systems.
11.7.2 Portable Generators.

11.7.2.1 Portable generators shall not be operated or refueled within buildings, on balconies, or on roofs.

11.7.2.1.1 Portable generators shall be permitted to be operated or refueled in a building or room that has been constructed for such use in accordance with the building code.

11.7.2.1.2 Fueling from a container shall be permitted when the engine is shut down and engine surface temperature is below the autoignition temperature of the fuel.

11.7.2.2 Portable generators shall be positioned so that the exhaust is directed as follows:

(1) At least 5 ft (1.5 m) in any direction away from any openings or air intakes

(2) Away from the building

Statement of Problem and Substantiation for Public Input

Location was moved to a new section 10.15 because their use is more closely associated with Chapter 10 general safety versus Chapter 11 building services requirements.

Related Public Inputs for This Document

<table>
<thead>
<tr>
<th>Related Input</th>
<th>Relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Input No. 99-NFPA 1-2018 [New Section after 10.15]</td>
<td></td>
</tr>
<tr>
<td>Public Input No. 101-NFPA 1-2018 [Section No. 11.7]</td>
<td></td>
</tr>
</tbody>
</table>

Submitter Information Verification

Submitter Full Name: Kelly Nicolello
Organization: UL LLC
Street Address: 
City: 
State: 
Zip: 
Submittal Date: Mon Jun 25 15:02:00 EDT 2018
Committee: 

Committee Statement

Resolution: FR-63-NFPA 1-2018
Statement: Section 10.15 moves the requirements for portable generators from current Section 11.7 for stationary generators and standby power systems, with modifications. The requirements for portable generators have been separated, expanded, and relocated to Chapter 10 with other general fire safety requirements as they are usually not looked at as a building service as addressed in Chapter 11.

Last cycle, a proposed change to increase the separation distance for portable generators was
received by the Technical Committee at the Second Draft stage but could not be acted on as it was
new material at that time. At this time, the Committee is recommending an increase from 5 ft to 20 ft
which is supported by current research as referenced in Public Comment No.75 from the Second
Draft agenda of the A2017 cycle and discussed by the Technical Committee. There has been some
evidence to suggest that a generator listed in accordance with UL 2201 may be okay at a 5 ft
separation distance. At this time there is some concern over how to properly educate the public on
the difference between a UL listed generator and a non-UL listed generator. Also, there is concern
over how easy it would be to identify a UL listed generator after installation.
11.7.2.2
Portable generators shall be positioned so that the exhaust is directed as follows:

- At least 5 ft (1.5 m) in any direction away from any openings or air intakes
- Away from the building has at least 20 ft (6 m) separation and oriented in a perpendicular direction away from the building, as measured from the generators exhaust system termination to the building. A portable generator that is closer then 20 ft (6 m) shall meet the reduced carbon monoxide emissions requirements as specified by ANSI/UL2201.

Additional Proposed Changes

<table>
<thead>
<tr>
<th>File Name</th>
<th>Description</th>
<th>Approved</th>
</tr>
</thead>
<tbody>
<tr>
<td>NFPA_1_Feedback_june_2018.pdf</td>
<td>Rationale Document for justifying new portable generator distance text</td>
<td></td>
</tr>
</tbody>
</table>

Statement of Problem and Substantiation for Public Input

Currently, the Fire Code (NFPA 1) code provisions on carbon monoxide (CO) do not provide accurate specification to address CO poisoning hazards for portable generators. Techtronic Industries Power Equipment (TTi) proposes the above changes to section 11.7.2.2 of NFPA 1 to reduce the risk of combustion gases exhausted from a generator engine infiltrating a structure so that the risk of CO poisoning injuries and deaths for occupants in the structure will be reduced. As of May 21, 2015, for the period 2004 through 2014, CPSC databases contained reports of at least 44 non-work-related consumer CO deaths from 31 incidents that resulted from the exhaust of generators operating outdoors, infiltrating into occupied enclosed spaces. In addition, in 10 percent of the of the 292 reported records of CO-related emergency department visits associated with generators, for the same period, CPSC’s National Electronic Injury Surveillance System (NEISS) database indicates that the generator was located outside. NEISS is a national probability sample of hospitals in the United States and its territories. In half of the “Outside the home” scenarios, the NEISS narrative specifically cites the location as near a window, door, or air conditioner. There are other published sources that also show CO deaths and injuries from outdoor operation of portable generators documenting that the injured consumers generally used their portable generators an average of only a few feet away from the nearest door or window. In 2013, the Centers for Disease Control and Prevention (CDC) began recommending that portable generators should never be placed less than 20 feet from an open window, door, or vent, where exhaust can vent into an enclosed area. CPSC is now making this recommendation as well. The recommendation is based, in part, on results of modeling studies performed by the National Institute of Standards and Technology (NIST) regarding the effects on indoor CO concentration profiles of operating an existing, gasoline-fueled carbureted generator outdoors. The studies concluded that placing the generator more than 15 feet away from the structure, with the exhaust pointing away, helps reduce CO infiltration. A recent report from the Main CDC shows that from April 2008-2015, of the 498 cases of CO poisoning in Maine, 59 (12%) were attributable to generators. The generator location for 50 of the 59 poisonings was identified. In 14 (24%) of the cases, the generator was located inside, in 12 (20%) cases, the generator was located in a garage/building, and in 24 (40%) cases the generator was located outside. The distance from the residence was identified in 10 of the 24 poisoning cases where the generator was located outside, and in all 10 cases was < 15 feet from the building.

The latest comprehensive review of portable generator location following Hurricane Irma by the Florida Department of Health shows that 65% of the generator CO incidents resulted from victims using the generator outside of the home, but not far enough away from the home.

Provided with this public input are many postings found by this submitter that were posted by individuals on their Facebook (FB) pages, all describing personal incidents of portable generators being used outside and CO infiltrating homes. A number of them stated that they thought they had the generator far enough away, yet were still put at risk from the exhaust CO. Typical portable generator warnings advise to keep the generator “far away”, yet this warning lacks a specific distance so that the user can have a sufficient frame of reference and may wrongly perceive a closer distance to their home to be safe due to their lack of knowledge of the intrinsic dangers of CO and its ability to travel undetected and accumulate in occupied spaces.

Submitter acknowledges that there are circumstances where neighborhoods with closely spaced homes do not provide the available space to allow the recommended 20 feet of separation from the structure. This point alone is
not justification enough for ignoring an important warning and recommended placement. For those cases that would require the generator to be less than 20 feet away, it is recommended to use a generator that meets the reduced CO emissions requirements specified in ANSI/UL2201. The emissions limits described in ANSI/UL2201 require a 90% reduction in CO when compared to standard generators of the same class. This significant reduction of dangerous CO emissions at the source provides a substantial decrease in risk to users of portable generators when placed less than 20 feet away from the structure. There are already many models of generators that comply with this new emissions requirement and many more in development as demand increases for safer generators.

Submitter Information Verification

Submitter Full Name: Michael Gardner
Organization: TTi
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jun 26 23:26:10 EDT 2018
Committee:

Committee Statement

Resolution: FR-63-NFPA 1-2018
Statement: Section 10.15 moves the requirements for portable generators from current Section 11.7 for stationary generators and standby power systems, with modifications. The requirements for portable generators have been separated, expanded, and relocated to Chapter 10 with other general fire safety requirements as they are usually not looked at as a building service as addressed in Chapter 11.

Last cycle, a proposed change to increase the separation distance for portable generators was received by the Technical Committee at the Second Draft stage but could not be acted on as it was new material at that time. At this time, the Committee is recommending an increase from 5 ft to 20 ft which is supported by current research as referenced in Public Comment No.75 from the Second Draft agenda of the A2017 cycle and discussed by the Technical Committee. There has been some evidence to suggest that a generator listed in accordance with UL 2201 may be okay at a 5 ft separation distance. At this time there is some concern over how to properly educate the public on the difference between a UL listed generator and a non-UL listed generator. Also, there is concern over how easy it would be to identify a UL listed generator after installation.
11.7.2.2
Portable generators shall be positioned so that the exhaust is directed as follows:

At least 5 ft

1. (1) At least 5 ft in any direction away from any openings or air intakes; and

2. The exhaust from the portable generator is directed away from any buildings within 25 ft of the portable generator.

Statement of Problem and Substantiation for Public Input

During recent storm events in Florida, and through studies of the CPSC, it has become readily apparent that the 5 ft distance language in NFPA 1 is inadequate and technically incorrect. The PI that originally inserted the 5’ language into NFPA 1 was not substantiated because there was no data on what was an acceptable distance requirement to ensure safety. This has now changed with added data. This is supported by:


Honda Youtube video recommends a 15’ distance from any window or door: https://www.youtube.com/watch?v=vzj1CVRlEXc


As of May 21, 2015, for the period 2004 through 2014, CPSC databases contained reports of at least 44 non-work-related consumer CO deaths from 31 incidents that resulted from the exhaust of generators operating outdoors, infiltrating into occupied enclosed spaces. In addition, in 10 percent of the of the 292 reported records of CO-related emergency department visits associated with generators, for the same period, CPSC’s National Electronic Injury Surveillance System (NEISS) database indicates that the generator was located outside. NEISS is a national probability sample of hospitals in the United States and its territories. In half of the "Outside the home" scenarios, the NEISS narrative specifically cites the location as near a window, door, or air conditioner. There are other published sources that also show CO deaths and injuries from outdoor operation of portable generators documenting that the injured consumers generally used their portable generators an average of only a few feet away from the nearest door or window. In 2013, the Centers for Disease Control and Prevention (CDC) began recommending that portable generators should never be placed less than 20 feet from an open window, door, or vent, where exhaust can vent into an enclosed area. CPSC is now making this recommendation as well. The recommendation is based, in part, on results of modeling studies performed by the National Institute of Standards and Technology (NIST) regarding the effects on indoor CO concentration profiles of operating an existing, gasoline-fueled carbureted generator outdoors. The studies concluded that placing the generator more than 15 feet away from the structure, with the exhaust pointing away, helps reduce CO infiltration.


3. CDC, 2006. Carbon Monoxide Poisonings After Two Major Hurricanes - Alabama and Texas, August -


Submitter Information Verification

Submitter Full Name: Anthony Apfelbeck
Organization: Altamonte Springs Building/Fire Safety Division
Street Address:
City:
State:
Zip:
Submittal Date: Sat Jan 20 14:04:46 EST 2018
Committee:

Committee Statement

Resolution: FR-63-NFPA 1-2018
Statement: Section 10.15 moves the requirements for portable generators from current Section 11.7 for stationary generators and standby power systems, with modifications. The requirements for portable generators have been separated, expanded, and relocated to Chapter 10 with other general fire safety requirements as they are usually not looked at as a building service as addressed in Chapter 11.

Last cycle, a proposed change to increase the separation distance for portable generators was received by the Technical Committee at the Second Draft stage but could not be acted on as it was new material at that time. At this time, the Committee is recommending an increase from 5 ft to 20 ft which is supported by current research as referenced in Public Comment No.75 from the Second Draft agenda of the A2017 cycle and discussed by the Technical Committee. There has been some evidence to suggest that a generator listed in accordance with UL 2201 may be okay at a 5 ft separation distance. At this time there is some concern over how to properly educate the public on the difference between a UL listed generator and a non-UL listed generator. Also, there is concern over how easy it would be to identify a UL listed generator after installation.
11.7.2.2
Portable generators shall be positioned so that the exhaust is directed as follows:

1. At least 5 ft (1.5 m) in any direction away from any openings or air intakes.

2. Away, at least XX ft away, from the building.

Additional Proposed Changes

<table>
<thead>
<tr>
<th>File Name</th>
<th>Description</th>
<th>Approved</th>
</tr>
</thead>
</table>

Statement of Problem and Substantiation for Public Input

Please see uploaded document.

Submitter Information Verification

Submitter Full Name: Dorothy Fibiger
Organization: California Air Resources Board
Street Address: City: State: Zip: Submittal Date: Wed Jun 27 18:35:59 EDT 2018

Committee Statement

Resolution: FR-63-NFPA 1-2018
Statement: Section 10.15 moves the requirements for portable generators from current Section 11.7 for stationary generators and standby power systems, with modifications. The requirements for portable generators have been separated, expanded, and relocated to Chapter 10 with other general fire safety requirements as they are usually not looked at as a building service as addressed in Chapter 11.

Last cycle, a proposed change to increase the separation distance for portable generators was received by the Technical Committee at the Second Draft stage but could not be acted on as it was new material at that time. At this time, the Committee is recommending an increase from 5 ft to 20 ft which is supported by current research as referenced in Public Comment No.75 from the Second Draft agenda of the A2017 cycle and discussed by the Technical Committee. There has been some evidence to suggest that a generator listed in accordance with UL 2201 may be okay at a 5 ft separation distance. At this time there is some concern over how to properly educate the public on the difference between a UL listed generator and a non-UL listed generator. Also, there is concern over how easy it would be to identify a UL listed generator after installation.
June 27, 2018

Dawn Michele Bellis  
Secretary, NFPA Standards Council  
1 Batterymarch Park  
Quincy, Massachusetts 02169-7471  

Dear Secretary Bellis:  

Re: NFPA 1-2018 Edition  
Fire Code  

California Air Resources Board (CARB) staff supports changes to National Fire Protection Association Code 1 (NFPA 1) that would require portable generator exhaust termination to be farther from buildings, which would help prevent possible exhaust intrusion into buildings. The minimum distance of five feet from any openings or air intakes, detailed in section 11.7.2.2 of NFPA 1, is inadequate to prevent injury, illness, or death from carbon monoxide (CO) poisoning caused by exhaust intrusion into a building. CARB supports increasing the minimum distance to greater than five feet to help provide health and wellness benefits to those using portable generators.

Portable generator engines produce high emissions of CO, with current California standards set at 549 grams per kilowatt-hour. A new 10-kilowatt portable generator engine could emit up to 5,490 grams of CO per hour without violating the California emission standard. In contrast, the average new car in 1969 emitted 839 grams per hour at idle. In 1989, the average new car emitted only 13.2 grams per hour, significantly less than what even a 1-kilowatt portable generator engine could produce. Many new cars today emit CO at even lower levels. Deaths from CO poisoning have decreased along with declining automobile CO emissions, with 13 percent fewer deaths attributed to CO poisoning in 2014 than in 1999. Death and injuries caused by portable generators continue to occur at unacceptable rates, often due to inadequate distance of the exhaust discharge from an inhabited structure. The Consumer Product Safety Commission estimates there are over 2,800 medically attended injuries due to CO exposure from generators in the U.S. each year. Additionally, during the period 2005-2016, there were 38 incidents, with 52 fatalities, due to CO exposure from generators running outdoors.

The higher CO emissions from portable and stationary generators often lead to high CO concentrations in the vicinity of these generators and, therefore, have a negative impact on health and safety. Exposure to moderate levels of CO can cause headache, dizziness, vomiting, nausea, and aggravation of angina and other cardiovascular
diseases. Exposure to high levels of CO can lead to unconsciousness or death. While moving all generator exhaust farther from buildings will not replace more stringent standards on CO emissions, it will reduce potential harm to people in the immediate vicinity of the generators. California's current CO emission standards for portable generators provide protection for ambient air quality, and this proposed rule change directly addresses the remaining issue of CO levels in the area most affected by emissions. Increasing the minimum distance for exhaust to greater than five feet from any openings or air intakes would provide greater protection to occupants in buildings with nearby portable generators in use.

We look forward to these changes reducing injury, illness, and death caused by CO from generator usage.

Sincerely,

Catherine Dunwoody, Chief Monitoring and Laboratory Division

---

11.7.2.2
Portable generators shall be positioned so that the exhaust is directed as follows:

(1) At least 5 ft (1.5 m) in any direction away from any openings or air intakes.

(2) In a structure such as a window, door, crawlspace access at or below grade level, or ventilation opening. The distance shall be measured from the generator exhaust system termination to the closest point on the structure opening.

(3) The exhaust is pointed away from the building.

Additional Proposed Changes

<table>
<thead>
<tr>
<th>File Name</th>
<th>Description</th>
<th>Approved</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public_Comment_No._75.pdf</td>
<td>NFPA 1 Public Comment No. 75</td>
<td></td>
</tr>
</tbody>
</table>

Statement of Problem and Substantiation for Public Input

NOTE: This Public Input appeared as "Reject but Hold" in Public Comment No. 14 of the A2017 Second Draft Report for NFPA 1 and per the Regs. at 4.4.8.3.1.

Rationale: Currently, the Fire Code ("NFPA 1") does not address carbon monoxide ("CO") poisoning hazards for portable generators. Staff of the U.S. Consumer Product Safety Commission ("CPSC") proposes these changes to section 11.7.2.2 of NFPA 1 to reduce the risk of combustion gases exhausted from a generator engine infiltrating a structure so that the risk of CO poisoning injuries and deaths for occupants in the structure will be reduced.

As of May 21, 2015, for the period 2004 through 2014, CPSC databases contained reports of at least 44 non-work-related consumer CO deaths from 31 incidents that resulted from the exhaust of generators operating outdoors, infiltrating into occupied enclosed spaces.(ref 1) In addition, in 10 percent of the of the 282 reported records of CO-related emergency department visits associated with generators, for the same period, CPSC’s National Electronic Injury Surveillance System ("NEISS") database indicates that the generator was located outside. NEISS is a national probability sample of hospitals in the United States and its territories. In half of the "Outside the home" scenarios, the NEISS narrative specifically cites the location as near a window, door, or air conditioner.(ref 2) There are other published sources that also show CO deaths and injuries from outdoor operation of portable generators documenting that the injured consumers generally used their portable generators an average of only a few feet away from the nearest door or window.(refs 3 and 4) In 2013, the Centers for Disease Control and Prevention ("CDC") began recommending that portable generators should never be placed less than 20 feet from an open window, door, or air vent, where exhaust can vent into an enclosed area.(ref 5) CPSC is now making this recommendation as well. (ref 6) The recommendation is based, in part, on results of modeling studies performed by the National Institute of Standards and Technology ("NIST") regarding the effects on indoor CO concentration profiles of operating an existing, gasoline-fueled carbureted generator outdoors. The studies concluded that placing the generator more than 15 feet away from the structure, with the exhaust pointing away, helps reduce CO infiltration. (refs 7 and 8)

References:


Page 104 of 290


**This proposal is that of the CPSC staff, has not been reviewed or approved by, and may not necessarily reflect the views of, the Commission.**

Submitter Information Verification

Submitter Full Name: Tc On Fcc-Aaa
Organization: NFPA
Street Address: 
City: 
State: 
Zip: 
Submittal Date: Wed Feb 07 10:08:59 EST 2018
Committee: 

Committee Statement

Resolution: FR-63-NFPA 1-2018
Statement: Section 10.15 moves the requirements for portable generators from current Section 11.7 for stationary generators and standby power systems, with modifications. The requirements for portable generators have been separated, expanded, and relocated to Chapter 10 with other general fire safety requirements as they are usually not looked at as a building service as addressed in Chapter 11.

Last cycle, a proposed change to increase the separation distance for portable generators was received by the Technical Committee at the Second Draft stage but could not be acted on as it was new material at that time. At this time, the Committee is recommending an increase from 5 ft to 20 ft which is supported by current research as referenced in Public Comment No.75 from the Second Draft agenda of the A2017 cycle and discussed by the Technical Committee. There has been some evidence to suggest that a generator listed in accordance with UL 2201 may be okay at a 5 ft separation distance. At this time there is some concern over how to properly educate the public on the difference between a UL listed generator and a non- UL listed generator. Also, there is concern over how easy it would be to identify a UL listed generator after installation.
11.7.2.2

Portable generators shall be positioned so that the exhaust is directed as follows:

1. At least 5, least 20 ft (6.1 m) in any direction away from any openings or air intakes

2. In a structure such as a window, door, crawlspace access at or below grade level, or ventilation opening. The distance shall be measured from the generator exhaust system termination to the closest point on the structure opening.

3. The exhaust is pointed away from the building.

Additional Proposed Changes

<table>
<thead>
<tr>
<th>File Name</th>
<th>Description Approved</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPSC_staff_proposal_for_NFPA_1_to_address_the_CO_hazard_of_portable_generators.docx</td>
<td>When I entered the change online, it inserted it as a 3-part change, but was meant to be only 2 parts. See attached</td>
</tr>
</tbody>
</table>

Statement of Problem and Substantiation for Public Comment

Rationale: Currently, the Fire Code ("NFPA 1") does not address carbon monoxide ("CO") poisoning hazards for portable generators. Staff of the U.S. Consumer Product Safety Commission ("CPSC") proposes these changes to section 11.7.2.2 of NFPA 1 to reduce the risk of combustion gases exhausted from a generator engine infiltrating a structure so that the risk of CO poisoning injuries and deaths for occupants in the structure will be reduced.

As of May 21, 2015, for the period 2004 through 2014, CPSC databases contained reports of at least 44 non-work-related consumer CO deaths from 31 incidents that resulted from the exhaust of generators operating outdoors, infiltrating into occupied enclosed spaces.(ref 1) In addition, in 10 percent of the of the 292 reported records of CO-related emergency department visits associated with generators, for the same period, CPSC’s National Electronic Injury Surveillance System ("NEISS") database indicates that the generator was located outside. NEISS is a national probability sample of hospitals in the United States and its territories. In half of the “Outside the home” scenarios, the NEISS narrative specifically cites the location as near a window, door, or air conditioner.(ref 2) There are other published sources that also show CO deaths and injuries from outdoor operation of portable generators documenting that the injured consumers generally used their portable generators an average of only a few feet away from the nearest door or window.(refs 3 and 4) In 2013, the Centers for Disease Control and Prevention ("CDC") began recommending that portable generators should never be placed less than 20 feet from an open window, door, or vent, where exhaust can vent into an enclosed area.(ref 5) CPSC is now making this recommendation as well. (ref 6) The recommendation is based, in part, on results of modeling studies performed by the National Institute of Standards and Technology ("NIST") regarding the effects on indoor CO concentration profiles of operating an existing, gasoline-fueled carbureted generator outdoors. The studies concluded that placing the generator more than 15 feet away from the structure, with the exhaust pointing away, helps reduce CO infiltration. (refs 7 and 8)

References:


**This proposal is that of the CPSC staff, has not been reviewed or approved by, and may not necessarily reflect the views of, the Commission.

Related Item
First Revision No. 128-NFPA 1-2015 [Section No. 11.5.2.3]

Submitter Information Verification

Submitter Full Name: Janet Buyer
Street Address:
City:
State:
Zip:
Submittal Date: Fri May 13 10:59:35 EDT 2016

Committee Statement

Committee Action: Rejected but held
Resolution: Proposed change is new material and will be addressed next cycle.
Copyright Assignment

I, Janet Buyer, hereby irrevocably grant and assign to the National Fire Protection Association (NFPA) all and full rights in copyright in this Public Comment (including both the Proposed Change and the Statement of Problem and Substantiation). I understand and intend that I acquire no rights, including rights as a joint author, in any publication of the NFPA in which this Public Comment in this or another similar or derivative form is used. I hereby warrant that I am the author of this Public Comment and that I have full power and authority to enter into this copyright assignment.

☑ By checking this box I affirm that I am Janet Buyer, and I agree to be legally bound by the above Copyright Assignment and the terms and conditions contained therein. I understand and intend that, by checking this box, I am creating an electronic signature that will, upon my submission of this form, have the same legal force and effect as a handwritten signature.
CPSC staff proposal for NFPA 1 *Fire Code* **

NFPA 1 (New revised text is *underlined* and deleted text is shown with a line through it.)

11.7.2.2

Portable generators shall be positioned *such that the exhaust is directed* as follows:

1. At least *20 ft (6.1 m)* *in any direction away* from any openings or air intakes in a structure such as a window, door, crawlspace access at or below grade level, or ventilation opening. The distance shall be measured from the generator exhaust system termination to the closest point on the structure opening.

2. The exhaust is pointed *away* from the building.
Public Input No. 42-NFPA 1-2018 [Section No. 11.7.2.2]

11.7.2.2
Portable generators shall be positioned so that the exhaust is directed as follows:

1. At least 5 ft (1.5 m) in any direction away from any openings or air intakes
2. Away from the building or occupied areas

Additional Proposed Changes

<table>
<thead>
<tr>
<th>File Name</th>
<th>Description</th>
<th>Approved</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public_Comment_No_.78.pdf</td>
<td>NFPA 1 Public Comment No. 78</td>
<td></td>
</tr>
</tbody>
</table>

Statement of Problem and Substantiation for Public Input

NOTE: This Public Input appeared as "Reject but Hold" in Public Comment No. 78 of the A2017 Second Draft Report for NFPA 1 and per the Regs. at 4.4.8.3.1.

Based on a study by the Centers for Disease Control and Prevention, almost half of the poisonings of carbon monoxide which are non-fatal during the hurricane season of 2004, are caused by outdoor generators which are operated within 7 feet from the house. The study also pointed out that people need specific guidelines on the use of portable generators to prevent poisoning of carbon monoxide.

The CDC, in order to find the safe distance to operate portable generators, teamed up with some building experts from the National Institute of Standards and Technology. Consequently, the NIST conducted studies with the view in mind of determining the safe distance from occupied spaces to operate the generator. The result of their studies suggests that even at a distance of 15 feet, the toxic gas can enter open windows and doors, so the CDC is recommending to only use portable generators more than 20 feet away from occupied buildings, doors, and windows.

Also, as one of the top 4 generator producers, TTI did a study in 2013 to determine the effectiveness between various warning texts and the user perception of an acceptable distance from structures that they should place their portable generator. The results indicated that the user better understands how far to place a generator when a warning is provided, and is even better informed of the potential hazards of CO when provided a frame of reference in the form of a specific distance number (20 feet).

NIST Technical Note 1666
NIST Technical Note 1637 http://www.cdc.gov/co/studies.htm

Submitter Information Verification

Submitter Full Name: TC On Fcc-Aaa
Organization: NFPA
Street Address:
City:
State:
Zip:
Submittal Date: Wed Feb 07 10:22:00 EST 2018
Committee:

Committee Statement

Resolution: FR-63-NFPA 1-2018
**Statement:**  Section 10.15 moves the requirements for portable generators from current Section 11.7 for stationary generators and standby power systems, with modifications. The requirements for portable generators have been separated, expanded, and relocated to Chapter 10 with other general fire safety requirements as they are usually not looked at as a building service as addressed in Chapter 11.

Last cycle, a proposed change to increase the separation distance for portable generators was received by the Technical Committee at the Second Draft stage but could not be acted on as it was new material at that time. At this time, the Committee is recommending an increase from 5 ft to 20 ft which is supported by current research as referenced in Public Comment No.75 from the Second Draft agenda of the A2017 cycle and discussed by the Technical Committee. There has been some evidence to suggest that a generator listed in accordance with UL 2201 may be okay at a 5 ft separation distance. At this time there is some concern over how to properly educate the public on the difference between a UL listed generator and a non-UL listed generator. Also, there is concern over how easy it would be to identify a UL listed generator after installation.
11.7.2.2
Portable generators shall be positioned so that the exhaust is directed as follows:

(1) At least 20 ft (6.1 m) in any direction away from any openings or air intakes
(2) Away from the building or occupied areas

Statement of Problem and Substantiation for Public Comment

Based on a study by the Centers for Disease Control and Prevention, almost half of the poisonings of carbon monoxide which are non-fatal during the hurricane season of 2004, are caused by outdoor generators which are operated within 7 feet from the house. The study also pointed out that people need specific guidelines on the use of portable generators to prevent poisoning of carbon monoxide.

The CDC, in order to find the safe distance to operate portable generators, teamed up with some building experts from the National Institute of Standards and Technology. Consequently, the NIST conducted studies with the view in mind of determining the safe distance from occupied spaces to operate the generator. The result of their studies suggests that even at a distance of 15 feet, the toxic gas can enter open windows and doors, so the CDC is recommending to only use portable generators more than 20 feet away from occupied buildings, doors, and windows.

Also, as one of the top 4 generator producers, TTI did a study in 2013 to determine the effectiveness between various warning texts and the user perception of an acceptable distance from structures that they should place their portable generator. The results indicated that the user better understands how far to place a generator when a warning is provided, and is even better informed of the potential hazards of CO when provided a frame of reference in the form of a specific distance number (20 feet).

NIST Technical Note 1666
NIST Technical Note 1637
http://www.cdc.gov/co/studies.htm

Related Item
First Revision No. 98-NFPA 1-2015 [New Section after 50.6.3]

Submitter Information Verification

Submitter Full Name: Michael Gardner
Organization: TTI
Affiliation: Techtronic Industries
Street Address:
City:
State:
Zip:
Submittal Date: Fri May 13 16:04:35 EDT 2016

Committee Statement

Committee Action: Rejected but held
Resolution: Proposed change is new material and will be addressed next cycle.
Copyright Assignment

I, Michael Gardner, hereby irrevocably grant and assign to the National Fire Protection Association (NFPA) all and full rights in copyright in this Public Comment (including both the Proposed Change and the Statement of Problem and Substantiation). I understand and intend that I acquire no rights, including rights as a joint author, in any publication of the NFPA in which this Public Comment in this or another similar or derivative form is used. I hereby warrant that I am the author of this Public Comment and that I have full power and authority to enter into this copyright assignment.

☑ By checking this box I affirm that I am Michael Gardner, and I agree to be legally bound by the above Copyright Assignment and the terms and conditions contained therein. I understand and intend that, by checking this box, I am creating an electronic signature that will, upon my submission of this form, have the same legal force and effect as a handwritten signature.

11.10.1 In all new and existing buildings, minimum radio signal strength for fire department communications shall be maintained at a level determined by the AHJ.

11.10.2 Where required by the AHJ, two-way radio communication enhancement systems shall comply with NFPA 1221.

11.10.2.1 Two-way radio communication enhancement systems installed within buildings shall be listed and labeled in accordance with UL 2524 In-building 2-Way Emergency Radio Communication Enhancement Systems.

Add UL 2524 to the chapter 2 references.

11.10.3 Where a two-way radio communication enhancement system is required and such system, components, or equipment has a negative impact on the normal operations of the facility at which it is installed, the AHJ shall have the authority to accept an automatically activated responder system.

Statement of Problem and Substantiation for Public Input

Two-way communication enhancement has been a code requirement for a number of years. However, there has not been a standard by which to certify the equipment being installed into buildings for this purpose. The past results have been inconsistent equipment packages that act as a number of standalone devices rather than as a coordinated system. This standard coordinates the performance requirements into a dependable working system.

Submitter Information Verification

Submitter Full Name: Kelly Nicolello
Organization: UL LLC
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jun 25 15:11:20 EDT 2018
Committee:

Committee Statement

Resolution: FR-70-NFPA 1-2018
Statement: This revision adds to the Code minimum safety and performance requirements for two-way radio communication enhancement systems that currently don’t exist in any other codes and standards. Requirements and accepted installation practices have made their way through the industry via emerging technologies that did not exist years ago and these Code changes seek to address this. Further refinement will be done between now and the Second Draft stages to make additional edits to the text per the NFPA Manual of Style.
Add the following

11.10.4 The operation of two-way radio communication enhancement system shall not be impeded by radio signal jamming equipment.

Statement of Problem and Substantiation for Public Input

Certain types of businesses install active or passive jamming systems in their buildings to prevent cyber attacks, employee theft of data or as a security measure. These systems have the potential to render the two-way radio communication systems ineffective. The presence of these types of systems should be considered.

This PI was modified as a result of the discussion at the PreROP meeting to simplify the language in the original PI.

Submitter Information Verification

Submitter Full Name: Anthony Apfelbeck
Organization: Altamonte Springs Building/Fire Safety Division
Street Address: 
City: 
State: 
Zip: 
Submittal Date: Tue Apr 24 10:48:33 EDT 2018
Committee: 

Committee Statement

Resolution: Requirements should not reference an illegal installation.
Public Input No. 150-NFPA 1-2018 [Sections 11.12.1, 11.12.2, 11.12.3]

Sections 11.12.1, 11.12.2, 11.12.3

11.12.1 Photovoltaic systems shall be designed and installed in accordance with Section 11.12. Electrical portions of photovoltaic systems shall be designed and installed in accordance with NFPA 70.


11.12.2.1* Marking.
Photovoltaic systems shall be permanently marked as specified in this subsection.

11.12.2.1.1* Rapid Shutdown Marking.
Buildings with a rooftop-mounted PV system and buildings with a BIPV system installed as the roof covering shall be provided with permanent labels as described in 11.12.2.1.1.1 through 11.12.2.1.1.7.

11.12.2.1.1.1 Rapid Shutdown Type.
The type of PV system rapid shutdown shall be labeled as described in 11.12.2.1.1.1.1 or 11.12.2.1.1.1.2.

11.12.2.1.1.1.1 For PV systems that shut down the array and conductors leaving the array:

EMERGENCY RESPONDER: THIS SOLAR PV SYSTEM IS EQUIPPED WITH RAPID SHUTDOWN
TURN RAPID SHUTDOWN SWITCH TO THE "OFF" POSITION TO SHUT DOWN ENTIRE PV SYSTEM

11.12.2.1.1.2 For PV systems that only shut down conductors leaving the array:

EMERGENCY RESPONDER: THIS SOLAR PV SYSTEM IS EQUIPPED WITH RAPID SHUTDOWN
TURN RAPID SHUTDOWN SWITCH TO THE "OFF" POSITION. ONLY CONDUCTORS INSIDE BUILDING OR OFF THE ROOF WILL SHUT DOWN

11.12.2.1.1.2 The label shall be reflective, with all letters capitalized and having a minimum height of 7/8 in. (9.5 mm), in white on a red background.

11.12.2.1.1.3 The label shall include a simple diagram of a building with a roof. Diagram sections in red shall signify sections of the PV system that are not shut down when the rapid shutdown switch is operated. Sections of the diagram in green shall signify sections of the PV system that are shut down when the rapid shutdown switch is operated.

11.12.2.1.1.4 The rapid shutdown label shall be located on or no more than 3 ft (1 m) from the service disconnecting means to which the PV systems are connected, and the label shall indicate the location of the rapid shutdown switch if it is not at the same location.

11.12.2.1.1.5 Buildings with More Than One Rapid Shutdown Type.
For buildings that have PV systems with both rapid shutdown types, or a rapid shutdown type and a PV system with no rapid shutdown, a detailed plan view diagram of the roof shall be provided showing each PV system and a dotted line around areas that remain energized after the rapid shutdown switch is operated.

11.12.2.1.1.6 Rapid Shutdown Switch.
The rapid shutdown switch shall have a label located on or no more than 3 ft (1 m) from the switch that includes the following words:

RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM

11.12.2.1.1.7 The label required by 11.12.2.1.1.6 shall be reflective, with all letters capitalized and having a minimum height of 7/8 in. (9.5 mm), in white on red background. [70:690.56(C)]
11.12.2.1.2
Each PV system disconnecting means shall be permanently marked to identify it as a PV system disconnect and shall indicate whether in the open or closed position. [70:690.13(B)]

11.12.2.1.3 Markings for Direct-Current Photovoltaic Source and Direct-Current Output Circuits on or Inside a Building.

The following wiring methods and enclosures that contain PV power source conductors shall be marked with the words WARNING: PHOTOVOLTAIC POWER SOURCE by means of permanently affixed labels or other approved permanent marking:

11.12.2.1.3.1 Marking Locations and Methods.
The labels or markings shall be visible after installation. The labels shall be reflective and shall have all letters capitalized with a minimum height of 3⁄8 in. (9.5 mm) white on red background. PV power circuit labels shall appear on every section of the wiring system that is separated by enclosures, walls, partitions, ceilings, or floors. Spacing between labels or markings, or between a label and a marking, shall not be more than 10 ft (3 m). Labels required by this section shall be suitable for the environment where they are installed. [70:690.31(G)(4)]

11.12.2.1.4 Secondary Power Source Markings.
A permanent plaque or directory, denoting all electric power sources on or in the premises, shall be installed at each service equipment location and at locations of all electric power production sources capable of being interconnected. [70:705.10]

11.12.2.1.5 Installer Information.
A label shall be installed adjacent to the main disconnect indicating the name and emergency telephone number of the company currently servicing the PV system.

11.12.2.1.6 Markings for Building Integrated PV (BIPV) Systems.
BIPV systems installed as the roof covering shall have markings to identify any areas with electrical hazards hidden from view. Marking shall be reflective and shall be visible from grade. The AHJ shall be permitted to reduce or exempt marking requirements for BIPV systems installed as the roof covering when they are listed in accordance with Section 690.12(B)(2) of NFPA 70.

11.12.2.2 Roof Access.

11.12.2.2.1 General.
Access pathways, setbacks, and spacing requirements shall be required to provide emergency access to the roof, provide pathways to specific areas of the roof, provide for smoke ventilation opportunity areas, and to provide emergency egress from the roof. The AHJ shall be permitted to reduce or modify roof access based upon fire department ventilation procedures or alternative methods that ensure adequate fire department access, pathways, and smoke ventilation. The AHJ shall be permitted to reduce or modify roof access for BIPV systems installed as the roof covering when they are listed in accordance with Section 690.12(B)(2) of NFPA 70.

11.12.2.2.2 One- and Two-Family Dwellings and Townhouses.
Photovoltaic systems installed in one- and two-family dwellings and townhouses shall provide roof access in accordance with 11.12.2.2.2. Designation of ridges shall not apply to roofs with 2 in 12 or less pitch.

11.12.2.2.2.1 Access Pathways.
Not less than two 36 in. (914 mm) wide access pathways on separate roof planes, from gutter to ridge, shall be provided on all buildings. One access pathway shall be provided on the street or driveway side of the roof. For each roof plane with a PV array, a 36 in. (914 mm) wide access pathway from gutter to ridge shall be provided on the same roof plane as the PV array, on an adjacent roof plane or straddling the same and adjacent roof planes. Access pathways shall be located in areas with minimal obstructions such as vent pipes, conduit, or mechanical equipment.
11.12.2.2.2.2 Setbacks at Ridge.
For PV arrays occupying up to 33 percent of the plan view roof area, a minimum 18 in. (457 mm) pathway setback shall be provided on either side of a horizontal ridge. For PV arrays occupying more than 33 percent of the plan view roof area, a minimum of 36 in. (914 mm) pathway setback shall be provided on either side of a horizontal ridge.

11.12.2.2.2.3 Alternative Setbacks at Ridge.
For one- and two-family dwellings with an automatic sprinkler system installed within the dwelling in accordance with Section 13.3.2.20, for PV arrays occupying up to 66 percent of the plan view roof area, a minimum 18 in. (457 mm) setback shall be provided on either side of a horizontal ridge. For PV arrays occupying more than 66 percent of the plan view roof area on sprinklered one- and two-family dwellings, a minimum 36 in. (914 mm) setback shall be provided on either side of a horizontal ridge.

11.12.2.2.3 Emergency Escape and Rescue Openings.
Where rooftop-mounted PV systems or BIPV systems installed as the roof covering are installed on a roof plane directly below an emergency escape and rescue opening, a minimum 36 in. (914 mm) wide access pathway shall be provided to at least one emergency escape and rescue opening for each sleeping room. The AHJ shall be permitted to reduce or exempt access pathways at emergency escape and rescue openings for BIPV systems installed as the roof covering when they are listed in accordance with Section 690.12(B)(2) of NFPA 70.

11.12.2.2.4 Buildings Other Than One- and Two-Family Dwellings and Townhouses.
Photovoltaic systems installed on any building other than one- and two-family dwellings and townhouses shall provide roof access in accordance with 11.12.2.2.4.3. Where the AHJ determines that the roof configuration is similar to a one- and two-family dwelling or townhouse, the AHJ shall allow the roof access requirements of 11.12.2.2. Detached, nonhabitable structures including, but not limited to, parking shade structures, carports, solar trellises, and similar structures shall not be required to provide roof access.

11.12.2.2.4.3.1 Perimeter Pathways.
A minimum 4 ft 48 in. (1219 mm) wide perimeter pathway shall be provided around the edges of the roof for buildings with a length or width of 250 ft (76.2 m) or less along either axis. A minimum 6 ft (1829 mm) wide perimeter pathway shall be provided around the edges of the roof for buildings having length or width greater than 250 ft (76.2 m) along either axis.

11.12.2.2.4.3.2 Other Pathways.
Pathways shall be over areas capable of supporting fire fighters accessing the roof and shall be provided between array sections as follows:

(1) Pathways shall be provided in a straight line 48 in. (1219 mm) or greater in width to all ventilation hatches, and roof standpipes.

(2) Pathways shall be provided 48 in. (1219 mm) or greater in width around roof access hatches with at least one 48 in. (1219 mm) or greater in width pathway to the parapet or roof edge.

(3) Pathways shall be provided at intervals no greater than 150 ft (46 m) throughout the length and width of the roof.

11.12.2.2.4.3.3 Smoke Ventilation.
A pathway shall be provided, minimum 48 in. (1219 mm) or greater in width, wide pathway shall be provided, bordering all sides of nongravity-operated smoke and heat vents and bordering at least one side of gravity-operated smoke and heat vents. Ventilation options between array sections shall be at least one of the following:

(1) A pathway 96 in. (2438 mm) or greater in width

(2) A pathway 48 in. (1219 mm) or greater in width and bordering on existing roof skylights or gravity-operated dropout smoke and heat vents on not less than one side at intervals no greater than 150 ft (46 m) throughout the length and width of the roof

(3) A pathway 48 in. (1219 mm) or greater in width and bordering 48 in. (1219 mm) by 96 in. (2438 mm) venting cutouts options every 20 ft (6096 mm)

11.12.2.2.4.3.4 Minimizing Obstructions in Pathways.
Pathways shall be located in areas with minimal obstructions such as vent pipes, conduit, or mechanical equipment to reduce trip hazards and maximize ventilation opportunities.

11.12.3 Ground-Mounted Photovoltaic System Installations.
Ground-mounted photovoltaic systems shall be installed in accordance with 11.12.3.1 through 11.12.3.2.
11.12.3.1* Clearances.
A clear area of 10 ft (3048 mm) around ground-mounted photovoltaic installations shall be provided.

11.12.3.2* Vegetation Management Plan.
A vegetation management plan or noncombustible base acceptable to the AHJ shall be approved and maintained under and around the installation where required by the AHJ.

11.12.3.3 Security Barriers.
Fencing, skirting, or other suitable security barriers shall be installed when required by the AHJ.

Statement of Problem and Substantiation for Public Input

In general, the proposed modifications are intended to improve NFPA 1 by incorporating improvements developed in the 2018 IFC and in the ICC Group A Committee Action Hearings for the 2021 IFC. These modifications also include language changes to improve NFPA 1 by using language that is more precise, to avoid differences in interpretation of the code and unintended consequences.

11.12.1: Modifications are intended to clarify that both design and installation must comply with these sections, and to clarify that only the electrical portions of the PV systems are covered in NFPA 70.

11.12.2: Clarify that rooftop mounted PV systems are covered in 11.12.2, as well as BIPV systems installed as the roof covering. Other PV installations not installed on the roof or as the roof covering are not included in 11.12.2.

11.12.2.1.1: Again, clarify that the requirements apply to both rooftop-mounted PV systems and BIPV systems installed as the roof covering.

11.12.2.1.6: Add a new subsection for markings for BIPV systems installed as the roof covering, to correlate with IFC proposal F200-18, including the option of reducing or exempting the requirement for BIPV systems listed in accordance with NFPA 70 Section 690.12(B)(2), as in the modification that was unanimously approved during the Committee Action Hearings.

11.12.2.2.1: In the first sentence, editorial changes to clarify requirements and to use broadly accepted terms "access pathways" and "setbacks" at ridge. In the final new sentence, add language to provide the AHJ the authority to reduce or exempt access pathway and setback requirements for BIPV systems installed as the roof covering when they are listed in accordance with NFPA 70 Section 690.12(B)(2), to correlate with ICC Group A Proposal F197-18, which created Exception 3 for these BIPV systems, and was approved unanimously by the Fire Committee.

11.12.2.2.2: Editorial change only.

11.12.2.2.2.1: Editorial changes only.

11.12.2.2.2.2: Editorial changes only.

11.12.2.2.2.3: Add new subsection for Alternative Setbacks at Ridge, to correlate with 2018 IFC Section 1204.2.1.3. This section provides increased thresholds for roof coverage of PV in order to allow 18 inch setback at ridge, by recognizing that rooftop operations are less likely to be needed in one- and two-family dwellings with automatic sprinkler systems.

11.12.2.2.2.3: Insert new subsection for emergency escape and rescue openings, to correlate with 2018 IFC Section 1204.2.2, which was a new section in the 2018 IFC. Further, note new subsection 11.12.2.2.3 applies to emergency escape and rescue openings in any residential occupancy, not just one- and two-family dwellings. Where multiple emergency escape and rescue openings occur in one sleeping room, at least one requires access. For BIPV systems installed as the roof covering, this subsection reiterates that the AHJ can reduce or exempt the requirement for an access pathway for BIPV systems listed in accordance with NFPA 70 Section 690.12(B)(2). With this added level of safety, the fire service could walk on the BIPV roof covering to access the emergency escape and rescue opening.

11.12.2.2.4 (formerly 11.12.2.2.2.3): Note this subsection is re-numbered to simplify the decimal system used for reference. It is subsection 11.12.2.2.2.3 in the 2018 NFPA 1. This numbering in the 2018 NFPA 1 is really too deep and unnecessary. The simplification in subsection numbering will make this section easier to read and reference.

11.12.2.4.1 (formerly 11.12.2.2.2.3.1): Editorial change for consistently use 48 inch units, instead of inconsistent 4 ft unit in the 2018 NFPA 1.
11.12.2.2.4.2 (formerly 11.12.2.2.2.3.2): Re-number subsection for easier reading and reference. No changes to text.

11.12.2.2.4.3 (formerly 11.12.2.2.2.3.3): Editorial changes for consistency with language used in previous section for perimeter pathways. Technical change to correlate with ICC Group A Proposal F201-18, which was unanimously approved by the IFC Committee. Gravity-operated smoke and heat vents are moved into the mandatory section, rather than the optional list, with a requirement that access is provided on at least one side. Ventilation Option 2 is modified to remove gravity-operated smoke and heat vents from the optional list, and to clarify the option for conventional skylights applies only at 150 foot intervals.

11.12.2.2.4.4 (formerly 11.12.2.2.2.3): Re-numbering change only.

11.12.3: Change reference to subsection range, in anticipation of strike-out of Section 11.12.3.3.

11.12.3.3: Strike out subsection without substitution. This section is a strike-out to correlate with the modification to ICC Group A Proposal F195-18, which was approved unanimously by the IFC Committee. As no specific technical requirement is stated, and the requirement is "when required by the AHJ," this subsection cannot lead to any consistent interpretation of technical requirements, and is therefore unenforceable. Many permitting authorities have strived to streamline their permitting process for PV systems. It is counter-productive to have a vague and ambiguous requirement in NFPA 1, such that every project requires individual consideration and the applicant does not know what will be required until there is a negotiation during the permitting process. We should all strive to eliminate statements that are vague, ambiguous, and unenforceable from NFPA 1.

Submitter Information Verification

Submitter Full Name: Joe Cain
Organization: Solar Energy Industries Association (SEIA)
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 27 21:47:44 EDT 2018
Committee:

Committee Statement

Resolution: FR-72-NFPA 1-2018
Statement: These modifications include language changes to improve NFPA 1 by using language that is more precise, to avoid differences in interpretation of the code and unintended consequences.

11.12.1: Modifications are intended to clarify that both design and installation must comply with these sections, and to clarify that only the electrical portions of the PV systems are covered in NFPA 70.

11.12.2: Clarify that rooftop mounted PV systems are covered in 11.12.2, as well as BIPV systems installed as the roof covering. Other PV installations not installed on the roof or as the roof covering are not included in 11.12.2.

11.12.2.1.1: Again, clarify that the requirements apply to both rooftop-mounted PV systems and BIPV systems installed as the roof covering.

11.12.2.1.6: Add a new subsection for markings for BIPV systems installed as the roof covering including the option of reducing or exempting the requirement for BIPV systems listed in accordance with NFPA 70 Section 690.12(B)(2).

11.12.2.2.1: In the first sentence, editorial changes to clarify requirements and to use broadly accepted terms "access pathways" and "setbacks" at ridge. In the final new sentence, add language to provide the AHJ the authority to reduce or exempt access pathway and setback requirements for BIPV systems installed as the roof covering when they are listed in accordance with NFPA 70 Section 690.12(B).

11.12.2.2.2: Editorial change only.
11.12.2.2.2.1: Editorial changes only.

11.12.2.2.2: Editorial changes only.

11.12.2.2.3: Add new subsection for Alternative Setbacks at Ridge. This section provides increased thresholds for roof coverage of PV in order to allow 18 inch setback at ridge, by recognizing that rooftop operations are less likely to be needed in one- and two-family dwellings with automatic sprinkler systems. 11.12.2.2.3: Insert new subsection for emergency escape and rescue openings. Further, note new subsection 11.12.2.2.3 applies to emergency escape and rescue openings in any residential occupancy, not just one- and two-family dwellings. Where multiple emergency escape and rescue openings occur in one sleeping room, at least one requires access. For BIPV systems installed as the roof covering, this subsection reiterates that the AHJ can reduce or exempt the requirement for an access pathway for BIPV systems listed in accordance with NFPA 70 Section 690.12(B)(2). With this added level of safety, the fire service could walk on the BIPV roof covering to access the emergency escape and rescue opening.

11.12.2.2.4 (formerly 11.12.2.2.2.3): Note this subsection is re-numbered to simplify the decimal system used for reference. It is subsection 11.12.2.2.3 in the 2018 NFPA 1. This numbering in the 2018 NFPA 1 is really too deep and unnecessary. The simplification in subsection numbering will make this section easier to read and reference.

11.12.2.2.4.1 (formerly 11.12.2.2.2.3.1): Editorial change for consistently use 48 inch units, instead of inconsistent 4 ft unit in the 2018 NFPA 1.

11.12.2.2.4.2 (formerly 11.12.2.2.2.3.2): Re-number subsection for easier reading and reference. No changes to text.

11.12.2.2.4.3 (formerly 11.12.2.2.2.3.3): Editorial changes for consistency with language used in previous section for perimeter pathways. Gravity-operated smoke and heat vents are moved into the mandatory section, rather than the optional list, with a requirement that access is provided on at least one side. Ventilation Option 2 is modified to remove gravity-operated smoke and heat vents from the optional list, and to clarify the option for conventional skylights applies only at 150 foot intervals.

11.12.2.2.4.4 (formerly 11.12.2.2.2.3): Re-numbering change only. 11.12.3: Change reference to subsection range, in anticipation of strike-out of Section 11.12.3.3.

11.12.3.3: Strike out subsection without substitution. As no specific technical requirement is stated, and the requirement is "when required by the AHJ," this subsection cannot lead to any consistent interpretation of technical requirements, and is therefore unenforceable. Many permitting authorities have strived to streamline their permitting process for PV systems. It is counter-productive to have a vague and ambiguous requirement in NFPA 1, such that every project requires individual consideration and the applicant does not know what will be required until there is a negotiation during the permitting process. We should all strive to eliminate statements that are vague, ambiguous, and unenforceable from NFPA 1.
12.3.3 Maintenance of Fire-Resistive Construction, Draft-Stop Partitions, and Roof Coverings.

12.3.3.1 The owner shall maintain an inventory of all required fire-resistive and smoke resistant construction, including fire barriers, fire walls, exterior walls due to location on property, smoke barriers, and smoke partitions.

12.3.3.2 Required fire-resistive construction, including fire barriers, fire walls, exterior walls due to location on property, fire-resistive requirements based on type of construction, draft-stop partitions, and roof coverings, shall be maintained and shall be properly repaired, restored, or replaced where damaged, altered, breached, penetrated, removed, or improperly installed.

12.3.3.3 Where required, fire-rated gypsum wallboard walls or ceilings that are damaged to the extent that through openings exist, the damaged gypsum wallboard shall be replaced or returned to the required level of fire resistance using a listed repair system or using materials and methods equivalent to the original construction.

12.3.3.4 Where readily accessible, required fire-resistance-rated assemblies in high-rise buildings shall be visually inspected for integrity at least once every 3 years.

12.3.3.4.1 The person responsible for conducting the visual inspection shall demonstrate appropriate technical knowledge and experience in fire-resistance-rated design and construction acceptable to the AHJ.

12.3.3.4.2 A written report prepared by the person responsible for conducting the visual inspection shall be submitted to the AHJ documenting the results of the visual inspection.

A.12.3.3.1 The inventory may take the form of life safety drawings or a list of describing the fire protection features and the location thereof.

Statement of Problem and Substantiation for Public Input

In order for the fire official to verify that the required inspections are being performed, the owner needs to document what fire protection features require inspection or testing.

Submitter Information Verification

Submitter Full Name: William Koffel
Organization: Koffel Associates, Inc.
Affiliation: Firestop Contractors International Association
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 27 12:49:46 EDT 2018
Committee:

Committee Statement

Resolution: The proposed text is not appropriate for all occupancies/properties. The proposed requirement can be onerous and burdensome for some facilities and as submitted it does not limit its application, and
therefore would be required for all occupancies. The language may be better directed at higher risk type occupancies such as health care, high-rise or other facilities utilizing a defend-in-place strategy.
Public Input No. 146-NFPA 1-2018 [Section No. 13.1.6]

13.1.6
Detailed records documenting all systems and equipment testing and maintenance shall be kept by the property owner and shall be made available upon request for review by the AHJ.

13.1.6.1
Maintenance, inspection and testing records shall be documented using approved reports or forms and shall be permitted to be submitted, stored, accessed and shared electronically in an approved format. Data and records shall be secured from unconditional public access.

Statement of Problem and Substantiation for Public Input

ITM reporting for existing fire protection systems is an effective tool for some AHJs to track the maintenance and status of systems in their jurisdictions. The records and reports generated by contractors for building owners that are stored on site, or in a cloud should be secure and access to the documents remain open to meet open records laws, but the information contained within should be limited. Personal and other confidential information should be addressed. This PI uses some material from NFPA 25, NFPA 950 and NFPA 951, but none of these standards or guidelines have the exact language or are developed to extract at this time. The fire code needs to provide some limited guidance on how to handle electronic data, reports and other materials coming from electronic data submissions.

Related Public Inputs for This Document

<table>
<thead>
<tr>
<th>Related Input</th>
<th>Relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Input No. 136-NFPA 1-2018 [Section No. 1.11]</td>
<td></td>
</tr>
</tbody>
</table>

Submitter Information Verification

Submitter Full Name: Jeffrey Hugo
Organization: National Fire Sprinkler Association
Affiliation: NFSA
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 27 14:39:16 EDT 2018
Committee:

Committee Statement

Resolution: Proposed requirement is already covered by NFPA 25. The submitter’s last statement is unclear. The proposed text still requires approval by AHJ so its up to them as to what format of documentation they want to accept.
Public Input No. 5-NFPA 1-2018 [ Section No. 13.2.2.2 ]

13.2.2.2
New buildings shall be equipped with a Class I standpipe system installed in accordance with the provisions of Section 13.2 where any of the following conditions exist:

1. More than three stories above grade where the building is protected by an approved automatic sprinkler system
2. More than two stories above grade where the building is not protected by an approved automatic sprinkler system
3. More than 50 ft (15 m) above grade and containing intermediate stories or balconies
4. More than one story below grade
5. More than 20 ft (6.1 m) below grade
6. In a building that is not protected by an approved automatic sprinkler system, when any interior portion of the building floor area is greater than 250 ft from the closest point a fire apparatus could be parked on a fire apparatus access road adjacent to the building, measured along a route the fire department would utilize to access the interior of the building
7. In a building that is protected by an approved automatic sprinkler system, when any interior portion of the building floor area is greater than 400 ft from the closest point a fire apparatus could be parked on a fire apparatus access road adjacent to the building, measured along a route the fire department would utilize to access the interior of the building

Statement of Problem and Substantiation for Public Input

This PI is submitted to encourage discussion on the issue of very large footprint buildings of 3 stories or less that would not require a standpipe system under the current provisions of this section. These are creating situations where hoses would have to be extended 300, 400, 500, 600 feet plus into a building in order to reach a fire. These hose line extension may need to occur over two or three floors. This PI provides one possible approach to this issue if the TC wishes to address this condition.

As per the discussion at the PreRop meeting, the distances specified in this PI are based on typical preconnect hose lines and high-rise packs carried by FD operations on an engine/aerial. Also, the PI was modified to add the word "interior" to provide intent on how access is to be measured.

Submitter Information Verification

Submitter Full Name: Anthony Apfelbeck
Organization: Altamonte Springs Building/Fire Safety Division
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jan 17 14:15:47 EST 2018
Committee:

Committee Statement

Resolution: See FR-17-NFPA 1-2018. Proposed (6) and (7) in the public input provide no threshold for the type of occupancy or building height and could result in unintended consequences. Regarding proposed (7) specifically, there was question on how this would apply to a one story building. There is no need to install a full NFPA 14 standpipe system to these buildings. Firefighters should not be entering a building of this size with no hose, and the requirement does not make sense in a fully sprinklered...
Statement: Changes to (1)-(5) update the terminology, for consistency, to reflect the language in the building code as well as in other sections of NFPA 1. No technical changes were intended by the changes proposed here.
Public Input No. 24-NFPA 1-2018 [ New Section after 13.3.2.20.2 ]

Add a new section as follows:

13.3.2.20.3 Where automatic sprinkler systems are not required in new one-and two-family dwellings, a disclosure statement shall be provided to the buyer in accordance with section 13.3.20.3.1 and 13.3.20.3.2.

13.3.2.20.3.1 Prior to agreeing on final pricing for the construction of a new one-or two-family dwelling with a buyer, the builder shall provide the buyer with a copy of a written materials approved by the AHJ which details the benefits of an automatic sprinkler system.

13.3.2.20.3.2 Concurrent with providing the information approved by the AHJ, as required in 13.3.2.20.3.1, a builder shall provide a quote for the cost associated with the installation of an automatic sprinkler system. Upon request of the buyer, the builder shall, at the buyer's expense, install an automatic sprinkler system.

A.13.3.2.20.3 The provisions of section 13.3.2.20.3 are intended to only apply to the execution of contracts for new one-and two-family dwellings that have not yet been constructed. Homes that are already constructed by a builder, typically called "spec homes", would not fall under the provisions of this section as they have already received a permit prior to a buyer executing a contract.

Statement of Problem and Substantiation for Public Input

The NFPA 1, 101 and IRC provisions requiring one-and two-family dwellings to be fire sprinkler protected has been legislatively removed and preempted in many states and local jurisdictions. One of the arguments that is made is that fire sprinkler protection is not needed and should be a choice of the home buyer. However, in almost all cases, the home buyer never gets the chance to make that choice. The home buyer is unaware of the option to have a fire sprinkler system installed in a new home and the value of a fire sprinkler. Even when the home buyer requests to have a residential fire sprinkler system installed, many home builders are refusing the request. This PI addresses these issues by incorporating the choice option that many opponents of mandatory fire sprinklers have advocated for through the years. If it is truly a choice, then the buyer should be educated and the option should be available to the buyer.

At the PreROP meeting, the TC suggest that "due to legislative action or a failure to adopt section 13.3.2.20.1 by the adopting body" be removed from the first section. This PI was modified to incorporate this change. In addition, the TC also voiced concern over the application to spec homes. Text has been added in the annex to clarify that purchasing a completed spec home is not under the scope of this section since the home has already been constructed.

Submitter Information Verification

Submitter Full Name: Anthony Apfelbeck
Organization: Altamonte Springs Building/Fire Safety Division
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jan 24 12:14:33 EST 2018
Committee:

Committee Statement

Resolution: FR-74-NFPA 1-2018
Statement: Proposing new text as an adoptable annex so it can be picked up by a jurisdiction, separately, depending on their local requirements for the protection of one and two family dwellings. The proposed text from Public Input No.24, if included in the body of the Code, could conflict with requirements in other states that have different legislation.
Add the following section:

13.3.26.2.4 Public Disclosure Signage. In high-rise buildings that are not protected throughout by an approved automatic sprinkler system, signage shall be posted complying with 13.3.26.2.4 (A) through 13.3.26.2.4 (F)

(A) Signage shall be posted at all building entrances.
(B) The bottom of the sign signage shall be located at least 48 in. above the adjacent floor and the top of the signage shall be located a maximum of 84 in. above the floor.
(C) The signage shall be on the entrance door or the closest edge of the sign shall be located within 24 in. of the door frame.
(D) The lettering on the sign shall be at least 1 in. high.
(E) The lettering shall be placed on a contrasting background.
(F) The wording shall state:

WARNING

This high-rise building is not protected throughout with an automatic fire sprinkler system and does not comply with the minimum accepted level of life safety. Therefore, the risk of dying or being injured in a fire is significantly increased in this high-rise building over a high-rise building with protection throughout with a fire sprinkler system. Without a fire sprinkler system, the ability of the fire department to conduct effective firefighting and rescue operations is very adversely impacted. Enter and stay at your own risk.

Statement of Problem and Substantiation for Public Input

When high-rise building are not fully protected with an automatic sprinkler system, regardless of reason, we have an obligation to inform the occupants and visitors of the hazard that has been created due to the lack of fire sprinkler protection. We have been trying for years to encourage fire sprinkler retrofit with code provisions but have received extreme push back from occupants who then demand that legislators repeal retrofit or modify it so that it is ineffective at achieving reasonable life safety goals. It is time to mark these unsafe buildings so the occupants, firefighters and owners are consciously made aware of the risks of staying in a building that is truly substandard. This PI accomplishes the objective of ensuring those parties are informed of the risk that is being created by a high-rise building that is not protected by a complete automatic fire sprinkler system.

Submitter Information Verification

Submitter Full Name: Anthony Apfelbeck
Organization: Altamonte Springs Building Fire Safety Division
Street Address: 
City: 
State: 
Zip: 
Submittal Date: Sat Jan 20 13:50:02 EST 2018
Committee: 

Committee Statement

Resolution: FR-75-NFPA 1-2018
Statement: When high-rise building are not fully protected with an automatic sprinkler system, regardless of reason, this signage will alert/inform occupants and first responders of the hazard that has been created due to the lack of fire sprinkler protection. The Code encourages fire sprinkler retrofit with other code provisions in Chapter 13 but some buildings still remain unsprinklered.
Public Input No. 32-NFPA 1-2018 [ New Section after 13.3.2.26.2.3 ]

Add the following new section:

13.3.2.26.2.4 For existing high-rise buildings that are not protected throughout by an approved automatic sprinkler system, the AHJ shall file the following notice in the property record for the building:

Notice to Owner and Prospective Purchasers

This high-rise building is not protected throughout with an automatic fire sprinkler system. Due to this deficiency, this high-rise building does not adhere to the minimum accepted level of safety for buildings over 75 feet in height. The risk of dying or being seriously injured in a fire in this building is significantly greater than a building equipped with automatic fire sprinklers. Without an automatic fire sprinkler system in this building, the ability of the fire department to conduct effective firefighting and rescue operations is negatively impacted. Firefighters may not be able to evacuate you or rescue you in the event of a fire occurring in this building. Occupying this building puts you at a significantly greater risk from injury or death in the event of a fire as compared to a fully fire sprinklered building.

[Insert Local Jurisdiction Name]

13.3.2.26.2.4.1 When the existing high-rise building becomes protected throughout by an approved automatic sprinkler system, the AHJ shall file a notice in the property record for the building rescinding the notice specified in 13.3.2.26.2.4.

Statement of Problem and Substantiation for Public Input

When high-rise buildings are not fully protected with an automatic sprinkler system, regardless of reason, we have an obligation to inform the property owner and prospective property owners of the hazard that has been created due to the lack of fire sprinkler protection. This PI accomplishes this objective by placing a notice in the property record that accurately reflects the hazard when a high-rise building is not protected by fire sprinklers.

Submitter Information Verification

Submitter Full Name: Anthony Apfelbeck
Organization: Altamonte Springs Building/Fire Safety Division
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jan 29 08:29:37 EST 2018
Committee:

Committee Statement

Resolution: The proposed text goes beyond what should be mandated by the Fire Code. The Code should not mandate information that is more appropriately within the scope of a legislative body or legal professional. The proposed First Revision in response to Public Input no. 13 provides necessary information to high-rise buildings.
13.5.1
Private fire service mains shall be installed in accordance with NFPA 13 and NFPA 24, NFPA 13R, NFPA 13D or NFPA 24 as applicable.

Statement of Problem and Substantiation for Public Input

NFPA 24 does not apply to underground for NFPA 13D systems and NFPA 13R for underground mains less than 4" in size.

Submitter Information Verification

Submitter Full Name: Peter Schwab
Organization: Wayne Automatic Fire Sprinkler
Street Address:
City:
State:
Zip:
Submittal Date: Thu Feb 01 15:02:40 EST 2018
Committee:

Committee Statement

Resolution: FR-18-NFPA 1-2018
Statement: The revision addresses the concerns of the submitter but separates out the scope statements from NFPA 24 to clarify that it does not apply to underground for NFPA 13D systems and NFPA 13R for underground mains less than 4" in size.
13.7.1.5.4
Fire alarm systems that have produced five, produced three, or more nuisance alarms in a 365-day period in any consecutive three month period, shall be classified as chronic nuisance alarm prone systems.

Statement of Problem and Substantiation for Public Input

The threshold change is to align with other fire codes and meet the same NFPA 72 provisions for requiring central station service.

Submitter Information Verification

Submitter Full Name: Kelly Nicolello
Organization: UL LLC
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jun 25 15:16:03 EDT 2018
Committee:

Committee Statement

Resolution: Accepting the proposed text could potentially result in having many alarms within a shorter amount of time. Proposed text is difficult to track. Does the proposed text intent for three nuisance alarms in a three month period OR 5 in a calendar year (The submitter is encouraged to submit a public comment with clarification.) Depending on the timing there is a potential to have many alarms within a calendar year, different from the intent of the current Code language. The intent of the proposed text is to be more restrictive but may not have solved the problem.
Public Input No. 149-NFPA 1-2018 [ New Section after 13.7.1.10.2 ]

TITLE OF NEW CONTENT

Monitor It Yourself (MIY) Systems

The use of a MIY system that can transmit signals directly to an Emergency Forces Call Centre shall not be permitted unless approved by the AHJ.

Statement of Problem and Substantiation for Public Input

With changing technology and the Internet of Things (IoT), it is now possible to have a fire alarm system transmit signals directly from the protected premise to an Emergency Forces Call Centre without being processed by a Supervising, Proprietary or Remote Station in accordance with NFPA 72. These are the modern versions of the former tape dialers. There is nothing within the Code at the present time that specifically prohibits their use. These systems have the potential of increasing Unwanted Alarms. This Public Input, if accepted, would only allow the use of these systems to be used if the AHJ for the fire department, fire district or government authority allows their use.

Submitter Information Verification

Submitter Full Name: Shane Clary
Organization: Bay Alarm Company
Affiliation: Bay Alarm Company
Street Address:
City: 
State: 
Zip: 
Submittal Date: Wed Jun 27 21:42:11 EDT 2018
Committee:

Committee Statement

Resolution: FR-76-NFPA 1-2018
Statement: With changing technology and the Internet of Things (IoT), it is now possible to have a fire alarm system transmit signals directly from the protected premise to an Emergency Forces Call Centre without being processed by a Supervising, Proprietary or Remote Station in accordance with NFPA 72. These are the modern versions of the former tape dialers. There is nothing within the Code at the present time that specifically prohibits their use. These systems have the potential of increasing Unwanted Alarms. The text as proposed in this First Revision is different than proposed in Public Input No. 140 so as to not call-out one specific system.
Add a new section 15.1.1.2 and 15.1.1.3 as follows:

15.1.1.2 Section 15.1.1.1 shall not apply to proposed developments that would exceed a 240-second travel time from an existing fire station and also exhibit one of the following characteristics:

(1) Total development square footage of greater than 100,000 square feet; or

(2) Increasing the fire department's service population by 500 or more; or

15.1.1.3 Section 15.1.1.1 shall not apply to proposed developments that exhibit operational challenges to the fire department that the fire department does not currently have the service levels in place to meet the hazard.

A.15.1.1.3 Examples of such operational challenges may include, but not be limited to, special amusement occupancies, high-rise buildings, high-angle rescue environments and high-hazard occupancies. The intent of this section is to capture uses that either additional fire department training and/or resources are necessary in order for the proposed development to be protected with effective fire department operational deployment.

Statement of Problem and Substantiation for Public Input

This PI addresses two concerns that have been raised by users of chapter 15:

1. The exception language in section 15.1.1.1 is so broad, it excludes developments that maybe in fringe areas of the FD service delivery. The 240-second criteria is taken from NFPA 1710 and provides some criteria to deal with larger developments in the fringe service areas that would otherwise be excluded by the provisions of 15.1.1.1. The 15.1.1.1 exception is broad since it applies to the entire jurisdiction and not just one particular services level for one station.

2. Unique developments can pose special hazards and operational challenges to the FD that force the FD to upgrade the response capability. This PI addresses those concerns by allowing the AHJ to trigger 15.1.1 when one-off type development activity occurs with unique challenge being presented to the FD.

Submitter Information Verification

Submitter Full Name: Anthony Apfelbeck
Organization: Altamonte Springs Building/Fire Safety Division
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jun 26 08:59:04 EDT 2018
Committee:

Committee Statement

Resolution: FR-77-NFPA 1-2018
Statement: This First Revision addresses two concerns that have been raised by users of chapter 15:

1. The exception language in section 15.1.1.1 is so broad, it excludes developments that maybe in fringe areas of the FD service delivery. The 240-second criteria is taken from NFPA 1710 and provides some criteria to deal with larger developments in the fringe service areas that would otherwise be excluded by the provisions of 15.1.1.1. The 15.1.1.1 exception is broad since it applies to the entire jurisdiction and not just one particular services level for one station.

2. Unique developments can pose special hazards and operational challenges to the FD that force the FD to upgrade the response capability. This revision addresses those concerns by allowing the AHJ to trigger 15.1.1 when one-off type development activity occurs with unique challenge being presented to the FD.
PUBLIC INPUT NO. 56-NFPA 1-2018 [NEW SECTION AFTER 16.1]

TITLE OF NEW CONTENT

Add 16.1.6

During construction, alteration or demolition any construction equipment not in use shall be parked away from the building undergoing construction, alteration and demolition by at least 25 feet. The vehicles shall also be separated from each other by a min of 10 feet and parked on a level surface. If not level then they shall be parked down hill from the building undergoing construction, alteration and demolition.

Statement of Problem and Substantiation for Public Input

We have seen from time to time fires in equipment used at buildings that have spread to other vehicles parked close to each other and if on a slope the fuel run down hill and also spread to other equipment. By adding this requirement it should help to eliminate the issue. The site fire safety plan can also address this issue.

Submitter Information Verification

Submitter Full Name: Donald Turno
Organization: Savannah River Nuclear Solution
Street Address:
City:
State:
Zip:
Submittal Date: Mon Mar 19 09:00:06 EDT 2018
Committee:

Committee Statement

Resolution: Proposed requirements are not realistic. The dimensions cannot be met based on some construction sites. Requirements can be enforced locally if necessary.
16.8 Asbestos and Lead Removal.

16.8.1 Notification.
The AHJ and the fire department shall be notified 24 hours prior to the commencement and closure of asbestos and lead removal operations.

16.8.2 Permits.
Permits, where required, shall comply with Section 1.12.

16.8.3 Signs.
Approved signs shall be posted at the entrance, exit and exit access door, decontamination areas, and waste disposal areas for asbestos and lead removal operations.

16.8.3.1 The signs shall state that asbestos is being removed from the area, that asbestos or lead is a suspected carcinogen and a health hazard, and that proper respiratory protection is required.

16.8.3.2 Signs shall have a reflective surface, and lettering shall be a minimum of 2 in. (51 mm) high.

Statement of Problem and Substantiation for Public Input

The hazard of lead abatement is very similar to the hazard of asbestos removal operations. Notifications and proper postings should occur in a similar manner.

Submitter Information Verification

Submitter Full Name: Anthony Apfelbeck
Organization: Altamonte Springs Building/Fire Safety Division
Street Address:
City:
State:
Zip:
Submittal Date: Wed May 30 09:15:30 EDT 2018
Committee:

Committee Statement

Resolution: The hazards associated with asbestos and lead removal are different and cannot be combined into one Code section. No thresholds were provided in the proposed text.
18.2.3.2.2.1
When buildings are protected throughout with an approved automatic sprinkler system that is installed in accordance with NFPA 13, NFPA 13D, or NFPA 13R, the distance in 18.2.3.2.2 shall be permitted to be increased to 450 ft. 300 ft (137 m).

Statement of Problem and Substantiation for Public Input

Reducing the fire access requirement from 450ft to 300ft allows fire crews to gain quicker access to a structure under fire conditions. While it's important to recognize the benefits of fire sprinkler systems, 13R and 13D systems are life safety systems only and not designed for property protection (i.e. attic coverage, concealed spaces, etc.) This proposed code change should not have a significant cost impact on development, reduces fire response times and still acknowledges the value that fire sprinkler systems provide.

Submitter Information Verification

Submitter Full Name: Ty Darby
Organization: IAFF
Street Address: 
City: 
State: 
Zip: 
Submittal Date: Fri Jun 22 00:11:55 EDT 2018
Committee: 

Committee Statement

Resolution: FR-78-NFPA 1-2018
Statement: Reducing the fire access requirement from 450ft to 300ft allows fire crews to gain quicker access to a structure under fire conditions. While it's important to recognize the benefits of fire sprinkler systems, 13R and 13D systems are life safety systems only and not designed for property protection (i.e. attic coverage, concealed spaces, etc.) This proposed code change should not have a significant cost impact on development, reduces fire response times and still acknowledges the value that fire sprinkler systems provide. The text shown in this First Revision is different than the text as proposed in Public Input No. 84 in that it separates the requirements for buildings with 13R systems.
Public Input No. 34-NFPA 1-2018 [Section No. 18.2.3.5.1.1 [Excluding any Sub-Sections]]

Fire department access roads shall have an unobstructed width of not less than 20 ft (6.1 m).

Statement of Problem and Substantiation for Public Input

The current width of the access roads is unreasonable to keep clear of obstructions i.e. snow/ice. 14' clearance is much more obtainable clearance.

Submitter Information Verification

Submitter Full Name: adam morse  
Organization: Fruitort Fire Department

Committee Statement

Resolution: The current code text in 18.2.3.5.1.1 addresses the submitter's concern. The local AHJ can adjust the width as necessary. No technical justification was provided by the submitter for the 14' dimension.
Public Input No. 52-NFPA 1-2018 [ New Section after 18.4.5.2.1 ]

A.18.4.5.2.1
See figure A.18.4.5.2.1. (See attachment for figure)

Additional Proposed Changes

<table>
<thead>
<tr>
<th>File Name</th>
<th>Description</th>
<th>Approved</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction_Type.docx</td>
<td>Conversion table</td>
<td></td>
</tr>
</tbody>
</table>

Statement of Problem and Substantiation for Public Input

This table should be available in the fire code.

Submitter Information Verification

Submitter Full Name: Peter Schwab
Organization: Wayne Automatic Fire Sprinkler
Street Address:  
City:
State:
Zip:
Submittal Date: Thu Mar 01 10:26:23 EST 2018
Committee:

Committee Statement

Resolution: The proposed change is not needed as the referenced Table is already included in the Code and available to the user in Section A.12.2.
<table>
<thead>
<tr>
<th></th>
<th>I(442)</th>
<th>I(352)</th>
<th>H(222)</th>
<th>H(111)</th>
<th>H(000)</th>
<th>H(211)</th>
<th>H(200)</th>
<th>IV(2HH)</th>
<th>V(111)</th>
<th>V(000)</th>
</tr>
</thead>
<tbody>
<tr>
<td>UBC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B/NBC</td>
<td>1A</td>
<td>1B</td>
<td>2A</td>
<td>2B</td>
<td>2C</td>
<td>3A</td>
<td>3B</td>
<td>4</td>
<td>5A</td>
<td>5B</td>
</tr>
<tr>
<td>SBC</td>
<td>I</td>
<td></td>
<td></td>
<td>IV hr</td>
<td>IV UNP</td>
<td>V 1 hr</td>
<td>V UNP</td>
<td>III</td>
<td>VI hr</td>
<td>VI UNP</td>
</tr>
<tr>
<td>IBC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

FR: Fire rated.
N: Nonsprinklered.
HT: Heavy timber.
UNP: Unprotected. [5000; Table A][7.2.1.1]
18.4.5.3.3  
Required fire flow shall be reduced by 75 percent when the building is protected throughout by an approved automatic sprinkler system, which utilizes fast response sprinklers throughout. The resulting fire flow shall not be less than 600 gpm (2270 L/min).

Statement of Problem and Substantiation for Public Input

Change quick response to fast response. Residential sprinklers and ESFR sprinklers are in the fast response category but are not considered quick response per the definitions in NFPA 13. Section 3.6.4.8 QR is defined as "A type of spray sprinkler that has a thermal element with an RTI of 50 (meter-seconds)^1/2 or less and is listed as a quick response sprinkler for its intended use."

Submitter Information Verification

Submitter Full Name: Peter Schwab  
Organization: Wayne Automatic Fire Sprinkler  
Street Address:  
City:  
State:  
Zip:  
Submittal Date: Thu Feb 22 13:46:00 EST 2018  
Committee:  

Committee Statement

Resolution: There could be unintended consequences with the proposed change. As written, the Code intended for application of quick response, not necessarily residential applications. It is a concern is that the text would allow a reduction for ESFR applications.
18.5.7.1
A 36 in - 48 in. (914 mm) clear space shall be maintained around the circumference of fire hydrants except as otherwise required or approved.

Statement of Problem and Substantiation for Public Input

The problem that would be resolved by changing this code from 36" to 48" is for the group of people that do things to the minimum. When 36" is listed people will only clear to that amount. With snow for example 36" quickly becomes 24" or less. The 48" gives firefighters the little more space to do their jobs faster and easier.

Submitter Information Verification

Submitter Full Name: Chad Scime
Organization: Milford Fire Department
Street Address: 
City: 
State: 
Zip: 
Submittal Date: Thu Jan 25 13:27:15 EST 2018
Committee:

Committee Statement

Resolution: The current code text is adequate. The submitter's substantiation does not present any technical justification or clear demonstration of a problem.
20.1.1.2
Indoor children's playground play structures shall also comply with Section 10.19.

Statement of Problem and Substantiation for Public Input
This change is consistent with the proposed change in PI 69.

Related Public Inputs for This Document

<table>
<thead>
<tr>
<th>Related Input</th>
<th>Relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Input No. 69-NFPA 1-2018 [Section No. 10.19]</td>
<td></td>
</tr>
</tbody>
</table>

Submitter Information Verification
Submitter Full Name: Marcelo Hirschler
Organization: GBH International
Street Address: 
City: 
State: 
Zip: 
Submittal Date: Fri Jun 01 18:20:39 EDT 2018
Committee: 

Committee Statement
Resolution: FR-79-NFPA 1-2018
Statement: This change is consistent with the proposed change in Public Input No 69 and the associated First Revision.
20.15.8.3.1 When any portion of the high-piled combustible storage area is greater than 200 ft (61 m) from a fire department access door along the path of travel, including racks, Class I standpipe outlets connected to a system sized to deliver 250 gpm (946.4 L/min) at the most hydraulically remote outlet shall be provided in accordance with 20.15.8.3.

Statement of Problem and Substantiation for Public Input

Clarification is needed that the travel distance should account for the arrangement of the racks.

Submitter Information Verification

Submitter Full Name: Peter Schwab
Organization: Wayne Automatic Fire Sprinkler
Street Address: 
City: 
State: 
Zip: 
Submittal Date: Fri Feb 02 10:49:16 EST 2018
Committee: 

Committee Statement

Resolution:
Statement: This requirement is obsolete and is not being used often by fire departments when responding to a fire event at a facility with high-piled storage. There is no tactical advantage to including this requirement in the Code. Other requirements that mandate the presence of standpipes based on building size, fire protection systems and fire department access would address the need for standpipes as necessary.
Public Input No. 49-NFPA 1-2018 [ Section No. 20.15.8.3.1 ]

20.15.8.3.1
When any portion of the high-piled combustible storage area is greater than 200 ft (61 m) from a fire department access door, Class I standpipe outlets connected to a system sized to deliver 250 gpm (946.4 L/min) at the most hydraulically remote outlet shall be provided in accordance with 20.15.8.3.

Statement of Problem and Substantiation for Public Input

Clarifies that the 200’ distance should be measured from any given access door.

Submitter Information Verification

Submitter Full Name: Peter Schwab  
Organization: Wayne Automatic Fire Sprinkler
Street Address:  
City:  
State:  
Zip:  
Submittal Date: Thu Mar 01 10:12:00 EST 2018  
Committee:  

Committee Statement

Resolution:  
Statement: This requirement is obsolete and is not being used often by fire departments when responding to a fire event at a facility with high-piled storage. There is no tactical advantage to including this requirement in the Code. Other requirements that mandate the presence of standpipes based on building size, fire protection systems and fire department access would address the need for standpipes as necessary.
Public Input No. 50-NFPA 1-2018 [Section No. 20.15.8.3.1]

20.15.8.3.1
When any portion of the high-piled combustible storage area is greater than 200 ft (61 m) from a fire department access door, Class I standpipe outlets, 2 1/2 in. (65 mm) hose connections, connected to a system sized to deliver 250 gpm (946.4 L/min) at the most hydraulically remote outlet shall be provided in accordance with 20.15.8.3.

Statement of Problem and Substantiation for Public Input

Using the term Class I standpipe could be misinterpreted to require up to 1000 GPM as per NFPA 14. Use of the term hose connection is more appropriate

Submitter Information Verification

Submitter Full Name: Peter Schwab
Organization: Wayne Automatic Fire Sprinkler
Street Address:
City:
State:
Zip:
Submittal Date: Thu Mar 01 10:13:42 EST 2018
Committee:

Committee Statement

Resolution:
Statement: This requirement is obsolete and is not being used often by fire departments when responding to a fire event at a facility with high-piled storage. There is no tactical advantage to including this requirement in the Code. Other requirements that mandate the presence of standpipes based on building size, fire protection systems and fire department access would address the need for standpipes as necessary.
Public Input No. 48-NFPA 1-2018 [ New Section after 20.15.8.3.2 ]

20.15.8.3.3
The outlet shall be permitted to be supplied from a manual standpipe system.

Statement of Problem and Substantiation for Public Input

A manual standpipe system should be permitted to supply this hose demand.

Submitter Information Verification

Submitter Full Name: Peter Schwab
Organization: Wayne Automatic Fire Sprinkler
Street Address:
City:
State:
Zip:
Submittal Date: Thu Mar 01 10:08:40 EST 2018
Committee:

Committee Statement

Resolution:
Statement: This requirement is obsolete and is not being used often by fire departments when responding to a fire event at a facility with high-piled storage. There is no tactical advantage to including this requirement in the Code. Other requirements that mandate the presence of standpipes based on building size, fire protection systems and fire department access would address the need for standpipes as necessary.
20.15.8.3.4
Where 2 1/2" hose connections are provided per 20.15.8.3.3, small hose connections in accordance with NFPA 13 shall not be required.

Statement of Problem and Substantiation for Public Input

Smaller 1 1/2 hose connections should not be required when hose connections are provided in accordance with this section.

Submitter Information Verification

Submitter Full Name: Peter Schwab
Organization: Wayne Automatic Fire Sprinkler
Street Address: 
City: 
State: 
Zip: 
Submittal Date: Thu Mar 01 10:18:30 EST 2018
Committee: 

Committee Statement

Resolution: 
Statement: This requirement is obsolete and is not being used often by fire departments when responding to a fire event at a facility with high-piled storage. There is no tactical advantage to including this requirement in the Code. Other requirements that mandate the presence of standpipes based on building size, fire protection systems and fire department access would address the need for standpipes as necessary.
20.15.8.3.3
Standpipe outlets shall be provided at each of the following locations:

1. In each exit passageway at the entrance from the storage areas into the passageway
2. At each intermediate landing between floor levels in every required exit stairway serving the storage area
3. At exterior entrances into the storage

Statement of Problem and Substantiation for Public Input

The base requirement from NFPA 14 is on the main landing.

Submitter Information Verification

Submitter Full Name: Peter Schwab
Organization: Wayne Automatic Fire Sprinkler
Street Address: 
City: 
State: 
Zip: 
Submittal Date: Thu Mar 01 10:06:31 EST 2018
Committee: 

Committee Statement

Resolution: 
Statement: This requirement is obsolete and is not being used often by fire departments when responding to a fire event at a facility with high-piled storage. There is no tactical advantage to including this requirement in the Code. Other requirements that mandate the presence of standpipes based on building size, fire protection systems and fire department access would address the need for standpipes as necessary.
25.1.12 Generators.

25.1.12.1 Generators and other internal combustion power sources shall comply with section 10.15, be separated from temporary membrane structures and tents by a minimum of 5 ft (1.5 m) and shall be protected from contact by fencing, enclosure, or other approved means.

25.1.12.2 Fueling.

Fuel tanks shall be of adequate capacity to permit uninterrupted operation during normal operating hours. Refueling shall be conducted only when not in use.

25.1.12.3 Fire Extinguishers.

A minimum of one portable fire extinguisher with a rating of not less than 2-A:10-B:C shall be provided.

Statement of Problem and Substantiation for Public Input

Portable generators have been identified as a major contributor to Carbon Monoxide poisoning of the public who did not understand the hazards of where the generator is placed in relation to where they slept or lived. Portable generators produce significant Carbon Monoxide concentrations to effect death in 50 or so cases over the last few years as called out by CPSB Reports. The amount of Carbon Monoxide produced by a single portable generator is as much as a 1990s vehicle. UL and industry producers have developed UL 2201 which establishes a standard that limits the production of Carbon Monoxide and turns off the generator when levels exceed industry limits.

Related Public Inputs for This Document

<table>
<thead>
<tr>
<th>Related Input</th>
<th>Relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Input No. 99-NFPA 1-2018 [New Section after 10.15]</td>
<td></td>
</tr>
</tbody>
</table>

Submitter Information Verification

Submitter Full Name: Kelly Nicolello
Organization: UL LLC
Street Address:
City:
State:
Zip:
Submital Date: Wed Jun 27 11:07:37 EDT 2018

Committee Statement

Resolution: FR-67-NFPA 1-2018
Statement: Hazard is the same as far as carbon monoxide. The 20 ft separation for the CO hazard will also help minimize the electrical and fire hazards. See also changes proposed to Chapter 10 and Chapter 11 provisions for generators.
30.1.3 Approved Storage Plan.
A floor plan, or legible size, shall be provided, mounted on a wall and protected from damage. The floor plan shall be mounted in an approved location and show the following:
1. Locations, dimensions and and rack layout of high-piled storage areas.
2. Design storage height for each storage area.
3. Types of commodities
4. Commodity clearance between top of storage and the sprinkler deflector for each storage arrangement.
5. Aisle dimensions between each storage array.
6. For palletized and solid-piled storage, the maximum pile volume for each storage array.
7. Location and classification of commodities.
8. Location of required fire department access doors.
9. Location of valves controlling the water supply of ceiling and in-rack sprinklers.

[5000, 30.1.1.5] see PI 45 NFPA 5000

34.6.6.3 Storage layout plan maintenance. The approved storage layout shall be verified and evaluated annually in accordance with Section 30.1.3. Modifications or changes to the provisions of the approved storage layout shall not be made without prior approval of the authority having jurisdiction.

Statement of Problem and Substantiation for Public Input

This proposal requires that a floor plan be mounted at the facility showing the storage configurations and commodity locations through NFPA 5000. The storage layout can be referred to during inspection of the facility through NFPA 1. As the stored commodity changes and the operating permit is revised, the storage layout would also change.

Submitter Information Verification

Submitter Full Name: Jeffrey Hugo
Organization: National Fire Sprinkler Association
Affiliation: NFSA
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jun 07 18:24:27 EDT 2018
Committee:

Committee Statement

Resolution: FR-33-NFPA 1-2018
Statement: This proposal requires that a floor plan be mounted at the facility showing the storage configurations and commodity locations through NFPA 5000. The storage layout can be referred to during inspection of the facility through NFPA 1. As the stored commodity changes and the operating permit is revised, the storage layout would also change.
38.5.2 Odor Control.
The use of ozone generators used for odor control shall comply with Chapter 54.

38.5.3 Carbon dioxide enrichment equipment. The design, installation and maintenance of equipment utilized for a carbon dioxide enrichment process with more than 100 pounds (45.4 kg) of carbon dioxide or utilizing any quantity of carbon dioxide having a remote fill connection, shall comply with Sections 38.5.3.1 through 38.5.3.5.

38.5.3.1 Equipment. Pressure relief, vent piping, fill indicators, fill connections, vent terminations, piping systems and the storage, use and handling of the carbon dioxide shall be in accordance with NFPA 55.

38.5.3.2 Gas detection system. A gas detection system complying with NFPA 55 shall be provided in rooms or indoor areas in which the carbon dioxide enrichment process is located, in rooms or indoor areas in which container systems are located, and in other areas where carbon dioxide could accumulate.

38.5.3.2.1 System design. The system shall be designed as follows:
1. Activates a low-level alarm upon detection of a carbon dioxide concentration of 5,000 ppm (9000 mg/m3).
2. Activates a high-level alarm upon detection of a carbon dioxide concentration of 30,000 ppm (54 000 mg/m3).

38.5.3.2.2 System activation. Activation of the low level gas detection system alarm shall automatically:
1. Stop the flow of carbon dioxide to the piping system.
2. Activate the mechanical exhaust ventilation system.
3. Activate an audible and visible supervisory alarm signal at an approved location within the building.

Activation of the high-level gas detection system alarm shall automatically:
1. Stop the flow of carbon dioxide to the piping system.
2. Activate the mechanical exhaust ventilation system.
3. Activate an audible and visible evacuation alarm both inside and outside of the carbon dioxide enrichment area, and the area in which the carbon dioxide containers are located.

38.5.3.3 Pressurization and ventilation. Rooms or indoor areas in which carbon dioxide enrichment is provided shall be maintained at a negative pressure in relation to the surrounding areas in the building. A mechanical ventilation system shall be provided in accordance with Section 3.3.5 Mechanical Code and complies with all of the following:
1. Mechanical ventilation in the room or area shall be at a rate of not less than 1 cfm per square foot [0.00508 m3/(s • m2)].
2. When activated by the gas detection system, the mechanical ventilation system shall remain on until manually reset.
3. The exhaust system intakes shall be taken from points within 12 inches (305 mm) of the floor.
4. The ventilation system shall discharge to the outdoors in an approved location.

38.5.3.4 Signage. Hazard identification signs shall be posted at the entrance to the room and indoor areas where the carbon dioxide enrichment process is located, and at the entrance to the room or indoor area where the carbon dioxide containers are located. The sign shall be not less than 8 inches (200 mm) in width and 6 inches (150 mm) in height and indicate:

CAUTION – CARBON DIOXIDE GAS
VENTILATE THE AREA BEFORE ENTERING.
A HIGH CARBON DIOXIDE (CO2) GAS CONCENTRATION IN THIS AREA CAN CAUSE ASPHYXIATION.

38.5.3.5 Container refilling. Carbon dioxide containers located indoors shall not be refilled unless filled from a remote connection located outdoors.

Statement of Problem and Substantiation for Public Input
Carbon Dioxide is a component of Cannabis grow operations and as a result poses a hazard to occupants.
requirements provide minimum protections.

Related Public Inputs for This Document

Public Input No. 105-NFPA 1-2018 [New Section after 38.6.1.3]

Submitter Information Verification

Submitter Full Name: Kelly Nicolello
Organization: UL LLC
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 27 12:57:30 EDT 2018
Committee:

Committee Statement

Resolution: FR-30-NFPA 1-2018
Statement: Carbon Dioxide is a component of Cannabis grow operations and as a result poses a hazard to occupants. These requirements provide minimum protections.
**Public Input No. 105-NFPA 1-2018 [ New Section after 38.6.1.3 ]**

**TITLE OF NEW CONTENT**
Indoor horticultural grow structures

*Add new definitions to Chapter 3*

Indoor horticultural grow structure. An enclosed structure installed within buildings that creates a controlled environment for enhanced horticultural growing conditions utilizing an artificial light source.

Carbon dioxide enrichment process. A process where carbon dioxide gas is intentionally introduced into an indoor environment for the purpose of accelerating plant growth.

**38.6.1.3 Indoor horticultural grow structures**

Indoor horticultural grow structures installed and operated inside all occupancies covered by this code that exceed 5 feet (1524mm) in height and 32 square feet (3.0 m2) in floor area shall comply with the building code and this Code.

Materials. Horticultural grow structures shall be constructed of noncombustible materials or of combustible materials that comply with 38.6.1.3.2.1 through 38.6.1.3.2.5.

Textiles and films complying with Test Method 2 of NFPA 701.

Plastic materials having a maximum heat-release rate not greater than 100 kilowatts when tested in accordance with UL 1975 or when tested in accordance with NFPA 289, using the 20 kW ignition source.

Exterior fire-retardant-treated wood complying in accordance with NFPA 703.

Light-transmitting plastics complying with Section 12.5.5.15 of this code.

Aluminum composite material (ACM) meeting the requirements meeting the requirements of Class A interior finish in accordance with Chapter 10 of NFPA 101 when tested as an assembly in the maximum thickness intended for use.

Electrical wiring and equipment. Electrical wiring, luminaires and equipment shall be listed and labeled for the intended use and installed in accordance with NFPA 70.

Where heating appliances are installed, these devices shall be installed in accordance with the manufacturer's instructions and comply with the requirements in Section 11.5 of this code.

All required fire protection systems shall be in accordance with Chapter 13 of this code. Clearance shall be maintained between automatic sprinklers and the top of horticultural grow structures in accordance with NFPA 13.

Clearance between indoor horticultural grow structures and ignition sources such as luminaires, heaters and grow lamps shall be maintained in an approved manner.

Indoor horticultural grow structures shall not exceed an aggregate 200 square feet (18.6 m2) of floor area per fire area, unless a special investigation, approved by the AHJ, has demonstrated adequate fire safety.

**Statement of Problem and Substantiation for Public Input**

Grow structures are used to maximize the production yield of the plant being grown and are located within a...
building and should be accounted for. New terms are expressed in this chapter that if accepted may warrant new definitions.

Related Public Inputs for This Document

<table>
<thead>
<tr>
<th>Related Input</th>
<th>Relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Input No. 144-NFPA 1-2018 [Section No. 38.5.2]</td>
<td></td>
</tr>
</tbody>
</table>

Submitter Information Verification

Submitter Full Name: Kelly Nicolello  
Organization: UL LLC  
Street Address:  
City:  
State:  
Zip:  
Submittal Date: Mon Jun 25 15:32:09 EDT 2018  
Committee:  

Committee Statement

Resolution: FR-31-NFPA 1-2018  
Statement: Grow structures are used to maximize the production yield of the plant being grown and are located within a building and should be accounted for. New terms are expressed in this chapter that if accepted may warrant new definitions.
Chapter 39  Additive Manufacturing

Add new text in chapter 39

Additive Manufacturing. An operational permit is required to conduct additive manufacturing operations as covered in Chapter 39.

Chapter 2 add UL 60950-1, UL 62368-1, UL 2011.

New Definitions Chapter 3

3D PRINTER. A machine used in the additive manufacturing process for fabricating objects through the deposition of a material using a print head, nozzle, or another printer technology.

ADDITIVE MANUFACTURING. A process of joining materials to make objects from 3D model data, usually layer upon layer, sometimes referred to as 3D printing. The Code recognizes three types of additive manufacturing:

- Personal additive manufacturing. 3D printing that is intended for use by all individuals, including consumers and students.

- Professional additive manufacturing. 3D printing that is intended for use only by trained personnel in controlled environments not normally accessible to the general public.

- Industrial additive manufacturing. 3D printing that is intended for use only by trained professional in industrial and factory settings.

Chapter 39 ADDITIVE MANUFACTURING (3D PRINTING)

39.1 Application

39.1.1. Additive manufacturing equipment and operations shall comply with this section and other applicable provisions of this code.

39.1.1.1. Personal additive manufacturing shall comply with Chapter 39.2.

39.1.1.2. Professional additive manufacturing shall comply with Chapter 39.3.

39.1.1.3. Industrial additive manufacturing shall comply with Chapter 39.4.

39.1.2 Permits. Permits shall be required as set forth in Section 1.12 for the activities or uses regulated by Section 39.4.

39.1.3 Installation, operation and maintenance. 3D printers and associated additive manufacturing equipment shall be installed, operated and maintained in accordance with this Code, the listing and the manufacturer's instructions.

39.2 Personal additive manufacturing. Personal additive manufacturing equipment and operations shall comply with Sections 39.2.1. through 39.2.6. Additive manufacturing operations and equipment that do not comply with Sections 39.2.1. through 39.2.5 shall comply with Sections 39.3 or 39.4, as appropriate.

39.2.1. Equipment used in personal additive manufacturing shall be listed and labeled in accordance with UL 60950-1 or UL 62368-1.

39.2.2. Personal additive manufacturing shall be self-contained and not use ancillary equipment, other than pre-packaged production materials.

39.2.3. The operation of the personal additive manufacturing shall not create a hazardous (classified) environment as defined in NFPA 70, Article 500.

39.2.4. Personal additive manufacturing shall only use plastic filament production materials, which are...
listed with the 3D printer and identified in the manufacturer's instruction.

39.2.5 Personal additive manufacturing shall not utilize inert gas for creating an inert environment.

39.2.6 Personal additive manufacturing shall be permitted in all occupancy groups.

39.3 Professional additive manufacturing. Professional additive manufacturing equipment and operations shall comply with Sections 39.3.1 through 39.3.3. Additive manufacturing operations and equipment that do not comply with Sections 39.3.1 through 39.3.3 shall comply with Sections 39.4.

39.3.1 Equipment used in professional additive manufacturing shall comply with 39.3.1.1 through 39.3.1.4.

39.3.1.1 3D printers shall be listed and labeled in accordance with UL 60950-1 or UL 62368-1.

39.3.1.2 3D printers shall be self-contained and not utility ancillary equipment, other than pre-packaged production materials.

39.3.1.3 The operation of the 3D printers shall not create a hazardous (classified) environment outside of the unit's outer enclosure as defined in NFPA 70, Article 500.

39.3.1.4 3D printers shall not use or produce combustible metal production materials.

39.3.2 Professional additive manufacturing shall be limited to installations and operations that comply with 39.3.2.1 through 39.3.2.3.

39.3.2.1 Do not utilize external dust collection systems.

39.3.2.2 Do not utilize inert gas for creating an inert environment.

39.3.2.3 Do not utilize automated external powder feed or sieve features.

39.3.3 Occupancies. Professional additive manufacturing shall not be performed in Assembly, Educational, Detention and Correctional, Health Care, Mercantile, or Residential Occupancies.

Where approved, professional additive manufacturing shall be permitted in laboratories and facilities areas not accessible to untrained occupants and the general public.

39.4 Industrial additive manufacturing. Industrial additive manufacturing equipment and operations shall comply with Section 39.4.1 through 39.4.9.

39.4.1 Permits shall be obtained from the fire code official in accordance with Section 1.12 prior to engaging in industrial additive manufacturing operations.

39.4.2 3D printers used in industrial additive manufacturing shall be listed and labeled in accordance with UL 2011 or approved for the application based on a field evaluation conducted by an approved agency.

39.4.3 Industrial additive manufacturing operations that use or produce combustible powders or dusts shall comply with Chapter 40 and this section.

39.4.4 3D printing powders used in industrial additive manufacturing operations shall be tested for combustibility in accordance with NFPA 484 or NFPA 652 as applicable. A copy of test reports shall be provided to the fire code official upon request.

39.4.5 Industrial additive manufacturing that uses combustible, nonmetallic powders shall comply with NFPA 652.

39.4.6 Industrial additive manufacturing operations that use combustible metals shall also comply with NFPA 484.

39.4.7 Ancillary equipment provided for recycling, sieving, vacuuming or handling combustible powders shall be designed and approved for such use.

39.4.8 Additive manufacturing processes that utilize inert gases shall comply with Chapter 60. A gas detection system shall be provided in rooms or indoor areas in which the inert gas is present. Gas sensors shall be provided in the areas where the gas is expected to accumulate, and in other locations required by the fire code official.
The gas detection system shall be designed to activate an audible and visible supervisory alarm at a normally attended location upon detection of inert gas at the 8-hour TWA concentration.

The gas detection system activate an audible and visible alarm within the room or immediate area where the system is located, and automatically shut off flow of the inert gas to the 3D printing equipment upon detection of inert gas at the TLV-STEL concentration.

Where required by the fire code official, a report evaluating the acceptability of technologies, processes, products, facilities, materials and uses associated with the operation shall be provided in accordance with 1.4. and approved. The evaluation shall be conducted in accordance with the UL 3400 Additive Manufacturing Facility Safety Management requirements by an approved agency.

Where approved by the AHJ, buildings and facilities where industrial additive manufacturing is performed shall be permitted to comply with the performance based design options in Section 3.4 as an alternative to compliance with the other requirements set forth in this Chapter.

Industrial additive manufacturing shall only be conducted in the occupancy groups associated with the manufacturing operations, and as permitted by NFPA 400 maximum allowable quantity tables.

Statement of Problem and Substantiation for Public Input

Additive manufacturing is a relatively new process that is being used in multiple occupancies and requires guidance to the user and the AHJ in the application, installation, maintenance and personal protection of occupants that use and surround these material production units. Additive manufacturing is being conducted in personal residences, business and industrial complexes that produce everything from plastic gadgets to titanium jet engine parts. AHJs have been approached about what regulations and codes apply and because there are none that address this industry, this proposal address those concerns.

Submitter Information Verification

Submitter Full Name: Kelly Nicolello
Organization: UL LLC
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jun 25 15:36:06 EDT 2018
Committee:

Committee Statement

Resolution: FR-44-NFPA 1-2018
Statement: Additive manufacturing is a relatively new process that is being used in multiple occupancies and requires guidance to the user and the AHJ in the application, installation, maintenance and personal protection of occupants that use and surround these material production units. Additive manufacturing is being conducted in personal residences, business and industrial complexes that produce everything from plastic gadgets to titanium jet engine parts. AHJs have been approached about what regulations and codes apply and because there are none that address this industry, this proposal address those concerns.
Chapter 39  Reserved

Chapter 39  Wastewater Treatment and Collection Facilities

39.1  General (or Application)

39.1.1 The minimum requirements for protection against fire and explosion hazards in wastewater treatment plants and associated collection systems, including the hazard classification of specific areas and processes, shall comply with (or “this chapter and”) NFPA 820, Standard for Fire Protection in Wastewater Treatment and Collection Facilities, as applicable, unless such installations are approved existing installations, which shall be permitted to be continued in service.

39.1.2 The requirements established by NFPA 820, Standard for Fire Protection in Wastewater Treatment and Collection Facilities, shall apply to the following:

1. Collection sewers
2. Trunk sewers
3. Interceptor sewers
4. Combined sewers
5. Storm sewers
6. Pumping stations
7. Wastewater treatment plants
8. Sludge-handling facilities
9. Chemical-handling facilities
10. Treatment facilities
11. Ancillary structures (see 3.3.54.1 of NFPA 820)

39.1.3 When additions or modifications are made to existing facilities, the modifications shall reflect the requirements of NFPA 820, Standard for Fire Protection in Wastewater Treatment and Collection Facilities.

Statement of Problem and Substantiation for Public Input

Ch. 60 Hazardous Materials in NFPA 1 and NFPA 400 do not include Wastewater Treatment Facilities, and NFPA 820 is not included in the Referenced Publications. Ch. 60 and NFPA 400 do not address the quantities that you will find at Wastewater Treatment and Collection Facilities, which well exceed the maximum quantities allowed per Ch. 60, even with the increase allowances. Nor does NFPA 1 or NFPA 400 address the additional fire protection measures required for these types of facilities. Therefore, it is difficult to enforce the necessary fire code requirements for these types of facilities, ultimately resulting in regulations not being enforced or on a limited basis. I applied to the NFPA 820 technical committee out of confusion and frustration as to how to deal with these facilities. I was appointed to the committee with the intention of gaining a greater understanding of the code requirements, and becoming more knowledgeable in this area so I could properly apply the requirements. I also thought it would be advantageous to give the committee a perspective from the enforcement side when developing the code. I really think the introduction of this new chapter would give AHJs some well needed direction as to how to ensure that a reasonable level of fire and life safety and property protection from the hazards created by these types of facilities is provided.

Submitter Information Verification

Submitter Full Name: Leigh Grosvenor
Organization: City of Deltona Fire Department
Street Address:
Committee Statement

Resolution: FR-43-NFPA 1-2018
Statement: NFPA 820 has specific provisions for wastewater treatment and collection facilities. There is currently no direction in NFPA 1 for a user to apply NFPA 820, other than a single reference for fire extinguishers. As an NFPA promulgated code/standard covering a specific hazard, the entire NFPA 820 should be referenced in NFPA 1.
Chapter 39 Wastewater Treatment and Collection Facilities

39.1 General

Wastewater treatment and collection facilities shall comply with NFPA 820, *Standard for Fire Protection in Wastewater Treatment and Collection Facilities.*

Statement of Problem and Substantiation for Public Input

NFPA 820 has specific provisions for wastewater treatment and collection facilities. There is currently no direction in NFPA 1 for a user to apply NFPA 820, other than a single reference for fire extinguishers. As an NFPA promulgated code/standard covering a specific hazard, the entire NFPA 820 should be referenced in NFPA 1.

Submitter Information Verification

Submitter Full Name: Anthony Apfelbeck
Organization: Altamonte Springs Building/Fire Safety Division
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jan 25 09:04:38 EST 2018
Committee:

Committee Statement

Resolution: FR-43-NFPA 1-2018
Statement: NFPA 820 has specific provisions for wastewater treatment and collection facilities. There is currently no direction in NFPA 1 for a user to apply NFPA 820, other than a single reference for fire extinguishers. As an NFPA promulgated code/standard covering a specific hazard, the entire NFPA 820 should be referenced in NFPA 1.
Public Input No. 131-NFPA 1-2018 [ Section No. 52.1 ]

52.1 General.
52.1.1 Energy storage systems shall comply with Chapter 52 and NFPA 855.
52.1.2 Permits.

52.1.2.1 Permits, where required, shall comply with Section 1.12.
52.1.2.2 Prior to installation, plans shall comply with Section 4.1.2 of NFPA 855 and shall be submitted and approved by the AHJ.

Statement of Problem and Substantiation for Public Input

The purpose of this proposal is to correlate NFPA Energy Storage System requirements with the new NFPA 855, Standard for the Installation of Stationary Energy Storage Systems.

Related Public Inputs for This Document

<table>
<thead>
<tr>
<th>Related Input</th>
<th>Relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Input No. 132-NFPA 1-2018 [Section No. 1.12.8]</td>
<td></td>
</tr>
<tr>
<td>Public Input No. 133-NFPA 1-2018 [New Section after 52.1.2]</td>
<td></td>
</tr>
<tr>
<td>Public Input No. 134-NFPA 1-2018 [Sections 52.2, 52.3]</td>
<td></td>
</tr>
</tbody>
</table>

Submitter Information Verification

Submitter Full Name: Robert Davidson
Organization: Davidson Code Concepts, LLC
Affiliation: Tesla, USA
Street Address: 
City: 
State: 
Zip: 
Submittal Date: Tue Jun 26 22:01:55 EDT 2018
Committee: 

Committee Statement

Resolution: CI-35-NFPA 1-2018
Statement: NFPA 855 is not complete but will be by NFPA 1 second draft meeting. This will allow the material to be extracted at the second draft meeting.
52.1.2.3
Permits shall be required to install and operate energy storage systems exceeding the values shown in Table 52.1.2.3.
Table 52.1.2.3 Threshold Quantities
Extract NFPA 855: Table 1.3 Threshold Quantities.

Statement of Problem and Substantiation for Public Input
The purpose of this proposal is to correlate NFPA Energy Storage System requirements with the new NFPA 855, Standard for the Installation of Stationary Energy Storage Systems.

Related Public Inputs for This Document

<table>
<thead>
<tr>
<th>Related Input</th>
<th>Relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Input No. 131-NFPA 1-2018 [Section No. 52.1]</td>
<td>Part of ESS Package</td>
</tr>
</tbody>
</table>

Submitter Information Verification
Submitter Full Name: Robert Davidson
Organization: Davidson Code Concepts, LLC
Affiliation: Tesla, USA
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jun 26 22:15:37 EDT 2018
Committee:

Committee Statement
Resolution: CI-35-NFPA 1-2018
Statement: NFPA 855 is not complete but will be by NFPA 1 second draft meeting. This will allow the material to be extracted at the second draft meeting.
52.2  Lead-Acid, Nickel-Cadmium, Batteries, and other Batteries with Aqueous Electrolyte.

52.2.1  General.

Stationary storage battery systems having an aqueous electrolyte capacity of more than 100 gal (378.5 L) in sprinklered buildings or 50 gal (189.3 L) in unsprinklered buildings for flooded lead-acid, nickel-cadmium, and valve-regulated lead–acid (VRLA) batteries used for facility standby power, emergency power, or uninterrupted power supplies shall be in accordance with Section 52.2 and Table 52.2.1.

Table 52.2.1 Battery Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Nonrecombinant Batteries</th>
<th>Recombinant Batteries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vented, Flooded and Other Spillable or Free-flowing Aqueous Electrolyte</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Safety caps</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Venting caps - Required</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thermal runaway management - Not required</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spill control - Required</td>
<td>Required</td>
<td>Required</td>
</tr>
<tr>
<td>Neutralization - Required</td>
<td>Required</td>
<td>Not required</td>
</tr>
<tr>
<td>Ventilation - Required</td>
<td>Required</td>
<td>Required</td>
</tr>
<tr>
<td>Signage - Required</td>
<td>Required</td>
<td>Required</td>
</tr>
<tr>
<td>Seismic control - Required</td>
<td>Required</td>
<td>Required</td>
</tr>
<tr>
<td>Fire detection - Required</td>
<td>Required</td>
<td>Required</td>
</tr>
</tbody>
</table>

52.2.2  Safety Features.
52.2.2.1 Safety Venting.
Batteries shall be provided with safety venting caps per 52.2.2.1.1 and 52.2.2.1.2.

52.2.2.1.1 Nonrecombinant Batteries.
Vented lead-acid and nickel-cadmium batteries shall be provided with safety venting caps.

52.2.2.1.2 Recombinant Batteries.
VRLA shall be equipped with self-resealing flame-arresting safety vents.

52.2.2.2 Thermal Runaway.
VRLA systems shall be provided with a listed device or other approved method to preclude, detect, and control thermal runaway.

52.2.2.3 Location and Occupancy Separation.

52.2.2.3.1 Battery systems shall be permitted in the same room as the equipment that they support.

52.2.2.3.2 Battery systems shall be housed in a noncombustible, locked cabinet or other enclosure to prevent access by unauthorized personnel unless located in a separate equipment room accessible only to authorized personnel.

52.2.2.3.3 In other than assembly, educational, detention, and correction facilities; health care, ambulatory health care, and day care centers; and residential board and care and residential occupancies, battery systems shall be located in a room separated from other portions of the building by a minimum of a 1-hour fire barrier.

52.2.2.3.4 In assembly, educational, detention and correction facilities; health care, ambulatory health care, and day care centers; and, residential board and care and residential occupancies, battery systems shall be located in a room separated from other portions of the building by a minimum of a 2-hour fire barrier.

52.2.2.4 Spill Control.

52.2.2.4.1 Rooms, buildings, or areas containing free-flowing liquid electrolyte in individual vessels having a capacity of more than 55 gal (208 L) or multiple vessels having an aggregate capacity exceeding 1000 gal (3785 L) shall be provided with spill control to prevent the flow of liquids to adjoining areas.

52.2.2.4.2 An approved method and materials for the control of a spill of electrolyte shall be provided that will be capable of controlling a spill from the single largest vessel.

52.2.2.4.3 VRLA batteries. Batteries with immobilized electrolyte shall not require spill control.

52.2.2.5 Neutralization.

52.2.2.5.1 An approved method to neutralize spilled electrolyte shall be provided.

52.2.2.5.2 For VRLA batteries, the method shall be capable of neutralizing a spill from the largest battery to a pH between 7.0 and 9.0.

52.2.2.6 Ventilation.
For flooded lead-acid, flooded nickel-cadmium, and VRLA aqueous batteries, ventilation shall be provided for rooms and cabinets in accordance with the mechanical code and one of the following:

1. The ventilation system shall be designed to limit the maximum concentration of hydrogen to 1.0 percent of the total volume of the room during the worst-case event of simultaneous “boost” charging of all the batteries, in accordance with nationally recognized standards.

2. Continuous ventilation shall be provided at a rate of not less than 1 ft³/min/ft² (5.1 L/sec/m²) of floor area of the room or cabinet.
52.2.7 Environment.
The battery environment shall be controlled or analyzed to maintain temperature in a safe operating range for the specific battery technology used.

52.2.8 Signs.

52.2.8.1
Doors or accesses into the following shall be provided with approved signs:

(1) Battery storage buildings
(2) Rooms containing stationary storage battery systems
(3) Other areas containing stationary storage battery systems

52.2.8.2
For rooms that contain VRLA batteries or other batteries with immobilize electrolyte, the signs required by 52.2.8.1 shall state the following:

This room contains:

(1) Stationary storage battery systems
(2) Energized electrical circuits

52.2.8.3
For rooms that contain flooded lead-acid or flooded Ni-Cd, or spillable batteries, the signs required by 52.2.8.1 shall state the following:

This room contains:

(1) Stationary storage battery systems
(2) Energized electrical circuits
(3) Corrosive battery electrolyte

52.2.8.4
Battery cabinets shall be provided with exterior labels that identify the manufacturer and model number of the system and electrical rating (i.e., voltage and current) of the contained battery system.

52.2.8.5
Signs shall be provided within battery cabinets to indicate the relevant electrical, chemical, and fire hazard.

52.2.9 Seismic Protection.
Battery systems shall be seismically braced in accordance with the building code.

52.2.10 Smoke Detection.
An approved automatic smoke detection system shall be installed in rooms containing stationary battery storage systems in accordance with NFPA 72.

52.2.10.1
The required automatic smoke detection system shall be supervised by an approved central, proprietary, or remote station service or a local alarm that will give an audible signal at a constantly attended location.

52.2.10.2
Normally unoccupied, stand-alone telecommunications structures with a gross floor area of less than 1,500 ft^2 (140 m^2) shall not be required to have the detection as indicated in 52.2.10.

Statement of Problem and Substantiation for Public Input

The 2018 issue of NFPA 1 made excellent progress in addressing the fire issues associated with new battery chemistries such as lithium-ion which are being increasingly deployed in new ESS applications, but lack the inherent fire resistance of many traditional battery types. From a fire risk perspective, battery chemistries can be differentiated by those that use water-based or aqueous electrolyte and those that use a non-aqueous or organic electrolyte which may be flammable. Lead-acid, Nickel-Cadmium, as well as established but less widely used battery chemistries, such as Nickel-Iron and Nickel-Zinc, use water-based electrolytes that are either acidic (lead-acid) or caustic (nickel-cadmium, nickel-iron, or nickel-zinc), but are not flammable. The non-flammable electrolytes can be further differentiated between spillable (flooded) or non-spillable (VRLA or sealed) types. In all...
cases, since the electrolyte is not flammable (contrary to common organic electrolytes in lithium-ion batteries) all of
these aqueous batteries can be treated similarly by the code. The unique issues to be addressed are the corrosive
nature of the electrolyte and proper ventilation of hydrogen formed during operation.

I commend the technical committee for the 2018 publication of requirements for historic battery technologies
consistent with those developed over several code cycles with broad input from the major users of standby battery
systems. The increased levels of protection included for newer and unproven technologies, are not justified for lead
acid, nickel-cadmium and similar aqueous batteries which are well addressed in the current code and have an
exemplary safety record. In applying the 2018 code, it is easy for the code official to determine which types of
batteries are present and what part of the code is applicable. This structure prevents numerous exceptions for
lead-acid type batteries that would otherwise be needed.

Related Public Inputs for This Document

<table>
<thead>
<tr>
<th>Related Input</th>
<th>Relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Input No. 147-NFPA 1-2018 [Section No. A.52.2]</td>
<td></td>
</tr>
</tbody>
</table>

Submitter Information Verification

<table>
<thead>
<tr>
<th>Submitter Full Name: Richard Kluge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organization: Ericsson</td>
</tr>
<tr>
<td>Affiliation: Alliance for Telecommunications Industry Solutions (ATIS)</td>
</tr>
<tr>
<td>Street Address:</td>
</tr>
<tr>
<td>City:</td>
</tr>
<tr>
<td>State:</td>
</tr>
<tr>
<td>Zip:</td>
</tr>
<tr>
<td>Submittal Date: Wed Jun 27 10:12:00 EDT 2018</td>
</tr>
<tr>
<td>Committee:</td>
</tr>
</tbody>
</table>

Committee Statement

<table>
<thead>
<tr>
<th>Resolution: CI-35-NFPA 1-2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Statement: NFPA 855 is not complete but will be by NFPA 1 second draft meeting. This will allow the material to be extracted at the second draft meeting.</td>
</tr>
</tbody>
</table>
52.2* Lead-Acid and Nickel-Cadmium Aqueous Batteries.

52.2.1 General.
Stationary storage battery systems having an electrolyte capacity of more than 100 gal (378.5 L) in sprinklered buildings or 50 gal (189.3 L) in unsprinklered buildings for flooded lead-acid, nickel-cadmium, and valve-regulated lead-acid (VRLA), a queous, batteries used for facility standby power, emergency power, or uninterruptible power supplies shall be in accordance with Section 52.2 and Table 52.2.1.

Table 52.2.1 Battery Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Nonrecombinant Batteries</th>
<th>Recombinant Batteries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety caps</td>
<td>Venting caps</td>
<td>Venting caps</td>
</tr>
<tr>
<td>Thermal runaway management</td>
<td>Not required</td>
<td>Not required</td>
</tr>
<tr>
<td>Spill control</td>
<td>Required</td>
<td>Required</td>
</tr>
<tr>
<td>Neutralization</td>
<td>Required</td>
<td>Required</td>
</tr>
<tr>
<td>Ventilation</td>
<td>Required</td>
<td>Required</td>
</tr>
<tr>
<td>Signage</td>
<td>Required</td>
<td>Required</td>
</tr>
<tr>
<td>Seismic control</td>
<td>Required</td>
<td>Required</td>
</tr>
<tr>
<td>Fire detection</td>
<td>Required</td>
<td>Required</td>
</tr>
</tbody>
</table>

52.2.2 Safety Features.

52.2.2.1 Safety Venting.
Batteries shall be provided with safety venting caps per 52.2.2.1.1 and 52.2.2.1.2.

52.2.2.1.1 Nonrecombinant Batteries.
Vented lead-acid and nickel-cadmium shall be provided with safety venting caps.

52.2.2.1.2 Recombinant Batteries.
VRLA shall be equipped with self-resealing flame-arresting safety vents.

52.2.2.2 Thermal Runaway.
VRLA systems shall be provided with a listed device or other approved method to preclude, detect, and control thermal runaway.

52.2.2.3 Location and Occupancy Separation.

52.2.2.3.1 Battery systems shall be permitted in the same room as the equipment that they support.

52.2.2.3.2 Battery systems shall be housed in a noncombustible, locked cabinet or other enclosure to prevent access by unauthorized personnel unless located in a separate equipment room accessible only to authorized personnel.
52.2.2.3.3
In other than assembly, educational, detention, and correction facilities; health care, ambulatory health care, and day care centers; and residential board and care and residential occupancies, battery systems shall be located in a room separated from other portions of the building by a minimum of a 1-hour fire barrier.

52.2.2.3.4
In assembly, educational, detention and correction facilities; health care, ambulatory health care, and day care centers; and, residential board and care and residential occupancies, battery systems shall be located in a room separated from other portions of the building by a minimum of a 2-hour fire barrier.

52.2.2.4 Spill Control.

52.2.2.4.1
Rooms, buildings, or areas containing free-flowing liquid electrolyte in individual vessels having a capacity of more than 55 gal (208 L) or multiple vessels having an aggregate capacity exceeding 1000 gal (3785 L) shall be provided with spill control to prevent the flow of liquids to adjoining areas.

52.2.2.4.2*
An approved method and materials for the control of a spill of electrolyte shall be provided that will be capable of controlling a spill from the single largest vessel.

52.2.2.4.3
VRLA batteries with immobilized electrolyte shall not require spill control.

52.2.2.5 Neutralization.

52.2.2.5.1*
An approved method to neutralize spilled electrolyte shall be provided.

52.2.2.5.2
For VRLA batteries, the method shall be capable of neutralizing a spill from the largest battery to a pH between 7.0 and 9.0.

52.2.2.6 Ventilation.

For flooded lead-acid, flooded nickel-cadmium, and VRLA batteries, ventilation shall be provided for rooms and cabinets in accordance with the mechanical code and one of the following:

(1) The ventilation system shall be designed to limit the maximum concentration of hydrogen to 1.0 percent of the total volume of the room during the worst-case event of simultaneous “boost” charging of all the batteries, in accordance with nationally recognized standards.

(2) Continuous ventilation shall be provided at a rate of not less than 1 ft³/min/ft² (5.1 L/sec/m²) of floor area of the room or cabinet.

52.2.2.7 Environment.

The battery environment shall be controlled or analyzed to maintain temperature in a safe operating range for the specific battery technology used.

52.2.2.8 Signs.

52.2.2.8.1
Doors or accesses into the following shall be provided with approved signs:

(1) Battery storage buildings
(2) Rooms containing stationary storage battery systems
(3) Other areas containing stationary storage battery systems

52.2.2.8.2
For rooms that contain VRLA batteries, the signs required by 52.2.2.8.1 shall state the following:

This room contains:

(1) Stationary storage battery systems
(2) Energized electrical circuits

Page 170 of 290
52.2.2.8.3
For rooms that contain flooded lead-acid or flooded Ni-Cd batteries, the signs required by 52.2.2.8.1 shall state the following:

This room contains:

(1) Stationary storage battery systems
(2) Energized electrical circuits
(3) Corrosive battery electrolyte

52.2.2.8.4
Battery cabinets shall be provided with exterior labels that identify the manufacturer and model number of the system and electrical rating (i.e., voltage and current) of the contained battery system.

52.2.2.8.5
Signs shall be provided within battery cabinets to indicate the relevant electrical, chemical, and fire hazard.

52.2.2.9 Seismic Protection.
Battery systems shall be seismically braced in accordance with the building code.

52.2.2.10 Smoke Detection.
An approved automatic smoke detection system shall be installed in rooms containing stationary battery storage systems in accordance with NFPA 72.

52.2.2.10.1
The required automatic smoke detection system shall be supervised by an approved central, proprietary, or remote station service or a local alarm that will give an audible signal at a constantly attended location.

52.2.2.10.2
Normally unoccupied, stand-alone telecommunications structures with a gross floor area of less than 1,500 ft² (140 m²) shall not be required to have the detection as indicated in 52.2.2.10.

Statement of Problem and Substantiation for Public Input

There are other battery chemistries that have similar fire risks to lead-acid and ni-cad batteries. Specifically the Nickel Zinc batteries fall into this category. These are referred to as aqueous batteries. Refer to Linden Handbook of Batteries, 4th edition 23.4.2 and 23.4.4 for safety considerations.

Submitter Information Verification

Submitter Full Name: William Cantor
Organization: TPI Corporation
Affiliation: ESSB Codes Working Group
Street Address: 
City: 
State: 
Zip: 
Submittal Date: Wed Jun 27 11:44:14 EDT 2018
Committee: 

Committee Statement

Resolution: CI-35-NFPA 1-2018
Statement: NFPA 855 is not complete but will be by NFPA 1 second draft meeting. This will allow the material to be extracted at the second draft meeting.
Sections 52.2, 52.3 Replace with NFPA 855 extract:

52.2

Lead-Acid and Nickel-Cadmium Batteries.

52.2.1 General.

Stationary storage battery systems having an electrolyte capacity of more than 100 gal (378.5 L) in sprinklered buildings or 50 gal (189.3 L) in unsprinklered buildings for flooded lead–acid, nickel-cadmium, and valve-regulated lead–acid (VRLA) batteries used for facility standby power, emergency power, or uninterrupted power supplies shall be in accordance with Section 52.2 and Table 52.2.1.

Table 52.2.1 Battery Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Nonrecombinant Batteries</th>
<th>Recombinant Batteries</th>
<th>Requirement Flooded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety caps</td>
<td>Vented lead–acid and nickel-cadmium</td>
<td>Vented lead–acid and nickel-cadmium</td>
<td>Vented lead–acid and nickel-cadmium</td>
</tr>
<tr>
<td>Venting caps</td>
<td>Vented lead–acid and nickel-cadmium</td>
<td>Vented lead–acid and nickel-cadmium</td>
<td>Vented lead–acid and nickel-cadmium</td>
</tr>
<tr>
<td>Self-resealing flame-arresting caps</td>
<td>Vented lead–acid and nickel-cadmium</td>
<td>Vented lead–acid and nickel-cadmium</td>
<td>Vented lead–acid and nickel-cadmium</td>
</tr>
<tr>
<td>Thermal runaway management</td>
<td>Not required</td>
<td>Required</td>
<td>Not required</td>
</tr>
<tr>
<td>Not required</td>
<td>Not required</td>
<td>Required Spill control</td>
<td>Required</td>
</tr>
<tr>
<td>Neutralization</td>
<td>Required</td>
<td>Required</td>
<td>Required</td>
</tr>
<tr>
<td>Required Ventilation</td>
<td>Required</td>
<td>Required</td>
<td>Required</td>
</tr>
<tr>
<td>Required Signage</td>
<td>Required</td>
<td>Required</td>
<td>Required</td>
</tr>
<tr>
<td>Required Fire-detection</td>
<td>Required</td>
<td>Required</td>
<td>Required</td>
</tr>
<tr>
<td>Signage</td>
<td>Required</td>
<td>Required</td>
<td>Required</td>
</tr>
<tr>
<td>Ventilation</td>
<td>Required</td>
<td>Required</td>
<td>Required</td>
</tr>
<tr>
<td>Security</td>
<td>Required</td>
<td>Required</td>
<td>Required</td>
</tr>
<tr>
<td>Fire detection</td>
<td>Required</td>
<td>Required</td>
<td>Required</td>
</tr>
</tbody>
</table>

52.2.2 Safety Features.

52.2.2.1 Safety Venting.

52.2.2.1.1 Nonrecombinant Batteries.

Vented lead–acid and nickel-cadmium shall be provided with safety venting caps.

52.2.2.1.2 Recombinant Batteries.

VRLA shall be equipped with self-resealing flame-arresting safety vents.

52.2.2.2 Thermal Runaway.

VRLA systems shall be provided with a listed device or other approved method to preclude, detect, and control thermal runaway.

52.2.2.3 Location and Occupancy Separation.

52.2.2.3.1 Battery systems shall be permitted in the same room as the equipment that they support.

52.2.2.3.2 Battery systems shall be housed in a noncombustible, locked cabinet or other enclosure to prevent access by unauthorized personnel unless located in a separate equipment room accessible only to authorized personnel.

52.2.2.3.3 In other than assembly, educational, detention, and correction facilities; health care, ambulatory health care, and day care centers; and residential board and care and residential occupancies, battery systems shall be located in a room separated from other portions of the building by a minimum of a 1-hour fire barrier.

52.2.2.3.4 In assembly, educational, detention and correction facilities; health care, ambulatory health care, and day care centers; and, residential board and care and residential occupancies, battery systems shall be located in a room separated from other portions of the building by a minimum of a 2-hour fire barrier.

52.2.2.4 Spill Control.
52.2.2.4.1

Rooms, buildings, or areas containing free-flowing liquid electrolyte in individual vessels having a capacity of more than 55 gal (208 L) or multiple vessels having an aggregate capacity exceeding 1000 gal (3785 L) shall be provided with spill control to prevent the flow of liquid to adjoining areas.

52.2.2.4.2*

An approved method and materials for the control of a spill of electrolyte shall be provided that will be capable of controlling a spill from the single largest vessel.

52.2.2.4.3

VRLA batteries with immobilized electrolyte shall not require spill control.

52.2.2.5 – Neutralization.

52.2.2.5.1*

An approved method to neutralize spilled electrolyte shall be provided.

52.2.2.5.2

For VRLA batteries, the method shall be capable of neutralizing a spill from the largest battery to a pH between 7.0 and 9.0.

52.2.2.6* – Ventilation.

For flooded lead-acid, flooded nickel-cadmium, and VRLA batteries, ventilation shall be provided for rooms and cabinets in accordance with the mechanical code and one of the following:

1. The ventilation system shall be designed to limit the maximum concentration of hydrogen to 1.0 percent of the total volume of the room during the worst-case event of simultaneous "boost" charging of all the batteries, in accordance with nationally recognized standards.

2. Continuous ventilation shall be provided at a rate of not less than 1 ft$^3$/min/ft$^2$ (5.1 L/sec/m$^2$) of floor area of the room or cabinet.

52.2.2.7 – Environment.

The battery environment shall be controlled or analyzed to maintain temperature in a safe operating range for the specific battery technology used.

52.2.2.8 – Signs.

52.2.2.8.1

Doors or accesses into the following shall be provided with approved signs:

1. Battery storage buildings
2. Rooms containing stationary storage battery systems
3. Other areas containing stationary storage battery systems

52.2.2.8.2

For rooms that contain VRLA batteries, the signs required by 52.2.2.8.1 shall state the following:

This room contains:

1. Stationary storage battery systems
2. Energized electrical circuits
For rooms that contain flooded lead-acid or flooded Ni-Cd batteries, the signs required by 52.2.2.8.1 shall state the following:

This room contains:

1. Stationary storage battery systems
2. Energized electrical circuits
3. Corrosive battery electrolyte

Battery cabinets shall be provided with exterior labels that identify the manufacturer and model number of the system and electrical rating (i.e., voltage and current) of the contained battery system.

Battery systems shall be seismically braced in accordance with the building code.

An approved automatic smoke detection system shall be installed in rooms containing stationary battery storage systems in accordance with NFPA 72.

The required automatic smoke detection system shall be supervised by an approved central, proprietary, or remote station service or a local alarm that will give an audible signal at a constantly attended location.

Normally unoccupied, stand-alone telecommunications structures with a gross floor area of less than 1,600 ft² (140 m²) shall not be required to have the detection as indicated in 52.2.2.10.

Energy storage systems having a capacity greater than the quantities listed in Table 52.3.1 shall be in accordance with Section 52.3 and where used as a legally required emergency or standby power system, shall also comply with 11.7.3.

Table 52.3.1 Energy Storage System Threshold Quantities

<table>
<thead>
<tr>
<th>Type</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lithium batteries, all types</td>
<td>20 KWh (18.0 Mega joules)</td>
</tr>
<tr>
<td>Sodium batteries, all types</td>
<td>20 KWh (18.0 Mega joules)</td>
</tr>
<tr>
<td>Flow batteries</td>
<td>20 KWh (18.0 Mega joules)</td>
</tr>
<tr>
<td>Other battery technologies</td>
<td>10 KWh (10.8 Mega joules)</td>
</tr>
<tr>
<td>Capacitors</td>
<td>70 KWh (25.2 Mega joules)</td>
</tr>
</tbody>
</table>

Notes:

a For batteries and capacitors rated in Amp-Hours, KWh should equal rated voltage times amp-hour rating divided by 1000.

b Includes vanadium, zinc-bromine, polysulfide-bromide, and other flowing electrolyte-type technologies.

c Or 70 KWh (25.2 Mega joules) for sodium-ion technologies.

Stationary storage battery systems shall be housed in a noncombustible, locked cabinet or other enclosure to prevent access by unauthorized personnel unless located in a separate equipment room accessible only to authorized personnel.
52.3.2.1.2.1 - Stationary storage battery systems shall not be located in areas where the floor is located more than 75 ft (22,860 mm) above the lowest level of fire department vehicle access, or where the floor level is more than 30 ft (9144 mm) below the finished floor of the lowest level of exit discharge, unless otherwise permitted by 52.3.2.1.2.

52.3.2.1.2.2 - Installations on noncombustible rooftops of buildings exceeding 75 ft (22,860 mm) in height that do not obstruct fire department rooftop operations shall be permitted when approved by the AHJ.

52.3.2.1.3 - Separation.
Rooms containing stationary storage battery systems shall be located in high-hazard occupancies, or shall be separated from other areas of the building as stated in 52.3.2.1.3.1 and 52.3.2.1.3.2. Stationary storage battery systems shall be allowed to be in the same room with the equipment they support.

52.3.2.1.3.1 - In other than assembly, educational, detention, and correction facilities; health care, ambulatory health care, and day care centers; and residential board and care and residential occupancies, stationary storage battery systems shall be located in a room separated from other portions of the building by a minimum of a 1-hour fire barrier.

52.3.2.1.3.2 - In assembly, educational, detention, and correction facilities; health care, ambulatory health care, and day care centers; and residential board and care and residential occupancies, stationary storage battery systems shall be located in a room separated from other portions of the building by a minimum of a 2-hour fire barrier.

52.3.2.1.4 - Outdoor Installations.
Stationary storage battery systems located outdoors shall comply with this paragraph, in addition to all applicable requirements of Section 52.3.

52.3.2.1.4.1 - Installations in outdoor enclosures or containers that are occupied for servicing, testing, maintenance, and other functions shall be treated as stationary storage battery system rooms.

52.3.2.1.4.2 - Battery arrays in noncombustible containers shall not be required to be spaced 3 ft (914 mm) from the container walls.

52.3.2.1.4.3 - Stationary storage battery systems located outdoors shall be separated by a minimum 5 ft (1524 mm) from the following:

1. Lot lines
2. Public ways
3. Buildings
4. Stored combustible materials
5. Hazardous materials
6. High-piled stock
7. Other exposure hazards

52.3.2.1.4.4 - The AHJ shall be permitted to authorize smaller separation distances if large-scale fire and fault condition testing conducted or witnessed and reported by an approved testing laboratory is provided showing that a fire involving the system will not adversely impact occupant egress from adjacent buildings, or adversely impact adjacent stored materials or structures.

52.3.2.1.4.5 - Means of Egress.
52.3.2.1.4.5.1  
Stationary storage battery systems located outdoors shall be separated from any means of egress as required by the AHJ to ensure safe egress under fire conditions, but in no case less than 10 ft (3048 mm).

52.3.2.1.4.5.2  
The AHJ shall be permitted to authorize smaller separation distances if large-scale fire and fault condition testing conducted or witnessed and reported by an approved testing laboratory is provided showing that a fire involving the system will not adversely impact occupant egress.

52.3.2.1.4.6  -- Security of Areas.  
Outdoor areas in which stationary storage battery systems are located shall be secured against unauthorized entry in an approved manner.

52.3.2.2  -- Maximum Allowable Quantities.

52.3.2.2.1  
Fire areas within buildings containing stationary storage battery systems exceeding the maximum allowable quantities in Table 52.3.2.2.1 shall comply with all applicable ordinary-hazard and high-hazard requirements as identified in 6.2.2 of NFPA 101 and the building code.

Table 52.3.2.2.1  

<table>
<thead>
<tr>
<th>Type</th>
<th>Maximum Allowable Quantities</th>
<th>Hazard Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lithium batteries, all types</td>
<td>600 KWh</td>
<td>High hazard</td>
</tr>
<tr>
<td>Sodium batteries, all types</td>
<td>600 KWh</td>
<td>High hazard</td>
</tr>
<tr>
<td>Flow batteries</td>
<td>600 KWh</td>
<td>High hazard</td>
</tr>
<tr>
<td>Other battery technologies</td>
<td>200 KWh</td>
<td>High hazard</td>
</tr>
</tbody>
</table>

Notes:

a For batteries rated in amp-hours, KWh should equal rated voltage times amp-hour rating divided by 1000.

b Includes vanadium, zinc-bromine, polysulfide-bromide, and other flowing electrolyte-type technologies.

c Can be permitted to be ordinary hazard classification if approved by the AHJ based on (1) a hazard mitigation analysis conducted in accordance with 52.3.2.4 and (2) large-scale fire and fault condition testing conducted or witnessed and reported by an approved testing laboratory that shows that a fire involving the stationary storage battery system is contained within the room for a duration equal to the fire resistance rating of the room separation required in 52.3.2.1.3.1 or 52.3.2.1.3.2, as applicable.

52.3.2.2.2  
Where approved by the AHJ, areas containing stationary storage battery systems that exceed the amounts in Table 52.3.2.2.1 shall be permitted to be treated as an ordinary-hazard and not a high-hazard classification based on a hazardous mitigation analysis in accordance with 52.3.2.4 and large-scale fire and fault condition testing conducted or witnessed and reported by an approved testing laboratory.

52.3.2.2.3  
Where areas within buildings contain a combination of energy system technologies, the total aggregate quantities shall be determined based on the sum of percentages of each type divided by the maximum allowable quantity of each type. If the sum of the percentages exceeds 100 percent, the area shall be treated as a high-hazard classification in accordance with Table 52.3.2.2.1.

52.3.2.3  -- Battery Arrays.

52.3.2.3.1  
Battery arrays shall comply with 52.3.2.3.2 and 52.3.2.3.3 unless otherwise permitted by 52.3.2.3.4 or 52.3.2.3.5.

52.3.2.3.2  
Storage batteries, prepackaged stationary storage battery systems, and pre-engineered stationary storage battery systems shall be segregated into arrays not exceeding 50 KWh (180 Mega joules) each.

52.3.2.3.3  
Each array shall be spaced a minimum of 3 ft (914 mm) from other arrays and from walls in the storage room or area. The storage arrangements shall comply with the egress provisions in NFPA 101.

52.3.2.3.4  
Listed pre-engineered stationary storage battery systems and prepackaged stationary storage battery systems shall not exceed 250 KWh (900 Mega joules) each.
52.3.2.3.5 –
The AHJ shall be permitted to approve listed pre-engineered and prepackaged battery arrays with larger capacities or smaller battery array spacing if large-scale fire and fault condition testing conducted or witnessed and reported by an approved testing laboratory is provided showing that a fire involving one array will not propagate to an adjacent array, and be contained within the room for a duration equal to the fire resistance rating of the room separation required by 52.3.2.1.3.

52.3.2.4 – Hazard Mitigation Analysis.
A failure mode and effects analysis (FMEA) or other approved hazard mitigation analysis shall be provided to the AHJ when any of the following conditions are present:

1. Battery technologies not specifically identified in Table 52.3.1 are provided.
2. More than one stationary storage battery technology is provided in a room or indoor area where there is a potential for adverse interaction between technologies.
3. When allowed as a basis for increasing maximum allowable quantities as specified in Table 52.3.2.2.1.

52.3.2.4.1 –
The analysis shall evaluate the consequences of the following failure modes, and others deemed necessary by the AHJ. Only single failure modes shall be considered for each mode:

1. Thermal runaway condition in a single module or array
2. Failure of a battery management system
3. Failure of a required ventilation system
4. Voltage surges on the primary electric supply
5. Short circuits on the load side of the stationary battery storage system
6. Failure of the smoke detection, fire suppression, or gas detection system

52.3.2.4.2 –
The AHJ shall be permitted to approve the hazardous mitigation analysis provided the consequences of the FMEA demonstrate the following:

1. Fires or explosions will be contained within unoccupied stationary storage battery system rooms for the minimum duration of the fire resistance rated specified in 52.3.2.1.3.1 or 52.3.2.1.3.2, as applicable
2. Fires and explosions in stationary storage battery system cabinets in occupied work centers allow occupants to safely evacuate
3. Toxic and highly toxic gases released during charging, discharging, and normal operation shall not exceed the permissible exposure limit (PEL)
4. Toxic and highly toxic gases released during fires and other fault conditions shall not reach concentrations in excess of IDLH level in the building or adjacent means of egress routes during the time deemed necessary to evacuate from that area
5. Flammable gases released from batteries during charging, discharging, and normal operation shall not exceed 25 percent of the lower flammable limit (LFL)

52.3.2.4.3 –
Construction, equipment, and systems that are required for the stationary storage battery system to comply with the hazardous mitigation analysis shall be installed, maintained, and tested in accordance with nationally recognized standards and specified design parameters.

52.3.2.5 – Listings.
Storage batteries shall be listed in accordance with UL 1973, Standard for Batteries for Use in Light Electric Rail (LER) Applications and Stationary Applications. Prepackaged and pre-engineered stationary storage battery systems shall be listed in accordance with UL 9540, Outline of Investigation for Energy Storage Systems and Equipment.
52.3.2.5.1 Prepackaged and Pre-engineered Systems.
Prepackaged and pre-engineered stationary storage battery systems shall be installed in accordance with their listing and the manufacturer’s instructions.

52.3.2.5.2 Environment.
The storage battery environment shall be controlled to maintain temperatures and conditions within the battery manufacturer’s specifications.

52.3.2.6 Installation.
52.3.2.6.1 Battery Management System.
An approved battery management system shall be provided for battery technologies for monitoring and balancing cell voltages, currents, and temperatures within the manufacturer’s specifications. The system shall transmit an alarm signal to an approved location if potentially hazardous temperatures or other conditions including short circuits, overvoltage (i.e., overcharge) or under voltage (i.e., over discharge) are detected.

52.3.2.6.2 Battery Chargers.
Battery chargers shall be compatible with the battery manufacturer’s electrical ratings and charging specifications. Battery chargers shall be listed in accordance with the UL 1564, Standard for Industrial Battery Chargers, or provided as part of a listed pre-engineered or prepackaged stationary storage battery system.

52.3.2.6.3 Vehicle Impact Protection.
Vehicle impact protection shall be provided where stationary storage battery systems are subject to impact by motor vehicles.

52.3.2.6.4 Combustible Storage.
52.3.2.6.4.1 Combustible materials not related to the stationary storage battery system shall not be stored in battery rooms, cabinets, or enclosures.

52.3.2.6.4.2 Combustible materials in occupied work centers shall comply with Section 10.18 and shall not be stored within 3 ft (915 mm) of battery cabinets.

52.3.2.6.5 Signage.
52.3.2.6.5.1 Approved signage shall be provided on doors or in approved locations near entrances to stationary battery storage system rooms.

52.3.2.6.5.2 New signage installations shall require the following items:
(1) Hazard identification markings in accordance with NFPA 704.
(2) “This room contains energized battery systems,” or the equivalent.
(3) Identification of the type(s) of batteries present
(4) AUTHORIZED PERSONNEL ONLY
(5) Technology-specific markings, if required in 52.3.2.11

52.3.2.6.5.3 Where the battery storage system disconnecting means is not within sight of the main service disconnect, placards or directories shall be installed at the locations of the main service disconnect to indicate the location of all battery storage disconnecting means in accordance with NFPA 70.

52.3.2.6.5.4 Existing stationary storage battery systems shall be permitted to include the signage required at the time it was installed.

52.3.2.6.5.5 Battery cabinets shall be provided with exterior labels that identify the manufacturer and model number of the system and electrical rating (i.e., voltage and current) of the contained battery system.
52.3.2.6.6.5.6
Signs shall be provided within battery cabinets to indicate the relevant electrical, chemical, and fire hazard.

52.3.2.6.5.7
Fire command centers in buildings containing stationary storage battery systems shall include signage or readily available documentation that describes the location of stationary storage battery systems, the types of batteries present, operating voltages, and location of electrical disconnects.

52.3.2.6.6 – Seismic Protection.
Battery systems shall be seismically braced in accordance with the building code.

52.3.2.6.7 – Safety Caps.
Vented batteries shall be provided with flame-arresting safety caps.

52.3.2.6.8* – Mixed Battery Systems.
Different types of batteries shall not be installed in the same room or cabinet if there is a potential for unsafe interaction between them, as determined by the AHJ.

52.3.2.7 – Suppression And Detection.
52.3.2.7.1 – Fire suppression.
Rooms containing stationary storage battery systems shall be protected by an automatic sprinkler system installed in accordance with Section 13.3.

52.3.2.7.1.1 – Commodity classifications for specific technologies of storage batteries shall be in accordance with Chapter 5 of NFPA 13.

52.3.2.7.1.2 – If the storage battery types are not specifically addressed in Chapter 5 of NFPA 13, the AHJ shall be permitted to approve the fire suppression system based on full-scale fire and fault condition testing conducted or witnessed and reported by an approved laboratory.

52.3.2.7.2 – Smoke Detection.
An approved automatic smoke detection system shall be installed in rooms containing stationary battery storage systems in accordance with NFPA 72 and the required automatic smoke detection system shall be supervised by an approved central, proprietary, or remote station service or a local alarm that will give an audible signal at a constantly attended location.

52.3.2.8* – Ventilation.
Where required by 52.3.2.11, ventilation shall be provided for rooms and cabinets in accordance with the mechanical code and one of the following:

1. The ventilation system shall be designed to limit the maximum concentration of flammable gas to 25 percent of the lower flammable limit (LFL) of the total volume of the room during the worst-case event of simultaneous “boost” charging of all the batteries, in accordance with nationally recognized standards.

2. Mechanical ventilation shall be provided at a rate of not less than 1 ft³/min ft² (5.1 L/sec/m²) of floor area of the room or cabinet. The ventilation can be either continuous, or activated by a gas detection system in accordance with 52.3.2.8.2.

52.3.2.8.1 – Required mechanical ventilation systems for rooms and cabinets containing storage batteries shall be supervised by an approved central, proprietary, or remote station service or shall initiate an audible and visual signal at an approved constantly attended on-site location.

52.3.2.8.2 – Where required by 52.3.2.8(2), rooms containing stationary storage battery systems shall be protected by an approved continuous gas detection system.

52.3.2.8.2.1 – The gas detection system shall be designed to activate when the level of flammable gas exceeds 25 percent of the lower flammable limit (LFL).
52.3.2.8.2.2

Activation of the gas detection system shall result in activation of the mechanical ventilation system, which shall remain on until the flammable gas detected is less than 25 percent of the LFL.

52.3.2.8.2.3

The gas detection system shall include a minimum two hours of standby power.

52.3.2.8.2.4

Failure of the gas detection system shall annunciate a trouble signal at an approved central, proprietary, or remote station service, or when approved at a constantly attended onsite location.

52.3.2.9

Spill Control and Neutralization.

Where required by 52.3.2.11, approved methods and materials shall be provided for the control and neutralization of spills of electrolyte or other hazardous materials in rooms containing stationary storage batteries as follows:

1. For batteries with free-flowing electrolyte, the method and materials shall be capable of neutralizing a spill of the total capacity from the largest cell or block to a pH between 5.0 and 9.0.
2. For batteries with immobilized electrolyte, the method and materials shall be capable of neutralizing a spill of 3.0 percent of the capacity of the largest cell or block in the room to a pH between 5.0 and 9.0.

52.3.2.10

Thermal Runaway.

Where required by 52.3.2.11, a listed device or other approved method shall be provided to preclude, detect, and control thermal runaway.

52.3.2.11

Battery-Specific Protection.

Stationary storage battery systems shall comply with 52.3.2 through 52.3.2.10 and this section, as applicable.

52.3.2.11.1

Lithium Batteries.

Stationary storage battery systems utilizing lithium batteries shall be provided with thermal runaway protection in accordance with 52.3.2.10.

52.3.2.11.2

Sodium Batteries.

Stationary storage battery systems utilizing sodium batteries shall comply with the following:

1. Ventilation shall be provided in accordance with 52.3.2.8.
2. Spill control and neutralization shall be in accordance with 52.3.2.9.
3. Thermal runaway protection shall be provided for in accordance with 52.3.2.10.
4. A hazard mitigation analysis shall be provided for systems that utilize sodium-sulfur batteries, or other sulfur-type battery systems that operate above ambient temperatures.
5. The signage required in 52.3.2.6.5 shall include, where applicable, “Water Reactive Hazard — Apply No Water.”

52.3.2.11.3

Flow Batteries.

Stationary storage battery systems utilizing flow batteries shall comply with the following:

1. Ventilation shall be provided in accordance with 52.3.2.8.
2. Spill control and neutralization shall be in accordance with 52.3.2.9.
52.3.2.11.4  – Other Battery Types.
Stationary storage battery systems utilizing battery technologies other than those described in
52.3.2.11.1 through 52.3.2.11.1 shall comply with the following:

(1) Ventilation shall be provided in accordance with 52.3.2.8 where flammable, toxic or highly toxic
gases could be present during charging, discharging, and normal system use.

(2) Spill control and neutralization shall be in accordance with 52.3.2.9 where the batteries contain
electrolytes that could be released from the batteries.

(3) Thermal runaway protection shall be provided in accordance with 52.3.2.10.

(4) The signage required in 52.3.2.6.5 shall also identify any potential hazards associated with the
batteries.

52.3.2.12  – Testing, Maintenance, and Repairs.
52.3.2.12.1  –
Stationary storage batteries and associated equipment and systems shall be tested and maintained in
accordance with the manufacturer’s instructions.

52.3.2.12.2  –
Any storage batteries or system components used to replace existing units shall be compatible with the
battery charger, battery management systems, other storage batteries, and other safety systems.

52.3.3  – Capacitor Energy Storage Systems.
52.3.3.1  – Capacity.
Stationary capacitor energy storage systems having capacities greater than those described in Table
52.3.1 shall comply with 52.3.3.

52.3.3.2  – Location and Occupancy Separation.
Stationary capacitor energy storage systems shall be located and constructed as required for stationary
storage battery system in accordance with 52.3.2.1 through 52.3.2.1.4.3.

52.3.3.3  – Maximum Allowable Quantities.
Fire areas within buildings containing capacitor energy storage systems exceeding 600 KWh (2160 mJ)
shall comply with all applicable ordinary-hazard and high-hazard requirements as identified in 6.2.2 of
NFPA 101 and the building code.

52.3.3.4  – Capacitor Arrays.
52.3.3.4.1  –
Capacitors, prepackaged stationary capacitor energy storage systems, and pre-engineered capacitor
energy storage systems shall be segregated into arrays not exceeding 50 KWh (180 Mega joules) each.

52.3.3.4.2  –
Each array shall be spaced a minimum 3 ft (914 mm) from other arrays and from walls in the storage
room or area. The storage arrangements shall comply with the egress provisions in NFPA 101.

52.3.3.5  – Listings.
Capacitors shall be listed in accordance with UL 1973, Standard for Batteries for Use in Light Electric
Rail (LER) Applications and Stationary Applications. Prepackaged and pre-engineered capacitor energy
systems shall be listed in accordance with UL 9540, Outline of Investigation for Energy Storage
Systems and Equipment.

52.3.3.5.1  – Prepackaged and Pre-engineered Systems.
Prepackaged and pre-engineered capacitor energy storage systems shall be installed in accordance with
their listing and the manufacturer’s instructions.

52.3.3.5.2  – Environment.
The environment surrounding the capacitors shall be controlled to maintain temperatures and conditions
within the manufacturer’s specifications.
52.3.3.6 – Chargers.
Capacitor chargers shall be compatible with the capacitor manufacturer's electrical ratings and charging
specifications, and shall be listed in accordance with the UL 1564, *Standard for Industrial Battery
Chargers*, or provided as part of a listed pre-engineered or prepackaged capacitor energy storage
system.

52.3.3.7 – Vehicle Impact Protection.
Vehicle impact protection shall be provided where capacitor energy storage systems are subject to impact
by motor vehicles.

52.3.3.8 – Combustible Storage.

52.3.3.8.1 –
Combustible materials not related to the capacitor energy storage system shall not be stored in capacitor
rooms, cabinets, or enclosures.

52.3.3.8.2 –
Combustible materials in occupied work centers shall comply with Section 10.18 and shall not be stored
within 3 ft (915 mm) of capacitor cabinets.

52.3.3.9 – Signage.
Approved signage shall be provided on doors or in approved locations near entrances to capacitor
energy storage systems, and shall include the following:

1. Hazard identification markings in accordance with NFPA 704.
2. “This room contains energized capacitor systems,” or the equivalent
3. Identification of the type(s) of capacitors present
4. AUTHORIZED PERSONNEL ONLY

52.3.3.9.1 –
Where the capacitor energy storage system disconnecting means is not within sight of the main service
disconnect, placards or directories shall be installed at the locations of the main service disconnect to
indicate the location of all capacitor energy storage system disconnecting means in accordance with
NFPA 70.

52.3.3.9.2 –
Capacitor cabinets shall be provided with exterior labels that identify the manufacturer and model number
of the system and electrical rating (i.e., voltage and current) of the contained battery system.

52.3.3.9.3 –
Signs shall be provided within capacitor cabinets to indicate the relevant electrical, chemical, and fire
hazard.

52.3.3.9.4 –
Fire command centers in buildings containing capacitor energy storage systems shall include signage or
readily available documentation that describes the location of the systems, the types of capacitors
present, operating voltages, and location of electrical disconnects.

52.3.3.10 – Seismic Protection.
Capacitor energy storage systems shall be seismically braced in accordance with the building code.

52.3.3.11 – Testing, Maintenance, and Repairs.

52.3.3.11.1 –
Capacitor energy storage systems and associated equipment and systems shall be tested and
maintained in accordance with the manufacturer's instructions.

52.3.3.11.2 –
Capacitors or system components used to replace existing units shall be compatible with the capacitor
charger, other capacitors, and other safety systems.
52.3 Emergency Planning and Training.

52.4 Repairs.

52.5 Retrofits.

52.6 Replacements.

52.7 Increase in Power Rating or Energy Capacity.

52.8 Environment.

52.9 Signage.

Figure 4.3.5.2 Example of ESS Signage.
4.3.5.6 Impact Protection.

52.10 Impact Protection.

4.3.7 All ESS shall be located or protected to prevent physical damage.

4.3.7.1

4.3.7.1.1

4.3.7.1.2

4.3.7.1.3

4.3.7.1.4

4.3.7.1.5

4.3.7.1.6

52.11 Security of Installations.

4.3.8 Security of Installations.

4.3.8.1

4.3.8.2

4.3.12 Fire Command Centers.

52.12 Mobile ESS Equipment and Operations.

4.5 Mobile ESS Equipment and Operations.

4.5.1 Charging and Storage.

4.5.2 Deployment.

4.5.3 Construction Documents.

4.5.4 Deployment Documents.

4.5.5 Approved Locations.

4.5.6 Charging and Storage.

4.5.6.1

4.5.6.2

4.5.6.3

4.5.6.4

4.5.6.5

4.5.6.6

4.5.7 Deployed Mobile ESS Requirements.

Table 4.5.7 Mobile Energy Storage Systems (ESS)

4.5.7.1

4.5.7.2

4.5.7.3 Duration.

4.5.7.4 Restricted Locations.

4.5.7.5 Clearance to Exposures.

4.5.7.6 Electrical Connections.

4.5.7.7 Local Staging.

4.5.7.8 Fencing.

52.13 Fire Protection

4.10 Smoke and Fire Detection.

4.10.1

4.11 Fire Control and Suppression.

4.11.1

4.12 Explosion Control.
4.13 Water Supply.

4.13.1 Spill Control.

4.14 Spill Control.


4.16 Remediation Measures.

4.16.1 Authorized Service Personnel.

4.16.2 Fire Mitigation Personnel.

4.16.2.1 Operations and Maintenance Documentation.

6.3 Operations and Maintenance Documentation.

6.3.1

6.3.2

6.3.3

6.4 Recommissioning of Existing Systems.

6.4.1 Recommissioning of Existing Systems.

6.4.2

6.4.3

6.4.4

7.1 System Operation.

7.1.1

7.1.2

7.1.3

7.1.4

7.1.5

7.2 System Maintenance.

7.2.1

7.2.2

7.2.3

7.2.4

7.2.5 Training.

7.2.5.1

7.2.5.2

7.2.5.3

7.3 System Testing.
Additional Proposed Changes

<table>
<thead>
<tr>
<th>File Name</th>
<th>Description</th>
<th>Approved</th>
</tr>
</thead>
<tbody>
<tr>
<td>NFPA_1_EXTRACT_855_First_Draft_Unofficial.docx</td>
<td>Text related to notated NFPA 855 sections in proposal</td>
<td></td>
</tr>
</tbody>
</table>

Statement of Problem and Substantiation for Public Input

The purpose of this proposal is to correlate NFPA Energy Storage System requirements with the new NFPA 855, Standard for the Installation of Stationary Energy Storage Systems.

Related Public Inputs for This Document

<table>
<thead>
<tr>
<th>Related Input</th>
<th>Relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Input No. 131-NFPA 1-2018 [Section No. 52.1]</td>
<td>Part of ESS Package</td>
</tr>
</tbody>
</table>

Submitter Information Verification

Submitter Full Name: Robert Davidson
Organization: Davidson Code Concepts, LLC
Affiliation: Tesla, USA
Street Address: 
City: 
State: 
Zip: 
Submittal Date: Tue Jun 26 22:22:53 EDT 2018
Committee: 

Committee Statement

Resolution: CI-35-NFPA 1-2018
Statement: NFPA 855 is not complete but will be by NFPA 1 second draft meeting. This will allow the material to be extracted at the second draft meeting.
Permits shall

Chapter 1 Administration

1.1 Scope.

This standard applies to the design, construction, installation, commissioning, operation, maintenance, and decommissioning of stationary energy storage systems (ESS), including mobile and portable ESS installed in a stationary configuration.

1.2 Purpose.

This standard provides the minimum requirements for minimizing the hazards associated with ESS.

1.3* Application.

This standard applies to ESS exceeding the values shown in Table 1.3.

Table 1.3 Threshold Quantities

<table>
<thead>
<tr>
<th>ESS Technology</th>
<th>Aggregate Capacity&lt;sup&gt;a&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>kWh</td>
</tr>
<tr>
<td><strong>Battery ESS</strong></td>
<td></td>
</tr>
<tr>
<td>Lead-acid, all types</td>
<td>70</td>
</tr>
<tr>
<td>Nickel-cadmium (Ni-Cd)</td>
<td>70</td>
</tr>
<tr>
<td>Lithium-ion, all types</td>
<td>20</td>
</tr>
<tr>
<td>Sodium, all types</td>
<td>20&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
<tr>
<td>Flow batteries&lt;sup&gt;b&lt;/sup&gt;</td>
<td>20</td>
</tr>
<tr>
<td>Other battery technologies</td>
<td>10</td>
</tr>
<tr>
<td>Batteries in residential occupancies</td>
<td>1</td>
</tr>
<tr>
<td><strong>Capacitor ESS</strong></td>
<td></td>
</tr>
<tr>
<td>Capacitors, all types</td>
<td>3</td>
</tr>
<tr>
<td><strong>Other ESS</strong></td>
<td></td>
</tr>
<tr>
<td>All other ESS</td>
<td>70</td>
</tr>
</tbody>
</table>

<sup>a</sup>For ESS units rated in amp-hrs, kWh equals rated voltage times amp-hr rating divided by 1000.

<sup>b</sup>Includes vanadium, zinc-bromine, polysulfide-bromide, and other flowing electrolyte-type technologies.

<sup>c</sup>Values for sodium-ion technologies are 70 kWh (252 MJ).

1.3.1

ESS shall comply with the requirements of this standard as applicable.

1.3.2

ESS installed in one- and two-family dwellings and townhouse units shall only comply with Chapter 17.

1.4 Retroactivity.

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

1.4.1
Unless otherwise specified, the provisions of this standard shall apply to new ESS and their component parts and to ESS or component parts that are made in whole or in part with previously used materials.

1.4.2

Unless otherwise specified, the provisions of this standard shall not apply to ESS installations that existed or were approved for construction or installation prior to the effective date of this standard.

1.4.3

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

1.5* Equivalency.

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

1.6 Units and Formulas.

Metric units in this standard shall be in accordance with the International System of Units, which is officially abbreviated SI in all languages.

Chapter 2 Referenced Publications

2.1 General.

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

2.2 NFPA Publications.

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


2.3 Other Publications.
2.3.1 ANSI Publications.
American National Standards Institute, Inc., 25 West 43rd Street, 4th Floor, New York, NY 10036.
2.3.2 ASTM Publications.
ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959.
2.3.3 IAPMO Publications.
International Association of Plumbing and Mechanical Officials, 4755 E. Philadelphia Street, Ontario, CA 91761.
2.3.4 ICC Publications.
International Code Council, 500 New Jersey Avenue, NW, 6th Floor, Washington, DC 20001.
2.3.5 IEEE Publications.
IEEE, 3 Park Avenue, 17th Floor, New York, NY 10016-5997.

**2.3.6** UL Publications.

Underwriters Laboratories Inc., 333 Pfingsten Road, Northbrook, IL 60062-2096.


**2.3.7** Other Publications.


**2.4** References for Extracts in Mandatory Sections.


**Chapter 3** Definitions

**3.1** General.

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

**3.2** NFPA Official Definitions.

**3.2.1** Approved.

Acceptable to the authority having jurisdiction.

**3.2.2** Authority Having Jurisdiction (AHJ).

An organization, office, or individual responsible for enforcing the requirements of a code or standard, or for approving equipment, materials, an installation, or a procedure.

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

3.2.4* Listed.

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

3.2.5 Shall.

Indicates a mandatory requirement.

3.2.6 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* Apartment Building.

A building or portion thereof containing three or more dwelling units with independent cooking and bathroom facilities. (SAF-RES) [101, 2018]

3.3.2 Battery.

A single cell or a group of cells connected together electrically in series, in parallel, or a combination of both.

3.3.2.1* Flow Battery.

A type of storage battery that includes chemical components dissolved in liquids where the liquid flows through a reaction zone.

3.3.3 Cell.

The basic electrochemical unit, characterized by an anode and a cathode, used to receive, store, and deliver electrical energy. [70:706.2]

3.3.4 Dwelling Unit.

One or more rooms arranged for complete, independent housekeeping purposes with space for eating, living, and sleeping; facilities for cooking; and provisions for sanitation. (SAF-RES) [101, 2018]

3.3.4.1* One- and Two-Family Dwelling Unit.
A building that contains not more than two dwelling units with independent cooking and bathroom facilities. (SAF-RES) [101, 2018]

3.3.4.2 One-Family Dwelling Unit.
A building that consists solely of one dwelling unit with independent cooking and bathroom facilities. (SAF-RES) [101, 2018]

3.3.4.3 Two-Family Dwelling Unit.
A building that consists solely of two dwelling units with independent cooking and bathroom facilities. (SAF-RES) [101, 2018]

3.3.5* Electrochemical Energy Storage System.
An energy storage system that utilizes electrochemical storage devices as the means for energy storage.

3.3.6* Energy Storage Management System (ESMS).
A system that monitors and controls performance of an energy storage system and can have the ability to disconnect the energy storage unit from the system in the event abnormal or hazardous conditions are detected.

3.3.7* Energy Storage Systems (ESS).
One or more devices, assembled together, capable of storing energy in order to supply electrical energy at a future time.

3.3.7.1 Capacitor Energy Storage System.
A rechargeable energy storage system consisting of capacitors, chargers, controls, and associated equipment.

3.3.7.2 Mobile Energy Storage System.
An energy storage system capable of being moved and utilized as a temporary source of power.

3.3.7.3 Energy Storage System Cabinet.
A cabinet containing components of the energy storage system that is included in the UL 9540 listing for the system where personnel cannot enter the enclosure other than reaching in to access components for maintenance purposes.

3.3.7.4 Energy Storage System Walk-In Unit.
A prefabricated structure containing energy storage systems that includes doors that provide walk-in access for personnel to maintain, test, and service the equipment and is typically used in outdoor and mobile energy storage system applications.

3.3.7.5 Energy Storage System Dedicated-Use Building.
A building constructed on-site that is only used for energy storage, energy generation, and other electrical grid-related operations.

3.3.7.6 Portable Energy Storage System.
An energy storage system suitable to be lifted and moved by a single person without mechanical aids and not permanently connected to an electrical system.

3.3.7.7 Stationary Energy Storage System.
An energy storage system that is permanently installed as fixed equipment.
3.3.8 Fire Area.

An area of a building separated from the remainder of the building by construction having a fire resistance of at least 1 hour and having all communicating openings properly protected by an assembly having a fire resistance rating of at least 1 hour. [30, 2018]

3.3.9 Fire Command Center.

The principal attended or unattended room or area where the status of the detection, alarm communications, control systems, and other emergency systems is displayed and from which the system(s) can be manually controlled. (SIG-ECS) [72, 2019]

3.3.10 Hazard Mitigation Analysis.

An evaluation of potential energy storage system failure modes and the safety-related consequences attributed to the failures.

3.3.11 Large-Scale Fire Testing.

Testing of an energy storage system unit that induces a significant fire into the unit under test and evaluates whether the fire will spread to adjacent energy storage system units, surrounding equipment, or through an adjacent fire-resistance-rated barrier.

3.3.12 Living Area.

Any normally occupiable space in a residential occupancy, other than sleeping rooms or rooms that are intended for combination sleeping/living, bathrooms, toilet compartments, kitchens, closets, halls, storage or utility spaces, and similar areas. (SAF-RES) [101, 2018]

3.3.13 Maximum Rated Energy (MRE).

The quantity of energy storage permitted in a fire area prior to the area being considered a high hazard occupancy.

3.3.14 Open Parking Garage.

A structure or portion of a structure with the openings on two or more sides that is used for the parking or storage of private motor vehicles.

3.3.15 Qualified Person.

One who has skills and knowledge related to the construction and operation of the electrical equipment and installations and has received safety training to recognize and avoid the hazards involved. (CMP-1) [70:Article 100]

3.3.16 Thermal Runaway.

The condition when an electrochemical cell increases its temperature through self-heating in an uncontrollable fashion and progresses when the cell's heat generation is at a higher rate than can dissipate leading to fire, explosion, and gassing.

3.3.17 Utility Interactive.

An energy storage system intended for use in parallel with an electric utility to supply common loads that can deliver power to the utility.

Chapter 4 General

4.1* General.
The design, construction, and installation of ESS and related equipment shall comply with Chapter 4 and as supplemented or modified by the technology-specific provisions in Chapters 9 through 16.

4.1.1* General.
ESS shall not release toxic or highly toxic gas creating conditions in excess of the permissible exposure limit (PEL) in the room or space in which they are located during normal charging, discharging, and use.

4.1.2 Construction Documents.

4.1.2.1 General.

4.1.2.1.1 The plans and specifications associated with an ESS and its intended installation, replacement or renewal, commissioning, and use shall be submitted to the AHJ for approval and shall include the following:

1. Location and layout diagram of the room or area in which the ESS is to be installed
2. Details on hourly fire-resistant-rated assemblies provided or relied upon in relation to the ESS
3. The quantities and types of ESS units
4. Manufacturer's specifications, ratings, and listings of ESS
5. Description of energy storage management systems and their operation
6. Location and content of required signage
7. Details on fire suppression, smoke or fire detection, thermal management, ventilation, exhaust, and deflagration venting systems, if provided
8. Support arrangement associated with the installation, including any required seismic support

4.1.2.1.2 The construction documents described in this section shall be provided to the building owner or the owner's authorized agent prior to the system being put in service.

4.1.2.2 Supplemental Information.
Supplemental information necessary to verify compliance with this standard shall include the following items and other relevant data, as appropriate, to the type of ESS and its intended installation:

1. Large-scale fire testing in accordance with 4.1.5
2. Reports associated with system or component testing or listing
3. Failure modes and effects analyses
4. Hazard mitigation analyses
5. Calculations
6. Worksheets
7. Compliance forms
8. Manufacturer literature

4.1.2.3 Manuals.

An operations and maintenance manual shall be provided to both the ESS owner or their authorized agent and system operator before the system is put into operation and includes the following:

1. Submittal data stating the ESS size and selected options for each component of the system
2. Manufacturer's operation manuals and maintenance manuals for the entire ESS or for each component of the system requiring maintenance that clearly identify the required routine maintenance actions
3. Name and address of a contracted service agency
4. A narrative of how the ESS and its components and controls are intended to operate, including recommended operational set points
5. A service record log form that lists the schedule for all required servicing and maintenance actions and space for logging such actions that can be completed over time and retained on site

4.1.2.3.1

The operations and maintenance manual shall be prepared prior to final approval of the ESS and be retained at an on-site location where readily accessible to personnel responsible for the ESS.

4.1.2.3.2

A copy of the operations and maintenance manual shall be placed in an approved location to be accessible to AHJs and emergency responders.

4.1.2.4 Commissioning Plan.

A commissioning plan meeting the provisions of Chapter 6 shall be provided to the building owner or their designated agent and a copy of the commissioning plan shall be provided to the AHJ.

4.1.3 Emergency Planning and Training.

4.1.3.1 General.

Emergency planning and training shall be provided by the owner of the ESS or their designated representative so that ESS facility staff and emergency responders can effectively address foreseeable hazards associated with the on-site systems.

4.1.3.2 Facility Staff Planning and Training.

An emergency operations plan and associated training shall be established, maintained, and conducted by ESS facility staff.

4.1.3.2.1 Emergency Operations Plan.

4.1.3.2.1.1

An emergency operations plan shall be readily available at an approved on-site location for use by facility staff.
The plan shall be updated when conditions change.

4.1.3.2.1.3

The emergency operations plan shall include the following:

1. Procedures for safe shutdown, de-energizing, or isolation of equipment and systems under emergency conditions to reduce the risk of fire, electric shock, and personal injuries, and for safe start-up following cessation of emergency conditions.

2. Procedures for inspection and testing of associated alarms, interlocks, and controls.

3. *Procedures to be followed in response to notifications from the energy storage management system (ESMS), when provided, that could signify potentially dangerous conditions, including shutting down equipment, summoning service and repair personnel, and providing agreed upon notification to fire department personnel for off-normal potentially hazardous conditions.

4. Emergency procedures to be followed in case of fire, explosion, release of liquids or vapors, damage to critical moving parts, or other potentially dangerous conditions. Procedures can include sounding the alarm, notifying the fire department, evacuating personnel, de-energizing equipment, and controlling and extinguishing the fire.

5. Response considerations similar to a safety data sheet (SDS) that will address response safety concerns and extinguishment when an SDS is not required.

6. Procedures for dealing with ESS equipment damaged in a fire or other emergency event, including maintaining contact information for personnel qualified to safely remove damaged ESS equipment from the facility.

7. Other procedures as determined necessary by the AHJ to provide for the safety of occupants and emergency responders.

8. Procedures and schedules for conducting drills of these procedures.

4.1.3.2.2 Facility Staff Training.

4.1.3.2.2.1

Personnel responsible for the ESS operation, use, maintenance, repair, servicing, and response shall be trained in the procedures included in the emergency operations plan in 4.1.3.2.1.

4.1.3.2.2.2

Refresher training shall be conducted at least annually and records of such training retained in an approved manner.

4.1.4 Hazard Mitigation Analysis.

4.1.4.1*

A hazard mitigation analysis shall be provided to the AHJ for review and approval when any of the following conditions are present:

1. When technologies not specifically addressed in Table 1.3 are provided.
2. More than one ESS technology is provided in a room or indoor area where adverse interaction between the technologies is possible.

3. When allowed as a basis for increasing maximum rated energy as specified in 4.8.1 and 4.8.3.

4.1.4.2

The analysis shall evaluate the consequences of the following failure modes and others deemed necessary by the AHJ:

1. Thermal runaway condition in a single module or array
2. Failure of an energy storage management system
3. Failure of a required ventilation or exhaust system
4. Voltage surges on the primary electric supply
5. Short circuits on the load side of the ESS
6. Failure of a required smoke detection, fire detection, fire suppression, or gas detection system

4.1.4.2.1

Only single failure modes shall be considered for each mode given in 4.1.4.2.

4.1.4.3

The AHJ shall be permitted to approve the hazardous mitigation analysis as documentation of the safety of the ESS installation provided the consequences of the analysis demonstrate the following:

1. Fires or explosions will be contained within unoccupied ESS rooms for the minimum duration of the fire resistance rating specified in 4.3.6.
2. Fires and explosions in ESS cabinets in occupied work centers allow occupants to safely evacuate.
3. Toxic and highly toxic gases released during normal charging, discharging, and operation will not exceed the PEL in the area where the ESS is contained.
4. Toxic and highly toxic gases released during fires and other fault conditions will not reach concentrations in excess of immediately dangerous to life or health (IDLH) level in the building or adjacent means of egress routes during the time deemed necessary to evacuate from that area.
5. Flammable gases released during charging, discharging, and normal operation will not exceed 25 percent of the LFL.

4.1.4.4

The hazard mitigation analysis shall be documented and made available to the AHJ and those authorized to design and operate the system.

4.1.4.5*

Construction, equipment, and systems that are required for the ESS to comply with the hazardous mitigation analysis shall be installed, tested, and maintained in accordance with nationally recognized standards and specified design parameters.
4.1.5 Large-Scale Fire Test.

4.1.5.1
Where required elsewhere in this standard, large-scale fire testing in accordance with 4.1.5 shall be conducted on a representative battery ESS in accordance with UL 9540A.

4.1.5.2
The testing shall be conducted or witnessed and reported by an approved testing laboratory and show that a fire involving one battery ESS unit will not propagate to an adjacent unit.

4.1.5.3
Where installed within buildings, the fire during the test shall be contained within the room or enclosed area for a duration equal to the fire resistance rating of the room separation specified in Table 4.3.6.

4.1.5.4
The test report shall be provided to the AHJ for review and approval.

4.1.6 Combustible Storage.

4.1.6.1
Combustible materials not related to the ESS shall not be stored in rooms, cabinets, or enclosures containing ESS equipment.

4.1.6.2
Combustible materials related to the ESS shall not be stored within 3 ft (914 mm) from ESS equipment.

4.1.6.3
Combustible materials in occupied work centers shall not be stored within 3 ft (914 mm) of ESS equipment and shall comply with Section 10.18 of NFPA 1 or other applicable fire codes.

4.1.6.4
Section 4.13 shall not apply to dwelling units.

4.2 Equipment.

4.2.1* Listings.

ESS shall be listed in accordance with UL 9540, unless specifically exempted in other sections of this standard.

4.2.1.1
Lead-acid and nickel-cadmium battery systems less than 50 V ac, 60 V dc in telecommunications facilities for installations of communications equipment under the exclusive control of communications utilities located outdoors or in building spaces used exclusively for such installations that are in compliance with NFPA 76 are not required to be listed in accordance with UL 9540.

4.2.2 Repairs.

4.2.2.1
Repairs of ESS shall only be done by qualified persons and documented in the maintenance, testing, and events log required in 4.1.2.3.
4.2.2.2
Repairs with other than identical or equivalent parts shall be considered a retrofit and comply with 4.2.3.

4.2.3 Retrofits.

4.2.3.1
Retrofitting of ESS shall comply with the following:

1. An installation permit shall be obtained in accordance with local codes.
2. ESS units such as batteries, battery modules, and capacitors shall be listed in accordance with UL 1973.
3. Battery management and other monitoring systems shall be connected and installed in accordance with the manufacturer’s instructions.
4. The overall installation shall continue to comply with UL 9540 listing requirements, where applicable.
5. Retrofits shall be documented in the maintenance, testing, and events log required in 4.1.2.3.

4.2.3.2
Changing out or retrofitting existing lead-acid or nickel-cadmium battery systems with other lead-acid or nickel-cadmium battery systems less than 50 V ac, 60 V dc in telecommunications facilities for installations of communications equipment under the exclusive control of communications utilities located outdoors or in building spaces used exclusively for such installations that are in compliance with NFPA 76 shall be considered repairs when there is no increase in system size or capacity.

4.2.4 Replacements.

4.2.4.1
Replacement of ESS shall be considered new ESS installations and comply with the provisions applicable to new ESS.

4.2.4.2
The ESS being replaced shall be decommissioned in accordance with Chapter 8.

4.2.5 Increase in Power Rating or Energy Capacity.

4.2.5.1
A complete new ESS that is added to an existing installation of one or more systems shall be treated as a new system and meet the applicable requirements of this standard.

4.2.5.2
An increase in energy capacity or power rating to an existing ESS shall be considered a retrofit and comply with 4.2.3.

4.2.6 Environment.

The temperature, humidity, and other environmental conditions in which an ESS is located shall be maintained in accordance with the listing and the manufacturer’s specifications.

4.2.7 Charge Controllers.
4.2.7.1
Charge controllers shall be compatible with the battery or ESS manufacturer's electrical ratings and charging specifications.

4.2.7.2
Charge controllers shall be listed and labeled in accordance with UL 1741 or provided as part of a listed pre-engineered or prepackaged ESS.

4.2.7.3
Battery chargers used for the charging of a battery system that is not utility interactive shall be permitted to be listed and labeled in accordance with UL 1564.

4.2.8 Inverters and Converters.

4.2.8.1
Inverters and converters shall be listed and labeled in accordance with UL 1741.

4.2.8.2*
Only units listed and labeled for utility interactive system use and identified as interactive shall be allowed to operate in parallel with the electric utility power system.

4.2.9* Energy Storage Management System (ESMS).

4.2.9.1
Where required by the equipment listing in accordance with 4.2.1 or the hazard mitigation analysis in accordance with 4.1.4, an approved ESMS shall be provided for monitoring operating conditions and maintaining voltages, currents, and temperatures within the manufacturer's specifications.

4.2.9.2
The ESMS shall electrically isolate the components of the ESS or place it in a safe condition if potentially hazardous temperatures or other hazardous conditions are detected.

4.2.9.3*
When required by the AHJ, visible annunciation shall be provided on the cabinet exterior or in an approved location to indicate potentially hazardous conditions associated with the ESS exist.

4.2.9.4
Lead-acid and nickel-cadmium battery systems less than 50 V ac, 60 V dc in telecommunications facilities for installations of communications equipment under the exclusive control of communications utilities located outdoors or in building spaces used exclusively for such installations that are in compliance with NFPA 76 are not required to comply with 4.2.9.1 through 4.2.9.3.

4.2.10 Reused and Repurposed Equipment.

Storage batteries previously used in other applications, such as electric vehicle propulsion, shall be permitted provided the equipment is repurposed by a UL 1974 compliant battery repurposing company when reused in ESS applications and the system complies with 4.2.1.

4.3 Installation.

ESS shall be installed in accordance with their listing, the manufacturer's installation instructions, and this standard.
4.3.1 Electrical Installation.
The electrical installation shall be in accordance with NFPA 70 or IEEE C2 based on the location of the ESS in relation to and its interaction with the electrical grid.

4.3.2* Working Space.
At a minimum, ESS equipment shall be located with working space in accordance with NFPA 70 for operation, inspection, troubleshooting, maintenance, or replacement.

4.3.3 Seismic Protection.
ESS shall be seismically braced in accordance with the local building code.

4.3.4 Design Loads.
The weight of the ESS and all associated equipment, components, and enclosure elements and their impact on the dead and live loads of the building or system foundation shall be in accordance with the local building code.

4.3.5* Signage.

4.3.5.1 Approved signage shall be provided in the following locations:

1. On the front of doors to rooms or areas containing ESS or in approved locations near entrances to ESS rooms
2. On the front of doors to outdoor occupiable ESS containers
3. In approved locations on outdoor ESS that are not enclosed in occupiable containers or otherwise enclosed

4.3.5.2* The signage required in 4.3.5.1 shall be in compliance with ANSI Z535 and shall include the following information as shown in Figure 4.3.5.2:

1. Labeled “Energy Storage Systems” with symbol of lightning bolt in a triangle
2. Type of technology associated with the ESS
3. Special hazards associated as identified in Chapter 5 through Chapter 16
4. Type of suppression system installed in the area of the ESS
5. Emergency contact information

Figure 4.3.5.2 Example of ESS Signage.
A permanent plaque or directory denoting the location of all electric power source disconnecting means on or in the premises shall be installed at each service equipment location and at the location(s) of the system disconnect(s) for all energy sources capable of being interconnected.

4.3.5.4
Existing ESS shall be permitted to retain the signage required at installation except as modified by 4.3.5.5.

4.3.5.5
Existing ESS signage shall be updated to comply with the requirements for new ESS installations when the system is retrofitted or existing signs need to be replaced.

4.3.5.6
Battery and ESS cabinets in occupied work centers covered by Section 4.7 shall be provided with exterior signs that identify the manufacturer and model number of the system and electrical rating (voltage and current) of the contained system, and any relevant electrical, chemical, and fire hazard.

4.3.6  Separation.

Rooms or spaces containing ESS in other than high hazard occupancies shall be separated from other areas of the building in accordance with Table 4.3.6.

Table 4.3.6 Required Separation of Occupancies

<table>
<thead>
<tr>
<th>Occupancy</th>
<th>Minimum Fire Barrier Rating (hr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambulatory health care</td>
<td>2</td>
</tr>
<tr>
<td>Assembly</td>
<td>2</td>
</tr>
<tr>
<td>Day care centers</td>
<td>2</td>
</tr>
<tr>
<td>Detention and correctional</td>
<td>2</td>
</tr>
<tr>
<td>Educational</td>
<td>2</td>
</tr>
<tr>
<td>Health care</td>
<td>2</td>
</tr>
<tr>
<td>Residential</td>
<td>2</td>
</tr>
<tr>
<td>Residential board and care</td>
<td>2</td>
</tr>
<tr>
<td>All other occupancies</td>
<td>1</td>
</tr>
</tbody>
</table>

4.3.7  Impact Protection.

4.3.7.1
All ESS shall be located or protected to prevent physical damage.

4.3.7.2
Vehicle impact protection consisting of guard posts or other approved means shall be provided where ESS are subject to impact by motor vehicles.

4.3.7.3*
When guard posts are installed, they shall be designed as follows:

1. Posts shall be constructed of steel not less than 4 in. (100 mm) in diameter and shall be filled with concrete.
2. Posts shall be spaced not more than 4 ft (1.2 m) on center.
3. Posts shall be set not less than 3 ft (0.9 m) deep in a concrete footing of not less than 15 in. (380 mm) diameter.
4. The top of the posts shall be set not less than 3 ft (0.9 m) above ground.
5. Posts shall be located not less than 3 ft (0.9 m) from the ESS.

4.3.7.4*
For residential garages, ESS shall not be installed in a location where subject to damage from impact by a motor vehicle.

4.3.8 Security of Installations.

4.3.8.1
ESS shall be secured against unauthorized entry and safeguarded in an approved manner.

4.3.8.2
Security barriers, fences, landscaping, and other enclosures shall not inhibit the required air flow to or exhaust from the ESS and its components.

4.3.9 Elevation.
ESS shall be located only on floors that can be accessed by external fire department laddering capabilities.

4.3.9.1
Installations shall be permitted on higher levels where permitted by the AHJ.

4.3.9.2
Installations shall be permitted on rooftops of buildings that do not obstruct fire department rooftop operations when approved.

4.3.9.3
Installations shall be permitted below grade where the floor level is not more than 30 ft (9144 mm) below the finished floor of the lowest level of exit discharge and acceptable to the AHJ.

4.3.10 Means of Egress.

4.3.10.1
All areas containing ESS shall provide egress from the area in which they are located in accordance with the local building code.

4.3.10.2
Required egress doors shall be provided with emergency lighting as required by the local building code.

4.3.11 Open Rack Installations.
Where installed in a room accessible only to authorized personnel, ESS shall be permitted to be installed on an open rack.

4.3.12 Fire Command Centers.
In buildings containing ESS and equipped with a fire command center, the command center shall include signage or readily available documentation that describes the location and type of ESS, operating voltages, and location of electrical disconnects as required by NFPA 70.
4.4 Installations.

4.4.1

ESS installed indoors, outdoors, on rooftops, and in open parking garages shall comply with this section.

4.4.2 Indoor Installations.

Indoor ESS installations shall comply with this section and as detailed in Table 4.4.2.

Table 4.4.2 Indoor ESS Installations

<table>
<thead>
<tr>
<th>Compliance Required</th>
<th>Dedicated-Use Buildings(^a)</th>
<th>Non-Dedicated-Use Buildings(^b)</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administrative</td>
<td>Yes</td>
<td>Yes</td>
<td>Chapters 1–3</td>
</tr>
<tr>
<td>General</td>
<td>Yes</td>
<td>Yes</td>
<td>Sections 4.1–4.3</td>
</tr>
<tr>
<td>Size and separation</td>
<td>Yes(^c)</td>
<td>Yes</td>
<td>Section 4.6</td>
</tr>
<tr>
<td>Maximum rated energy</td>
<td>No</td>
<td>Yes</td>
<td>Section 4.8</td>
</tr>
<tr>
<td>Elevation</td>
<td>Yes</td>
<td>Yes</td>
<td>4.4.2.4</td>
</tr>
<tr>
<td>Separation</td>
<td>NA</td>
<td>Yes</td>
<td>4.3.6</td>
</tr>
<tr>
<td>Smoke and fire detection</td>
<td>Yes(^d)</td>
<td>Yes</td>
<td>Section 4.10</td>
</tr>
<tr>
<td>Fire control and suppression</td>
<td>Yes(^c)</td>
<td>Yes</td>
<td>Section 4.11</td>
</tr>
<tr>
<td>Water supply</td>
<td>Yes(^c)</td>
<td>Yes</td>
<td>Section 4.13</td>
</tr>
<tr>
<td>Signage</td>
<td>Yes</td>
<td>Yes</td>
<td>4.3.5</td>
</tr>
<tr>
<td>Occupied work centers</td>
<td>Not allowed</td>
<td>Yes</td>
<td>Section 4.7</td>
</tr>
<tr>
<td>Technology-specific protection</td>
<td>Yes</td>
<td>Yes</td>
<td>Chapters 9–16</td>
</tr>
</tbody>
</table>

NA: Not applicable.

\(^a\)See 4.4.2.1.

\(^b\)See 4.4.2.2.

\(^c\)Where approved by the AHJ, the fire control and suppression systems, the size and separation requirements, and the water supply are permitted to be omitted in dedicated-use buildings located more than 100 ft (30.5 m) from buildings, lot lines, public ways, stored combustible materials, hazardous materials, high-piled stock, and other exposure hazards not associated with electrical grid infrastructure.

\(^d\)When approved, alarm signals are not required to be transmitted to an approved location when local fire alarm annunciation is provided and trained personnel are always present.

4.4.2.1 Dedicated-Use Buildings.

Dedicated-use ESS buildings shall be constructed in accordance with local building codes and comply with all the following:

1. The building shall only be used for energy storage, energy generation, and other electrical grid-related operations.
2. Occupants in the rooms and areas containing ESS shall be limited to personnel that operate, maintain, service, test, and repair the ESS and other energy systems.

3. No other occupancy types shall be permitted in the building.

4. Administrative and support personnel shall be permitted in incidental-use areas within the buildings that do not contain ESS, provided the following:
   1. The areas do not occupy more than 10 percent of the building area of the story in which they are located.
   2. The areas are separated from the ESS and other rooms and areas containing ESS by 2-hour fire barriers and 2-hour fire resistance-rated horizontal assemblies constructed in accordance with the local building code, as appropriate.
   3. A means of egress is provided from the incidental-use areas to a public way that does not require occupants to traverse through areas containing ESS or other energy systems.

4.4.2.2 Non-Dedicated-Use Buildings.
Non-dedicated-use buildings shall include all buildings that contain ESS and do not comply with dedicated-use building requirements in 4.4.2.1.

4.4.2.3 Dwelling Units and Sleeping Units.

4.4.2.3.1 Stationary ESS shall not be installed in sleeping units or in habitable spaces of dwelling units unless specifically allowed in Chapters 9 through 17.

4.4.2.3.2 Portable ESS regulated by this standard shall be permitted to be used in sleeping units and in habitable spaces of dwelling units provided they are listed.

4.4.2.4 Elevation.
ESS shall be located only on floors that can be accessed by external fire department laddering capabilities unless a higher location is approved by the AHJ.

4.4.2.4.1 Installations where the floor level is below the finished floor of the lowest level of exit discharge shall not permitted unless the location is approved by the AHJ.

4.4.2.4.2 When approved, installations on rooftops of buildings that do not obstruct fire department rooftop operations shall be permitted.

4.4.2.4.3 When approved, installations in underground vaults constructed in accordance with NFPA 70, Article 450, Part III, shall be permitted.

4.4.2.4.4 The requirements in 4.4.2 do not apply to lead-acid and nickel-cadmium battery systems less than 50 V ac, 60 V dc in telecommunications facilities for installations of communications
equipment under the exclusive control of communications utilities located outdoors or in building spaces used exclusively for such installations that are in compliance with NFPA 76.

4.4.3 Outdoor Installations.

Outdoor ESS installations shall comply with this section and as detailed in Table 4.4.3.

Table 4.4.3 Outdoor Stationary ESS Installations

<table>
<thead>
<tr>
<th>Compliance Required</th>
<th>Remote Locations</th>
<th>Locations Near Exposures</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administrative</td>
<td>Yes</td>
<td>Yes</td>
<td>Chapters 1–3</td>
</tr>
<tr>
<td>General</td>
<td>Yes</td>
<td>Yes</td>
<td>Sections 4.1–4.3</td>
</tr>
<tr>
<td>Maximum size</td>
<td>Yes</td>
<td>Yes</td>
<td>4.4.3.2</td>
</tr>
<tr>
<td>Clearance to exposures</td>
<td>NA</td>
<td>Yes</td>
<td>4.4.3.3</td>
</tr>
<tr>
<td>Means of egress separation</td>
<td>NA</td>
<td>Yes</td>
<td>4.4.3.4</td>
</tr>
<tr>
<td>Walk-in units</td>
<td>Yes</td>
<td>Yes</td>
<td>4.4.3.5</td>
</tr>
<tr>
<td>Vegetation control</td>
<td>Yes</td>
<td>Yes</td>
<td>4.4.3.6</td>
</tr>
<tr>
<td>Enclosures</td>
<td>Yes</td>
<td>Yes</td>
<td>4.4.3.7</td>
</tr>
<tr>
<td>Size and separation</td>
<td>No</td>
<td>Yes&lt;sup&gt;c&lt;/sup&gt;</td>
<td>Section 4.6</td>
</tr>
<tr>
<td>Maximum rated energy</td>
<td>No</td>
<td>Yes</td>
<td>Section 4.8</td>
</tr>
<tr>
<td>Smoke and fire detection</td>
<td>Yes</td>
<td>Yes</td>
<td>Section 4.10</td>
</tr>
<tr>
<td>Fire control and suppression</td>
<td>Yes&lt;sup&gt;d&lt;/sup&gt;</td>
<td>Yes</td>
<td>Section 4.11</td>
</tr>
<tr>
<td>Water supply</td>
<td>Yes&lt;sup&gt;d&lt;/sup&gt;</td>
<td>Yes</td>
<td>Section 4.13</td>
</tr>
<tr>
<td>Signage</td>
<td>Yes</td>
<td>Yes</td>
<td>4.3.5</td>
</tr>
<tr>
<td>Occupied work centers</td>
<td>Not allowed</td>
<td>Not allowed</td>
<td>Section 4.7</td>
</tr>
<tr>
<td>Technology-specific protection</td>
<td>Yes</td>
<td>Yes</td>
<td>Chapters 9–16</td>
</tr>
</tbody>
</table>

NA: Not applicable.

<sup>a</sup>See 4.4.3.1(1).

<sup>b</sup>See 4.4.3.1(2).

<sup>c</sup>In outdoor walk-in units, spacing is not required between ESS and the enclosure walls.

<sup>d</sup>When agreeable with the ESS owner and approved by the AHJ, fire suppression systems and water supply are permitted to be omitted.

4.4.3.1 Classification.

Outdoor ESS installations shall be classified as follows:

1. **Remote locations.** Remote outdoor locations include ESS located more than 100 ft (30.5 m) from buildings, lot lines, public ways, stored combustible materials, hazardous materials, high-piled stock, and other exposure hazards not associated with electrical grid infrastructure.

2. **Locations near exposures.** Locations near exposures include all outdoor ESS locations that do not comply with remote outdoor location requirements.

4.4.3.2 Maximum Size.
4.4.3.2.1
Outdoor walk-in containers or enclosures housing ESS shall not exceed 53 ft × 8 ft × 9.5 ft high.

4.4.3.2.2
Units that exceed the dimensions in 4.4.3.2.1 shall be treated as indoor installations and comply with the requirements in 4.4.2.

4.4.3.3 Clearance to Exposures.
ESS located outdoors shall be separated by a minimum 10 ft (3048 mm) from the following exposures:

1. Lot lines
2. Public ways
3. Buildings
4. Stored combustible materials
5. Hazardous materials
6. High-piled stock
7. Other exposure hazards

4.4.3.3.1
The required separation distances shall be permitted to be reduced to 3 ft (914 mm) when a 1-hour freestanding fire barrier, suitable for exterior use, and extending 5 ft (1.5 m) above and 5 ft (1.5 m) beyond the physical boundary of the ESS installation is provided to protect the exposure.

4.4.3.3.2
Clearances to buildings shall be permitted to be reduced to 3 ft (914 mm) where noncombustible exterior walls with no openings or combustible overhangs are provided on the wall adjacent to the ESS. The fire resistance rating of the exterior wall shall comply with the fire resistance requirements in Table 4.4.3.

4.4.3.3.3
Clearances to buildings shall be permitted to be reduced to 3 ft (914 mm) where the enclosure of the ESS is constructed of noncombustible materials and it has been demonstrated that a fire within the enclosure will not ignite combustible materials outside the enclosure based on large-scale fire testing complying with 4.1.5.

4.4.3.3.4
Clearances to buildings shall be permitted to be reduced to 3 ft (914 mm) where the enclosure of the ESS has a 2-hour fire resistance rating established in accordance with ASTM E119 or UL 263.

4.4.3.3.5
Exhaust outlets from an ESS that exhaust other than ventilation air shall be located at least 15 ft (4.572 m) from heating, ventilating, and air conditioning (HVAC) air intakes, windows, doors, loading docks, ignition sources, and other openings into buildings and facilities.

4.4.3.3.6
Exhaust outlet(s) from an ESS shall not be directed onto means of egress, walkways, or pedestrian or vehicular travel paths.

4.4.3.4 Means of Egress Separation.

4.4.3.4.1
ESS located outdoors shall be separated from any means of egress as required by the AHJ to ensure safe egress under fire conditions but in no case less than 10 ft (3048 mm).

4.4.3.4.2
The AHJ shall be authorized to approve smaller separation distances if large-scale fire and fault condition testing complying with 4.1.5 is provided that shows that a fire involving the ESS will not adversely impact occupant egress.

4.4.3.5 Walk-in Units.

4.4.3.5.1
Where an ESS includes an outer enclosure, the unit shall only be entered for inspection, maintenance, and repair of energy storage units and ancillary equipment, and shall not be occupied for other purposes.

4.4.3.5.2*
Walk-in units shall comply with this standard and local building code requirements.

4.4.3.6 Vegetation Control.

4.4.3.6.1
Areas within 10 ft (3 m) on each side of outdoor ESS shall be cleared of combustible vegetation and other combustible growth.

4.4.3.6.2
Single specimens of trees, shrubbery, or cultivated ground cover such as green grass, ivy, succulents, or similar plants used as ground covers shall be permitted to be exempt provided that they do not form a means of readily transmitting fire.

4.4.3.7 Enclosures.

4.4.3.7.1
ESS electrical circuitry shall be within weatherproof enclosures marked with the environmental rating suitable for the type of exposure required by NFPA 70.

4.4.3.7.2
Enclosures shall be of noncombustible construction.

4.4.3.8 Access Roads.

Fire department access roads shall be provided to outdoor ESS installations in accordance with the local fire code.

4.4.3.9 Hazardous Atmospheres.

The system shall not be located inside or in a manner where it could be affected by potentially hazardous atmospheres as defined in NFPA 70 or IEEE C2 unless listed and approved for the specific installation.

4.4.4 Rooftop and Open Parking Garage Installations.
Rooftop and open parking garage ESS installations shall comply with this section and as detailed in Table 4.4.4.

Table 4.4.4 Rooftop and Open Parking Garage ESS Installations

<table>
<thead>
<tr>
<th>Compliance Required</th>
<th>Rooftops(^a)</th>
<th>Open Parking Garages(^b)</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administrative</td>
<td>Yes</td>
<td>Yes</td>
<td>Chapters 1–3</td>
</tr>
<tr>
<td>General</td>
<td>Yes</td>
<td>Yes</td>
<td>Sections 4.1–4.3</td>
</tr>
<tr>
<td>Maximum size</td>
<td>Yes</td>
<td>Yes</td>
<td>4.4.3.2</td>
</tr>
<tr>
<td>Means of egress separation</td>
<td>Yes</td>
<td>Yes</td>
<td>4.4.3.4</td>
</tr>
<tr>
<td>Walk-in units</td>
<td>Yes</td>
<td>Yes</td>
<td>4.4.3.5</td>
</tr>
<tr>
<td>Enclosures</td>
<td>Yes</td>
<td>Yes</td>
<td>4.4.3.7</td>
</tr>
<tr>
<td>Clearance to exposures</td>
<td>Yes</td>
<td>Yes</td>
<td>4.4.4.2</td>
</tr>
<tr>
<td>Fire suppression and control</td>
<td>Yes</td>
<td>Yes</td>
<td>Section 4.11</td>
</tr>
<tr>
<td>Rooftop installations</td>
<td>Yes</td>
<td>No</td>
<td>4.4.4.4</td>
</tr>
<tr>
<td>Open parking garages</td>
<td>No</td>
<td>Yes</td>
<td>4.4.4.5</td>
</tr>
<tr>
<td>Size and separation</td>
<td>Yes</td>
<td>Yes</td>
<td>Section 4.6</td>
</tr>
<tr>
<td>Maximum rated energy</td>
<td>Yes</td>
<td>Yes</td>
<td>Section 4.8</td>
</tr>
<tr>
<td>Elevation</td>
<td>Yes</td>
<td>Yes</td>
<td>4.3.9</td>
</tr>
<tr>
<td>Fire detection</td>
<td>Yes</td>
<td>Yes</td>
<td>Section 4.10</td>
</tr>
<tr>
<td>Signage</td>
<td>Yes</td>
<td>Yes</td>
<td>4.3.5</td>
</tr>
<tr>
<td>Occupied work centers</td>
<td>Not allowed</td>
<td>Not allowed</td>
<td>Section 4.7</td>
</tr>
<tr>
<td>Open rack installations</td>
<td>Not allowed</td>
<td>Not allowed</td>
<td>4.3.11</td>
</tr>
<tr>
<td>Technology-specific protection</td>
<td>Yes</td>
<td>Yes</td>
<td>Chapters 9–16</td>
</tr>
</tbody>
</table>

NA: Not applicable.

\(^a\)See 4.4.4.1(1).

\(^b\)See 4.4.4.1(2).

4.4.4.1

ESS installations shall be classified as follows:

1. **Rooftop installations.** Rooftop ESS installations are those located on the roofs of buildings.

2. **Open parking garage installations.** Open parking garage ESS installations are those located in a structure or portion of a structure as defined in 3.3.14.

4.4.4.2 Clearance to Exposures.

4.4.4.2.1

ESS located on rooftops and in open parking garages shall be separated by a minimum 10 ft (3048 mm) from the following exposures:

1. Buildings, except the portion of the building on which rooftop ESS is mounted
2. Lot lines
3. Public ways
4. Stored combustible materials
5. Locations where motor vehicles can be parked
6. Hazardous materials
7. Other exposure hazards

4.4.4.2.2

Clearances are permitted to be reduced to 3 ft (914 mm) under the following conditions:

1. Where a 1-hour freestanding fire barrier, suitable for exterior use, and extending 5 ft (1.5 m) above and extending 5 ft (1.5 m) beyond the physical boundary of the ESS installation is provided to protect the exposure

2. Where the weatherproof ESS enclosure is constructed of noncombustible materials and it has been demonstrated that a fire within the enclosure will not ignite combustible materials outside the enclosure based on large-scale fire testing complying with Section 4.6

4.4.4.3 Fire Suppression and Control.

4.4.4.3.1

ESS located in walk-in enclosures on rooftops or in open parking garages shall be provided with automatic fire control and suppression systems within the ESS enclosure in accordance with Section 4.8.

4.4.4.3.2

Areas containing ESS other than walk-in units in open parking structures not open above to the sky shall be provided with an automatic fire suppression system complying with Section 4.11.

4.4.4.3.3

When approved by the AHJ, ESS shall be permitted to be installed in open parking garages without the protection of an automatic fire control and suppression system where large-scale fire and fault condition testing conducted in accordance with 4.1.5 indicates that an ESS fire does not present an exposure hazard to parked vehicles or compromise the means of egress.

4.4.4.4 Rooftop Installations.

4.4.4.4.1

Installations shall be permitted on rooftops of buildings that do not obstruct fire department rooftop operations when approved.

4.4.4.4.2

ESS and associated equipment that are located on rooftops and not enclosed by building construction shall comply with the following:

1. Stairway access to the roof for emergency response and fire department personnel shall be provided either through a bulkhead from the interior of the building or a stairway on the exterior of the building.

2. Service walkways at least 5 ft (1524 mm) in width shall be provided for service and emergency personnel from the point of access to the roof to the system.
3. ESS and associated equipment shall be located from the edge of the roof a distance equal to at least the height of the system, equipment, or component but not less than 5 ft (1.5 m).

4. The roofing materials under and within 5 ft (1524 mm) horizontally from an ESS or associated equipment shall be noncombustible or shall have a Class A rating when tested in accordance with ASTM E 108 or UL 790.

5. A Class I standpipe outlet shall be installed at an approved location on the roof level of the building or in the stairway bulkhead at the top level.

6. Installations on rooftops over 75 ft (23 m) in height above grade shall be permitted when approved by the AHJ.

7. Access, service space, guards, and handrails shall be provided where required by the local building and mechanical codes.

8. A radiant energy-sensing fire detection system complying with Section 4.10 shall be provided to protect the ESS.

9. The ESS shall be a minimum of 10 ft (3.48 m) from the fire service access point on the rooftop.

4.4.4.5 Open Parking Garages.

ESS and associated equipment that are located in open parking garages shall comply with all of the following:

1. ESS shall not be located within 50 ft (25.3 m) of air inlets for building HVAC systems. This distance shall be permitted to be reduced to 25 ft (7620 mm) if the automatic fire alarm system monitoring the radiant energy-sensing detectors de-energizes the ventilation system connected to the air intakes upon detection of fire.

2. ESS shall not be located within 25 ft (7620 mm) of exits leading from the attached building when located on a covered level of the parking structure not directly open to the sky above. When approved, the separation distance is permitted to be reduced to 10 ft (2048 mm) based on large-scale fire and fault condition testing conducted in accordance with 4.1.5.

3. Means of egress separation shall comply with 4.4.3.4.

4. A radiant energy-sensing fire detection system complying with Section 4.10 shall be provided to protect the ESS.

5. An approved fence with a locked gate or other approved barrier shall be provided to keep the general public at least 5 ft (1024 mm) from the outer enclosure of the ESS.

4.5 Mobile ESS Equipment and Operations.

4.5.1 Charging and Storage.

For the purpose of Section 4.5, charging and storage shall cover the operation where mobile ESS are charged and stored so they are ready for deployment to another site and where they are charged and stored after a deployment.

4.5.2 Deployment.
For the purpose of Section 4.5, deployment shall cover operations where mobile ESS are located at a site other than the charging and storage site and are being used to provide power.

4.5.3 Construction Documents.

Construction documents complying with 4.1.2 shall be provided to the AHJ with any locally required construction permit applications for mobile ESS charging and storage locations.

4.5.4 Deployment Documents.

The following information shall be provided to the AHJ with any locally required operational permit applications for mobile ESS deployments:

1. Relevant information for the mobile ESS equipment and protection measures in the construction documents required by 4.1.2
2. Location and layout diagram of the area in which the mobile ESS is to be deployed, including a scale diagram of all nearby exposures
3. Location and content of signage, including no smoking signs
4. Description of fencing to be provided around the ESS, including locking methods
5. Details on fire suppression, smoke and automatic fire detection, system monitoring, thermal management, exhaust ventilation, and explosion control, if provided
6. For deployment, the intended duration of operation, including anticipated connection and disconnection times and dates
7. Description of the temporary wiring, including connection methods, conductor type and size, and circuit overcurrent protection to be provided
8. Description of how fire suppression system connections to water supplies or extinguishing agents are to be provided
9. Contact information for personnel who are responsible for maintaining and servicing the equipment and responding to emergencies

4.5.5 Approved Locations.

Locations where mobile ESS are charged, stored, and deployed shall be restricted to the locations approved by the AHJ.

4.5.6 Charging and Storage.

Installations where mobile ESS are charged and stored shall be treated as permanent ESS installations and shall comply with the following sections, as applicable:

1. Indoor charging and storage shall comply with 4.4.2.
2. Outdoor charging and storage shall comply with 4.4.3.
3. Charging and storage on rooftops and in open parking garages shall comply with 4.4.4.

4.5.6.1 Electrical connections shall be permitted to be made using temporary wiring complying with the manufacturer’s instructions, the UL 9540 listing, and NFPA 70.

4.5.6.2
Fire suppression system connections to the water supply shall be acceptable to the AHJ.

**4.5.7 Deployed Mobile ESS Requirements.**

Deployed mobile ESS equipment and operations shall comply with this section and Table 4.5.7.

Table 4.5.7 Mobile Energy Storage Systems (ESS)

<table>
<thead>
<tr>
<th>Compliance Required</th>
<th>Deployment</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administrative</td>
<td>Yes</td>
<td>Chapters 1–3</td>
</tr>
<tr>
<td>General</td>
<td>Yes</td>
<td>Sections 4.1–4.3</td>
</tr>
<tr>
<td>Size and separation</td>
<td>Yes</td>
<td>Section 4.6</td>
</tr>
<tr>
<td>Maximum rated energy</td>
<td>Yes</td>
<td>Section 4.8</td>
</tr>
<tr>
<td>Fire detection</td>
<td>Yes</td>
<td>Section 4.10</td>
</tr>
<tr>
<td>Fire control and suppression</td>
<td>Yes</td>
<td>Section 4.11</td>
</tr>
<tr>
<td>Maximum size</td>
<td>Yes</td>
<td>4.4.3.2</td>
</tr>
<tr>
<td>Vegetation control</td>
<td>Yes</td>
<td>4.4.3.6</td>
</tr>
<tr>
<td>Means of egress separation</td>
<td>Yes</td>
<td>4.4.3.4</td>
</tr>
<tr>
<td>Technology-specific protection</td>
<td>Yes</td>
<td>Chapters 9–16</td>
</tr>
</tbody>
</table>

aSee 4.5.2.

bIn walk-in units, spacing is not required between ESS units and the walls of the enclosure.

cAlarm signals are not required to be transmitted to an approved location for mobile ESS deployed 30 days or less.

dSee 4.5.7.2.

**4.5.7.1**

Mobile operations on wheeled vehicles or trailers shall not be required to comply with 4.3.3 seismic protection requirements.

**4.5.7.2**

Fire suppression system connections to the water supply shall be permitted to use approved temporary connections.

**4.5.7.3** Duration.

Mobile ESS deployments that provide power for durations longer than 30 days shall comply with 4.5.7.

**4.5.7.4** Restricted Locations.

Deployed mobile ESS operations shall not be located indoors, in covered parking garages, on rooftops, below grade, or under building overhangs.

**4.5.7.5** Clearance to Exposures.

**4.5.7.5.1**

Deployed mobile ESS shall be separated by a minimum 10 ft (3 m) from the following exposures:

1. Public ways
2. Buildings
3. Stored combustible materials
4. Hazardous materials
5. High-piled stock
6. Other exposure hazards not associated with electrical grid infrastructure

4.5.7.5.2
Deployed mobile ESS shall be separated by a minimum 50 ft (15.3 m) from public seating areas and from tents, canopies, and membrane structures with an occupant load of 30 or more.

4.5.7.6 Electrical Connections.
Electrical connections shall be made in accordance with the manufacturer's instructions.

4.5.7.6.1
Temporary wiring for electrical power connections shall comply with NFPA 70.

4.5.7.6.2
Fixed electrical wiring shall not be permitted.

4.5.7.7 Local Staging.
Mobile ESS in transit from the charging and storage location to the deployment location and back shall not be parked within 100 ft (30.5 m) of an occupied building for more than 1 hour during transit, unless specifically approved in advance by the AHJ.

4.5.7.8 Fencing.
An approved fence with a locked gate or other approved barrier shall be provided to keep the general public at least 5 ft (1024 mm) from the outer enclosure of a deployed mobile ESS.

4.6* Size and Separation.

4.6.1
ESS in the following locations shall comply with 4.6.2 and 4.6.3 unless otherwise permitted by 4.6.4 or 4.6.5.

1. Indoor ESS installations in non-dedicated-use buildings in accordance with 4.4.2
2. Outdoor ESS installations in locations near exposures as described in 4.4.3.1(2)

4.6.2
ESS shall be comprised of groups with a maximum energy capacity of 250 kWh each.

4.6.3
Each group shall be spaced a minimum 3 ft (914 mm) from other groups and from walls in the storage room or area.

4.6.4
The AHJ shall be permitted to approve groups with larger energy capacities or smaller group spacing based on large-scale fire testing complying with 4.1.5.

4.6.5
Subsections 4.6.2 and 4.6.3 shall not apply to lead-acid and nickel-cadmium battery systems less than 50 V ac, 60 V dc in telecommunications facilities in compliance with NFPA 76.

4.7* Occupied Work Centers.

ESS in occupied work centers shall comply with this section.

4.7.1

ESS shall be permitted in the same room as the equipment that they support.

4.7.2

ESS shall be housed in a noncombustible, locked cabinet or other enclosure to prevent access by unauthorized personnel unless located in a separate equipment room accessible only to authorized personnel.

4.8 Maximum Rated Energy.

ESS in the following locations shall comply with Section 4.8 as follows:

1. Fire areas within non-dedicated-use buildings containing ESS as described in 4.4.2.2 shall not exceed the maximum rated energy values in Table 4.8 except as permitted by 4.8.1.

2. Outdoor ESS installations in locations near exposures as described in 4.4.3.1(2) shall not exceed the maximum rated energy values in Table 4.8 except as permitted by 4.8.2.

3. ESS installations in open parking garages and on rooftops of buildings as described in 4.4.4.1 shall not exceed the maximum rated energy values in Table 4.8 except as permitted by 4.8.2.

4. Mobile ESS equipment as covered by Section 4.5 shall not exceed the maximum rated energy values in Table 4.8 except as permitted by 4.8.2.

Table 4.8 Maximum Rated ESS Energy

<table>
<thead>
<tr>
<th>ESS Type</th>
<th>Maximum Rated Energy* (kWh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead-acid batteries, all types(^b)</td>
<td>600</td>
</tr>
<tr>
<td>Nickel-cadmium batteries(^b)</td>
<td>600</td>
</tr>
<tr>
<td>Lithium-ion batteries, all types</td>
<td>600</td>
</tr>
<tr>
<td>Sodium batteries, all types</td>
<td>600</td>
</tr>
<tr>
<td>Flow batteries(^c)</td>
<td>600</td>
</tr>
<tr>
<td>Other battery technologies</td>
<td>200</td>
</tr>
<tr>
<td>Capacitors</td>
<td>20</td>
</tr>
</tbody>
</table>

*For batteries and capacitors rated in amp-hrs, kWh should equal rated voltage times amp-hr rating divided by 1000.

\(^b\)Quantities are unlimited in the telecommunication buildings complying with NFPA 76.

\(^c\)Includes vanadium, zinc-bromine, polysulfide, bromide, and other flowing electrolyte-type technologies.

4.8.1
Where approved by the AHJ, fire areas in non-dedicated-use buildings containing ESS that exceed the amounts in Table 4.8 shall be permitted based on a hazardous mitigation analysis in accordance with 4.1.4 and large-scale fire testing complying with 4.1.5.

4.8.2
Where more than one ESS technology is present within a fire area, the fire protection systems shall be designed to protect the greatest hazard.

4.8.3
Where approved by the AHJ, outdoor ESS installations, ESS installations in open parking garages and on rooftops of buildings, and mobile ESS equipment that exceed the amounts in Table 4.8 shall be permitted based on a hazardous mitigation analysis in accordance with Section 4.16 and large-scale fire and fault condition testing complying with 4.1.5.

4.8.4
Where fire areas within buildings and other installations contain a combination of energy systems covered in Table 4.8, the total aggregate quantities shall be determined based on the sum of percentages of each type divided by the maximum rated energy of each type.

4.8.5
The sum of the percentages calculated in 4.8.4 shall not exceed 100 percent except as permitted in 4.8.1 or 4.8.2.

4.9 Exhaust Ventilation.

4.9.1
Where required by Table 9.2 or elsewhere in this standard, exhaust ventilation shall be provided for rooms, enclosures, walk-in containers, and cabinets in accordance with 4.9.2 or 4.9.3.

4.9.2
The ventilation system shall be designed to limit the maximum concentration of flammable gas to 25 percent of the lower flammable limit (LFL) of the total volume of the room, enclosure, container, or cabinet during the worst-case event of simultaneous “boost” charging of all the batteries, in accordance with nationally recognized standards.

4.9.3
Mechanical ventilation shall be provided at a rate of not less than 1 ft$^3$/min/ft$^2$ (5.1 L/sec/m$^2$) of floor area of the room, enclosure, container, or cabinet.

4.9.3.1
The ventilation shall be either continuous or be activated by a gas detection system in accordance with 4.9.3.4.

4.9.3.2
Required mechanical exhaust ventilation systems shall be installed in accordance with the manufacturer’s installation instructions and local building, mechanical, and fire codes.

4.9.3.3
Required mechanical exhaust ventilation systems shall be supervised by an approved central station, proprietary, or remote station service in accordance with NFPA 72 or shall initiate an audible and visual signal at an approved constantly attended on-site location.
4.9.3.4
Where required by 4.9.3, rooms, enclosures, walk-in containers, and cabinets containing ESS shall be protected by an approved continuous gas detection system that complies with the following:

1. The gas detection system shall be designed to activate the mechanical ventilation system when the level of flammable gas in the room, enclosure, container, and cabinet exceeds 25 percent of the LFL.
2. The mechanical ventilation system shall remain on until the flammable gas detected is less than 25 percent of the LFL.
3. The gas detection system shall be provided with a minimum of 2 hours of standby power.
4. Failure of the gas detection system shall annunciate a trouble signal at an approved central station, proprietary, or remote station service or when approved at a constantly attended on-site location.

4.10 Smoke and Fire Detection.

4.10.1
All fire areas containing ESS systems located within buildings or structures shall be provided with a smoke detection system in accordance with NFPA 72.

4.10.2
Normally unoccupied, remote stand-alone telecommunications structures with a gross floor area of less than 1500 ft$^2$ (139 m$^2$) utilizing lead-acid battery technology, nickel-cadmium battery technology, or nickel-metal hydride battery technology shall not be required to have the detection required in 4.10.1.

4.10.3
The smoke detection system shall be permitted to be replaced with a radiant energy–sensing detection system installed in accordance with NFPA 72 in open parking garages and similar occupancies where conditions negatively impact the use of smoke detection technologies.

4.10.4
Telecommunications facilities with lead-acid and nickel-cadmium battery storage less than 50 V ac, 60 V dc shall have fire detection installed in accordance with NFPA 76.

4.11 Fire Control and Suppression.

4.11.1
Where required elsewhere in this standard, fire control and suppression for rooms or areas within buildings and outdoor walk-in units containing ESS shall be provided in accordance with this section.

4.11.2
Where required automatic fire suppression and control is provided using automatic sprinkler systems they shall be installed in accordance with one of the following:

1. NFPA 13 with a minimum density of 0.3 gpm/ft$^2$ (12.2 mm/min) based over the area of the room or 2500 ft$^2$ (230 m$^2$) design area, whichever is smaller
2. NFPA 13 with a minimum density based on large-scale fire testing in accordance with Section 4.5

4.11.2.1

Where other fixed fire control and suppression systems are used to provide required protection, they shall be permitted based on reports issued as a result of large-scale fire testing as provided in 4.11.2.

4.11.2.1.1*

Foam fire suppression systems shall be designed to provide a foam blanket or foam submergence until it can be demonstrated that the ESS has cooled to below the temperature that can cause thermal runaway and below the autoignition temperature of combustible material present.

4.11.2.1.2* Gaseous Agent Fire Suppression Systems.

4.11.2.1.2.1*

Total flooding gaseous agent systems shall be designed based on the following factors including but not limited to:

1. The agent concentrations required for the specific combustible materials involved
2. The specific configuration of the equipment and enclosure

4.11.2.1.2.2*

Total flooding gaseous suppression systems shall be designed to maintain the design concentration within the enclosure for a time to ensure that the fire is extinguished and that temperatures of the ESS have cooled to below the autoignition temperature of combustible material present and the temperature that can cause thermal runaway as defined in the emergency operations plan.

4.11.2.1.2.3

An operating device shall be available in an approved location such that fire services can begin exhaust prior to hold time expiration if deemed necessary.

4.11.2.1.2.4*

Local application gaseous agent suppression systems shall be designed to operate for a time sufficient to ensure that the fire is extinguished and that temperatures of the ESS have cooled to below the autoignition temperature of combustible material present and the temperature at which thermal runaway can occur.

4.11.2.1.3

Dry chemical fire suppression systems shall be designed to operate until it can be demonstrated that the ESS has cooled to below the autoignition temperature of combustible material present and the temperature at which thermal runaway can occur.

4.11.2.1.4*

Water mist suppression systems shall be designed and installed in accordance with their listing for the specific hazards and protection objectives specified in the listing.

4.11.2.2
Where other fixed fire control and suppression systems are used, they shall comply with the following standards, as appropriate:

1. NFPA 12
2. NFPA 15
3. NFPA 750
4. NFPA 2001
5. NFPA 2010

4.11.2.3

Lead-acid and nickel-cadmium battery systems less than 50 V ac, 60 V dc in telecommunications facilities for installations of communications equipment under the exclusive control of communications utilities located outdoors or in building spaces used exclusively for such installations that are in compliance with NFPA 76 shall not be required to have a fire suppression system installed.

4.11.3

When approved by the AHJ, ESS shall be permitted to be installed in open parking garages without the protection of an automatic fire suppression system where full-scale fire and fault condition testing documents the system does not present an exposure hazard to parked vehicles when installed in accordance with manufacturer’s instructions and this standard.

4.12  Explosion Control.

Hazardous exhaust and deflagration venting shall be provided in accordance with this section.

4.12.1*

Lithium-ion technology ESS installed within a room, enclosure, or container shall be provided with deflagration prevention by combustible concentration reduction measures in accordance with NFPA 69 or shall be provided with deflagration venting in accordance with NFPA 68.

4.12.2

Deflagration prevention and deflagration venting shall not be required when documentation is presented that the system discharge cannot exceed 25 percent of the lower explosive limit (LEL) anywhere in the room, enclosure, or container.

4.12.3*

Flooded lead-acid and VRLA batteries installed within a room, enclosure, or container shall be provided with deflagration prevention by combustible concentration reduction measures in accordance with NFPA 69 or shall be provided with deflagration venting in accordance with NFPA 68.

4.12.3.1

Deflagration prevention and deflagration venting shall not be required when documentation is presented that the system discharge cannot exceed 25 percent of the lower explosive limit (LEL) anywhere in the room, enclosure, or container.

4.12.3.2

Lead-acid and nickel-cadmium battery systems less than 50 V ac, 60 V dc in telecommunications facilities for installations of communications equipment under the exclusive control of communications utilities located outdoors or in building spaces used exclusively for
such installations that are in compliance with NFPA 76 shall be exempt from the requirements in Section 4.12.

4.13 Water Supply.

4.13.1*
Sites where nonmechanical ESS are installed shall be provided with a permanent source of water for fire protection.

4.13.2
Where no permanent adequate and reliable water supply exists for fire-fighting purposes, the requirements of NFPA 1142 shall apply.

4.13.3
Fire hydrants in accordance with NFPA 24 shall be provided for site ESS installations where a public or private water supply is available.

4.14 Spill Control.

4.14.1
Rooms, buildings, or areas containing ESS with free-flowing liquid electrolyte in individual vessels having a capacity of more than 55 gal (208 L) or multiple vessels having an aggregate capacity exceeding 1000 gal (3785 L) shall be provided with spill control to prevent the flow of liquids to adjoining areas.

4.14.2*
An approved method and materials for the control of a spill of electrolyte or other hazardous liquid shall be provided that will be capable of controlling a spill from the single largest vessel.

4.14.3
In rooms, buildings, or areas protected by water-based fire protection systems, the capacity of the spill containment system shall accommodate the capacity of the expected fire protection system discharge for a period of 10 minutes.

4.14.4
The capacity increase in 4.14.3 shall not apply to integral spill containment systems that are shielded from the fire protection system discharge.

4.14.5
Sealed valve-regulated lead-acid (VRLA) batteries and other ESS equipment with immobilized electrolyte and immobilized hazardous liquids shall not require spill control.

4.14.6
Rooms, buildings, or areas containing other hazardous materials shall include spill control as required in NFPA 1.

4.15 Neutralization.

4.15.1*
An approved method to neutralize spills from ESS with free-flowing electrolyte shall be provided.

4.15.2
Neutralization shall not be required for ESS with immobilized electrolyte.
4.15.3
The method shall be capable of neutralizing a spill from the largest battery or vessel to a pH between 5.0 and 9.0.

4.16 Remediation Measures.

4.16.1 Authorized Service Personnel.

In the event a fire or other event has damaged the ESS and ignition or re-ignition of the ESS is possible, the owner, agent, or lessee shall immediately dispatch authorized service personnel to mitigate the hazard or remove damaged equipment from the premises to a safe location.

4.16.2 Fire Mitigation Personnel.

4.16.2.1 When, in the opinion of the AHJ, it is essential for public safety that trained personnel be on site to respond to possible ignition or re-ignition of damaged the ESS, the owner, agent, or lessee shall provide one or more fire mitigation personnel, as required and approved, at their expense.

4.16.2.2 These personnel shall remain on duty continuously after the fire department leaves the premises until the damaged ESS is removed from the premises or the AHJ indicates they can leave.

4.16.2.3 On-duty fire mitigation personnel shall have the following responsibilities:

1. Keep diligent watch for fires, obstructions to means of egress, and other hazards
2. Immediately contact the fire department if their assistance is needed to mitigate any hazards
3. Take prompt measures for remediation of hazards and extinguishment of fires that occur
4. Take prompt measures to assist in the evacuation of the public from the structures

Chapter 5 System Interconnections

5.1* General.

All electrical connections and wiring to and from an ESS or the components of an ESS shall be in accordance with NFPA 70 or IEEE C2 based on the location of the ESS in relation to and its interaction with the electrical grid.

5.2* Disconnecting Means.

A readily accessible disconnecting means for the ESS shall be provided within sight of the ESS in accordance with NFPA 70.

5.3 Nonelectrical Systems.

5.3.1 Natural Gas.

Piping, valves, and fittings from the outlet of the supplier’s piping to the outlet of the ESS system’s shutoff valve shall be in accordance with NFPA 54.
5.3.2 Compressed Natural Gas (CNG).
The design, location, and installation of piping, valves, and fittings from the outlet of the point of delivery from the supplier to the inlets of the equipment shutoff valves shall be in accordance with NFPA 52.

5.3.3 Liquefied Petroleum Gas (LP-Gas) Systems and Storage.
The design, location, and installation of liquefied petroleum gas (LP-Gas) storage and piping systems shall comply with NFPA 58.

5.3.4 Hydrogen Fuel Systems and Storage.
The design, location, and installation of hydrogen gas and liquid hydrogen storage and piping systems shall comply with NFPA 2.

5.3.5 Biogas.
Storage tanks and their associated equipment, piping, valves, and regulators shall be designed and installed in accordance with NFPA 54.

5.3.6 Liquid Fuels.
The design of liquid fuel piping systems and the location and storage of liquid fuels shall be in accordance with NFPA 30.

5.3.7
Where the ESS requires water to operate, it shall be provided through a connection to an on-site water supply in accordance with ICC IPC (International Plumbing Code), IAPMO UPC (Uniform Plumbing Code), or local regulations, or through a self-contained water source.

5.4 Communication Systems.
Engineered and field-constructed ESS shall have appropriate communication interconnections between the ESS components and site located systems, which will allow for safe operation of the system.

5.5* Notification.
Notifications shall be present per the requirements of NFPA 70, 706.7(D).

5.6 Mechanical Systems.

5.6.1
All connections to and from a self-contained prepackaged ESS or the components of a pre-engineered ESS to required plumbing, fire alarm, detection, or control circuits or to mechanical systems shall be in accordance with nationally recognized standards applicable to those systems, listed equipment instructions, and the applicable provisions of Chapter 5 and Chapter 6.

5.6.2
All connections to, from, and within engineered and field-constructed ESS to required plumbing, fire alarm, detection, or control circuits or to mechanical systems shall be in accordance with the listed equipment instructions and applicable provisions of Chapter 5 and Chapter 6.

5.7 Emergency and Standby Systems.
Chapter 6  Commissioning

6.1  System Commissioning.

6.1.1
ESS shall be evaluated for proper operation and confirmed by the system owner or their designated agent in accordance with a commissioning plan prepared in accordance with 6.1.1.1, 6.1.1.2, and 6.1.1.2.

6.1.1.1
The system installer or commissioning agent shall prepare a written commissioning plan that provides a description of the means and methods necessary to document and verify that the system and its associated controls and safety systems, as required by this standard, are in proper working condition.

6.1.1.2
The commissioning plan shall include the following information:

1. An overview of the commissioning process developed specifically for the ESS to be installed and narrative description of the activities to be conducted
2. Roles and responsibilities for all those involved in the planning, design, construction, installation, or operation of the system(s)
3. Means and methods whereby the commissioning plan will be made available during the implementation of the ESS project(s)
4. Plans and specifications necessary to understand the installation and operation of the ESS and all associated operational controls and safety systems
5. A detailed description of each activity to be conducted during the commissioning process, who will perform each activity, and at what point in time the activity is to be conducted
6. Procedures to be used in documenting the proper operation of the ESS and all associated operational controls and safety systems
7. Testing for any required fire detection or suppression and thermal management, ventilation, or exhaust systems associated with the installation
8. Guidelines and format for a commissioning checklist and relevant operational testing forms and necessary commissioning logs and progress reports
9. Means and methods whereby facility operating and maintenance staff will be trained on the system
10. Identification of personnel who are qualified to service and maintain the system and respond to incidents involving the system
11. A decommissioning plan meeting the provisions of Section 8.1 that covers the removal of the system from service and from the facility in which it is located and information on disposal of materials associated with the ESS

6.1.2
System commissioning shall be conducted in accordance with 6.1.2.1 and 6.1.2.2 after the installation is complete but prior to final inspection and approval.

6.1.2.1

ESS shall be evaluated for their proper operation by the system installer in accordance with the commissioning plan developed under 6.1.1 and a commissioning report documenting the commissioning process in accordance with 6.1.6.

6.1.2.2

The commissioning results in accordance with 6.1.3 shall be provided by the system installer to the system(s) owner and the AHJ prior to final inspection and approval.

6.1.3

A commissioning report documenting the commissioning process and the results shall be provided in accordance with 6.1.3.1, 6.1.3.2, and 6.1.3.3.

6.1.3.1

A commissioning report shall be prepared by the system installer and shall summarize the commissioning process and the operation of the system and associated operational controls and safety systems.

6.1.3.2

The report shall include the final commissioning plan, the results of the commissioning process, as well as a copy of the plans and specifications associated with the as-built system design and installation.

6.1.3.3

The report shall include any issues identified during commissioning and the measures taken to resolve them.

6.1.3.4

A corrective action plan acceptable to the AHJ shall be developed for any open or continuing issues that are allowed to be continued after commissioning.

6.1.4

ESS installed in one- and two-family homes shall be permitted to be commissioned as follows:

1. Verify that the system is installed in accordance with the approved plans and manufacturer’s instructions and is operating properly.
2. Provide a copy of the manufacturer’s installation, operation, and maintenance instructions provided with the listed system.
3. Provide training on the proper operation and maintenance of the system to the system owner.
4. Provide a label on the installed system containing the contact information for the qualified maintenance and service providers.

6.1.5

Where the system is installed in a one- or two-family dwelling that is owned by the builder and has yet to be sold, commissioning shall be conducted as outlined in 6.1.4, and the builder shall then transfer the required information in 6.1.4 to the home owner when the property is sold.
6.1.6 System Testing.

6.1.6.1
ESS shall be evaluated for their proper operation by the system installer in accordance with the manufacturer’s instructions, the commissioning plan, and the requirements of this section after the installation is complete but prior to final approval.

6.1.6.2
A report documenting the commissioning process and the results shall be prepared by the entity commissioning the system and a copy provided to the AHJ prior to final inspection and approval and included in the manual required by 4.1.2.3.

6.1.6.3
System testing shall be conducted as a component of the commissioning process and include functional performance testing of the ESS that demonstrates that the installation and operation of the system and associated components, controls, and safety-related systems are in accordance with approved plans and specifications and that the operation, function, and maintenance serviceability for each of the commissioned ESS is confirmed.

6.2 Issues and Resolutions Documentation. (Reserved)

6.3 Operations and Maintenance Documentation.

6.3.1
Operations and maintenance documentation shall be provided to the ESS owner.

6.3.2
The documentation shall include design, construction, installation, testing, and commissioning information associated with the ESS as initially approved after being commissioned.

6.3.3
A copy of the documentation shall be placed in an approved location to be accessible to facility personnel, fire code officials, and emergency responders.

6.4 Recommissioning of Existing Systems.

6.4.1
Recommissioning shall meet the provisions of Section 6.1 and include the entire system with issuance of a new commissioning report, identification of any new issues and resolutions documentation, and identification of any revisions to the operations and maintenance documentation.

6.4.2
When alterations, additions, repositioning, or renovations to the system or any of its components are warranted, they shall be permitted in accordance with Chapter 4 and be performed by qualified entities and the system recommissioned in accordance with Section 6.1.

6.4.3
Repairs or renewals to systems utilizing identical components shall not require recommissioning.

6.4.4
Listed ESS that has been modified in the field beyond the field-installed options that are part of the listing shall be investigated and found suitable by the organization that listed the equipment.

**Chapter 7  Operation and Maintenance**

**7.1  System Operation.**

All ESS shall be operated in accordance with the manufacturer's instructions and the operation and maintenance documentation.

**7.1.1**

The operation and maintenance documentation shall include the following:

1. Procedures for the safe startup of the ESS system and associated equipment
2. Procedures for inspection and testing of associated alarms, interlocks, and controls
3. Procedures for maintenance and operation of the following, when applicable:
   1. Energy storage management systems (ESMS)
   2. Fire protection equipment and systems
   3. Spill control and neutralization systems
   4. Exhaust and ventilation equipment and systems
   5. Gas detection systems
   6. Other required safety equipment and systems
4. Response considerations similar to a safety data sheet (SDS) that will address response safety concerns and extinguishment when an SDS is not required
5. An indication of which changes would necessitate re-permitting
6. *A notification that changes to the system are required to be recorded by updating any engineering documentation

**7.1.2**

Copies of SDS for hazardous materials contained in the ESS shall be posted within sight of the disconnecting means of any ESS or at a location approved by the AHJ.

**7.1.3**

Where the operations and maintenance documentation calls for detailed procedures to be used for specific scheduled operational checks or assessments, an operations record that includes data associated with configurable system settings, system start-up, system shutdown (including emergency shutdown), and long-term shutdown (storage mode) shall be maintained by the system owner or their designated agent and be made available to the AHJ upon request.

**7.1.4**

The operations record shall indicate the maintenance action taken, the date of the action, who implemented the action, and the results associated with the action.

**7.1.5**

The operations record shall be kept in a readily accessible location, or a sign indicating where the record is located shall be posted adjacent to the system.
7.2 System Maintenance.
The ESS shall be maintained in accordance with the system manufacturer’s instructions.

7.2.1
The maintenance documentation shall include a detailed maintenance schedule covering all
affected equipment and the activities to be performed.

7.2.2
Maintenance shall be performed by qualified individuals.

7.2.3
Maintenance documentation indicating the maintenance action taken, the date of the action,
who implemented the action, and the results associated with the action shall be maintained as
required by Section 6.3.

7.2.4
Maintenance documentation shall be revised to include information on any repair, renewal, or
renovation.

7.2.5 Training.
Training shall be provided to all those responsible for system operation and maintenance.

7.2.5.1
Training on system operation and maintenance shall be provided by the system owner or their
designated agent.

7.2.5.2
After recommissioning the system, training on any changes to the operation and maintenance
documentation shall be provided.

7.2.5.3
Records of training shall be retained and accessible, indicating the training taken, the name(s)
of those taking the training, and the date of the training.

7.3 System Testing.

7.3.1
System testing shall be performed when required by the operating instructions or maintenance
documentation in accordance with testing procedures provided by the ESS manufacturer.

7.3.2
A record of all testing shall be maintained in accordance with the requirements in Section 6.3.

Chapter 8 Decommissioning

8.1 Decommissioning Plan.

Prior to decommissioning, the owner of an ESS or their designated agent(s) shall prepare a
written decommissioning plan that provides the organization, documentation requirements, and
methods and tools necessary to indicate how the safety systems as required by this standard
and the ESS and its components will be decommissioned and the ESS removed from the site.

8.1.1*
The decommissioning plan shall include the following information:

1. An overview of the decommissioning process developed specifically for the ESS that are to be decommissioned
2. Roles and responsibilities for all those involved in the decommissioning of the ESS and their removal from the site
3. Means and methods whereby the decommissioning plan will be made available at a point in time corresponding to the decision to decommission the ESS
4. Plans and specifications necessary to understand the ESS and all associated operational controls and safety systems, as built, operated, and maintained
5. A detailed description of each activity to be conducted during the decommissioning process and who will perform that activity and at what point in time
6. Procedures to be used in documenting the ESS and all associated operational controls and safety systems that have been decommissioned
7. Guidelines and format for a decommissioning checklist and relevant operational testing forms and necessary decommissioning logs and progress reports
8. A description of how any changes to the surrounding areas and other systems adjacent to the ESS, such as but not limited to structural elements, building penetrations, means of egress, and required fire detection and suppression systems, will be protected during decommissioning and confirmed as being acceptable after the system is removed

8.2 Decommissioning Process.

8.2.1
The AHJ shall be notified prior to decommissioning an ESS.

8.2.2
The ESS shall be decommissioned by the owner of the ESS or their designated agent(s) in accordance with the decommissioning plan.

8.3 Decommissioning Report.

A decommissioning report shall be prepared by the ESS owner or their designated agent and summarize the decommissioning process of the system and associated operational controls and safety systems.

8.3.1
The report shall include the final decommissioning plan and the results of the decommissioning process.

8.3.2
The report shall include any issues identified during decommissioning and the measures taken to resolve them.

Chapter 9 Electrochemical Energy Storage Systems

9.1 Application.
9.1.1
The requirements of this chapter shall apply to installations of electrochemical ESS.

9.1.2
Unless modified by this chapter, the requirements of Chapters 4 through 8 shall also apply.

9.2 General.

Electrochemical ESS shall comply with the applicable sections of Chapters 4 and 9 as specified in Table 9.2.

Table 9.2 Electrochemical ESS Technology-Specific Requirements

<table>
<thead>
<tr>
<th>Compliance Required</th>
<th>Battery Technology</th>
<th>Other Electrochemical ESS and Battery Technologies</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lead-Acid</td>
<td>Ni-Cd or Ni-mH</td>
<td>Lithium-Ion</td>
</tr>
<tr>
<td>Exhaust ventilation</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Spill control</td>
<td>Yes(^b)</td>
<td>Yes(^b)</td>
<td>No</td>
</tr>
<tr>
<td>Neutralization</td>
<td>Yes(^b)</td>
<td>Yes(^b)</td>
<td>No</td>
</tr>
<tr>
<td>Safety caps</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Thermal runaway</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes(^c)</td>
</tr>
<tr>
<td>Explosion control</td>
<td>Yes(^d)</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Size and separation</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

\(^a\)Not required if documentation acceptable to the AHJ, including a hazard mitigation analysis complying with Section 4.15, provides justification that the protection is not necessary based on the technology used.

\(^b\)Applicable to vented- (i.e., flooded-) type nickel-cadmium and lead-acid batteries.

\(^c\)The thermal runaway protection is permitted to be part of a battery management system that has been evaluated with the battery as part of the evaluation to UL 1973 or UL 9540.

\(^d\)Not required for lead-acid and nickel-cadmium battery systems less than 50 V ac, 60 V dc in telecommunications facilities for installations of communications equipment under the exclusive control of communications utilities located outdoors or in building spaces used exclusively for such installations that are in compliance with NFPA 76.

9.3 Thermal Runaway Protection.

Where required by Table 9.2, a listed device or other approved method shall be provided to preclude, detect, and minimize the impact of thermal runaway.

9.4 Safety Caps.

Where required by Table 9.2, vented batteries used in ESS shall be provided with flame-arresting safety caps.

Chapter 10 Capacitors

10.1 Application.
10.1.1
The requirements of this chapter shall apply to installations of capacitor ESS.

10.1.2
Unless modified by this chapter, the requirements of Chapters 4 through 8 shall also apply.

10.1.3
This chapter shall not apply to surge capacitors installed in accordance with NFPA 70, Section 460.

10.2 Protection Features.

Capacitor ESS installations shall comply with the technology-specific requirements specified in Table 10.2.

Table 10.2 Capacitor ESS Technology-Specific Requirements

<table>
<thead>
<tr>
<th>Compliance Required</th>
<th>Capacitor Energy Storage*</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exhaust ventilation</td>
<td>Yes</td>
<td>Section 4.9</td>
</tr>
<tr>
<td>Spill control</td>
<td>Yes</td>
<td>4.14</td>
</tr>
<tr>
<td>Neutralization</td>
<td>Yes</td>
<td>4.1.5</td>
</tr>
<tr>
<td>Thermal runaway†</td>
<td>Yes</td>
<td>Section 10.3</td>
</tr>
<tr>
<td>Safety caps</td>
<td>Yes</td>
<td>Section 10.4</td>
</tr>
<tr>
<td>Explosion control</td>
<td>Yes</td>
<td>4.12</td>
</tr>
</tbody>
</table>

*Not required if documentation acceptable to the AHJ, including a hazard mitigation analysis complying with Section 4.15, provides justification that the protection is not necessary based on the capacitor technology used.

†The thermal runaway protection is permitted to be part of an ESS management system that has been evaluated with the capacitor as part of the evaluation to UL 1973 or UL 9540.

10.3 Thermal Runaway Protection.

Where required by Table 10.2, a listed device or other approved method shall be provided to preclude, detect, and minimize the impact of thermal runaway.

10.4 Safety Caps.

Where required by Table 10.2, vented batteries used in ESS shall be provided with flame-arresting safety caps.
Chapter 11  Fuel Cell Energy Storage Systems

11.1  Installation and Maintenance.

11.1.1
Stationary fuel cell ESS shall comply with the following requirements of Chapter 4:

1. Charge controllers  (see 4.2.7)
2. Inverters and converters (see 4.2.8)
3. Energy storage management system (ESMS)  (see 4.2.9)
4. Impact protection  (see 4.3.7)
5. Smoke and fire detection (see Section 4.10)
6. Fire control and suppression  (see Section 4.11)
7. Water supply  (see Section 4.13)
8. Signage  (see Section 4.3.5)
9. Combustible storage  (see Section 4.1.6)
10. Hazard mitigation analysis  (see Section 4.1.4)
11. Emergency planning and training  (see Section 4.1.3)
12. Construction documents  (see Section 4.1.2)

11.1.2
Non-hydrogen fueled stationary fuel cell ESS shall be installed and maintained in accordance with NFPA 70, NFPA 853, the manufacturer’s instructions, and the equipment listing.

11.1.3
Hydrogen fueled stationary fuel cell ESS shall be installed and maintained in accordance with NFPA 2, NFPA 853, NFPA 70, the manufacturer's instructions, and the equipment listing.

Chapters 12 – 16 have no content
Chapter 17 One- and Two-Family Dwellings and Townhouse Units

17.1 General.
ESS installed in one- or two-family dwellings or in townhouse units shall comply with the requirements of this chapter.

17.2 Equipment Listings.
ESS 1 kWh or greater in energy capacity shall be listed and labeled for residential use in accordance with UL 9540.

17.3 Installation.
ESS shall be installed in accordance with the manufacturer's instructions and their listing.

17.4 ESS Spacing.
Individual ESS units shall be separated from each other by a minimum of 3 ft (914 mm) unless smaller separation distances are documented to be adequate based on large-scale fire testing complying with 4.1.5.

17.5 Location.
17.5.1
ESS shall be permitted to be located in accordance with the following:
   (1) In attached garages separated from the dwelling unit living area and sleeping units in accordance with the local building code
   (2) In detached garages and detached accessory structures
   (3) Outdoors on exterior walls located a minimum of 3 ft (914 mm) from doors and windows

17.5.2
ESS shall not be installed in living area of dwelling units or in sleeping units other than within utility closets and storage or utility spaces.

17.6 Energy Ratings.
Individual ESS units shall have a maximum rating of 20 kWh.
17.6.1
The aggregate rating amount within a dwelling, garage, or accessory structure shall not exceed the following:
   (1) 40 kWh within utility closets and storage or utility spaces
   (2) 80 kWh in attached or detached garages and detached accessory structures
   (3) 80 kWh on exterior walls
   (4) 80 kWh in outdoor installations

17.6.2
ESS installations of more than 80 kWh shall comply with Chapters 4 through 9.
17.6.3
The use of an electric-powered vehicle to power the dwelling while parked shall comply with Section 17.12.

### 17.7 Electrical Installation.

ESS shall be installed in accordance with NFPA 70.

#### 17.7.1

Inverters shall be listed and labeled in accordance with UL 1741 or provided as part of the UL 9540 listing.

#### 17.7.2

Systems connected to the utility grid shall use inverters listed for utility interaction.

### 17.8 Fire Detection.

#### 17.8.1

Rooms, attached garages, and areas in which ESS are installed shall be protected by smoke alarms in compliance with local building code.

#### 17.8.2

Where ESS are installed in an attached garage or an area in which smoke alarms cannot be installed in accordance with their listing, an interconnected listed heat alarm shall be installed and be connected to the smoke alarm system required by the local building code.

### 17.9 Protection from Impact.

Stationary storage battery systems installed in a location subject to vehicle damage shall be protected by approved barriers.

### 17.10 Ventilation.

Indoor installations of ESS that include batteries that produce hydrogen or other flammable gases during charging shall be provided with ventilation in accordance with Section 4.12.

### 17.11 Toxic and Highly Toxic Gas.

ESS that have the potential to release toxic or highly toxic gas during charging, discharging, and normal use conditions shall not be installed within one- or two-family dwellings or in townhouses.

### 17.12 Electric Vehicle Use.

The use of the dwelling unit owner's or occupant's electric-powered vehicle to power the dwelling while parked in an attached or detached garage or outside shall comply with the vehicle manufacturer's instructions and NFPA 70.
Public Input No. 83-NFPA 1-2018 [ Section No. 52.3.2.1.3.1 ]

52.3.2.1.3.1
In other than assembly business, educational industrial, detention, and correction facilities, health care, ambulatory health care, and day care centers, and residential board and care and residential, mercantile and storage occupancies, stationary storage battery systems shall be located in a room separated from other portions of the building by a minimum of a 1-hour fire barrier.

Statement of Problem and Substantiation for Public Input

The current language in 52.3.2.1.3.1 does not list the occupancies that the section language applies to. It lists the ones that it does not so the user has to work backward to determine what occupancies do apply. This PI, changes that language to write the section so the language lists the applicable occupancies for both 52.3.2.1.3.1 and 52.3.2.1.3.2.

Submitter Information Verification

Submitter Full Name: Anthony Apfelbeck
Organization: Altamonte Springs Building/Fire Safety Division
Street Address:
City: 
State: 
Zip: 
Submittal Date: Tue Jun 19 08:32:51 EDT 2018
Committee:

Committee Statement

Resolution: CI-35-NFPA 1-2018
Statement: NFPA 855 is not complete but will be by NFPA 1 second draft meeting. This will allow the material to be extracted at the second draft meeting.
Chapter 53 Mechanical Refrigeration

53.1* General.

53.1.1 Applicability.

53.1.1.1* Refrigeration unit and system installations having a refrigerant circuit containing more than 220 lb (100 kg) of Group A1 or 30 lb (13.6 kg) of any other group refrigerant shall be in accordance with Chapter 53 and the mechanical code.

53.1.1.2 Temporary and portable installations shall be exempt from the requirements of this chapter when approved.

51.1.1.3 Ammonia Refrigeration

Ammonia refrigeration systems shall be exempt from the requirements of this chapter, other than Sections 53.1.2 and 53.1.3.

53.1.2 Permits and Plans.

53.1.2.1 Permits, where required, shall comply with Section 1.12.

53.1.2.2 Plans and specifications for devices and systems required by this chapter shall be submitted to the AHJ for review and approval prior to installation.

53.1.3 Reference Codes and Standards.

53.1.3.1 Refrigeration systems using a refrigerant other than ammonia shall be in accordance with ASHRAE 15 and the mechanical code.

53.1.3.2 Refrigeration systems using ammonia as the refrigerant shall also comply with ANSI/IIAR 2, Standard for Equipment, Design and Installation of Closed-Circuit Ammonia Mechanical Refrigerating Systems; IIAR 6, IIAR 7, IIAR 8 and IIAR 9.

53.2 Safety Features.

53.2.1 Emergency Pressure Control System.

Refrigeration systems containing more than 6.6 lb (3 kg) of flammable, toxic, or highly toxic refrigerant or ammonia shall be provided with an emergency pressure control system in accordance with 53.2.1.1 and 53.2.1.2.

53.2.1.1 High and Intermediate Pressure Zones.

Each high and intermediate pressure zone in a refrigeration system shall be provided with a single automatic valve providing a crossover connection to a lower pressure zone. Automatic crossover valves shall comply with 53.2.1.1.1 through 53.2.1.1.4.

53.2.1.1.1 Overpressure Limit Set Point for Crossover Valves.

Automatic crossover valves shall be provided to automatically relieve excess system pressure to a lower pressure zone if the pressure in a high or intermediate pressure zone rises to within 90 percent of the set point for emergency pressure relief devices.

53.2.1.1.2 Manual Operation.

Where required by the AHJ, automatic crossover valves shall be capable of manual operation.

53.2.1.1.3 System Design Pressure.

Refrigeration system zones that are connected to a higher pressure zone by an automatic crossover valve shall be designed to safely contain the maximum pressure that can be achieved by interconnection of the two zones.
53.2.1.4 Automatic Emergency Stop.

Operation of an automatic crossover valve shall cause all compressors on the affected system to immediately stop in accordance with the following:

1. Dedicated pressure-sensing devices located immediately adjacent to crossover valves shall be permitted as a means for determining operation of a valve.
2. To ensure that the automatic crossover valve system provides a redundant means of stopping compressors in an overpressure condition, high pressure cutout sensors associated with compressors shall not be used as a basis for determining operation of a crossover valve.

53.2.1.2 Low Pressure Zone.

53.2.1.2.1 Overpressure Limit Set Point for Emergency Stop.

The lowest pressure zone in a refrigeration system shall be provided with a dedicated means of determining a rise in system pressure to within 90 percent of the set point for emergency pressure relief devices.

53.2.1.2.2 Automatic Emergency Stop.

Activation of the overpressure sensing device shall cause all compressors on the affected system to immediately stop.

53.2.2 Treatment, Flaring, and Diffusion Systems for Refrigerant Discharge.

53.2.2.1 Required Systems.

Unless the AHJ determines, upon review of an engineering analysis prepared at the expense of the owner, that a significant fire, health, or environmental hazard would not result from an atmospheric release, refrigeration systems that are designed to discharge refrigerant vapor to the atmosphere shall be provided with an approved treatment, flaring, or diffusion system where required by 53.2.2.1.1 through 53.2.2.1.3.

53.2.2.1.1 Toxic and Highly Toxic Refrigerants.

Systems containing toxic or highly toxic refrigerants shall discharge vapor to the atmosphere only through an approved treatment system in accordance with Chapter 63 or flaring system in accordance with 53.2.2.2.

53.2.2.1.2 Flammable Refrigerants.

Systems containing flammable refrigerants shall discharge vapor to the atmosphere in accordance with the following:

1. For refrigerants having a density equal to or greater than the density of air, discharge shall be through an approved treatment system in accordance with or flaring system in accordance with 53.2.2.2.
2. For refrigerants having a density less than the density of air, discharge to the atmosphere shall be permitted, provided that the point of discharge is located outside of the structure at not less than 15 ft (4.6 m) above the adjoining grade level and not less than 20 ft (6.1 m) from any window, ventilation opening, or exit.

53.2.2.1.3 Ammonia Refrigerant.

Systems containing ammonia refrigerant shall discharge vapor to the atmosphere through a treatment system in accordance with 53.2.2.2, through an approved ammonia diffusion system in accordance with 53.2.2.3, or by other approved means except as follows:

1. Discharge through a treatment, flaring, or diffusion system shall not be required for ammonia–water absorption unit systems installed outdoors serving a dwelling unit, provided that the discharge is shielded and dispersed.
2. Discharge through a treatment, flaring, or diffusion system shall not be required for ammonia–water absorption unit systems containing less than 22 lb (10 kg) of ammonia and for which the ammonia circuit is located entirely outdoors.

53.2.2.2 Design of Flaring Systems.
53.2.2.2.1
Flaring systems for incineration of flammable, toxic, or highly toxic refrigerants or ammonia shall be designed to incinerate the entire discharge.

53.2.2.2.2
The products of refrigerant incineration shall not pose health or environmental hazards.

53.2.2.2.3
Incineration shall be automatic upon initiation of discharge, shall be designed to prevent blowback, and shall not expose structures or materials to threat of fire.

53.2.2.2.4
Standby fuel, such as LP-Gas, and standby power shall have the capacity to operate for one and one half the required time for complete incineration of refrigerant in the system.

53.2.2.3
Design of Ammonia Diffusion Systems.

53.2.2.3.1
Ammonia diffusion systems shall include a tank containing 1 gal of water for each pound of ammonia (4 L of water for each kg of ammonia) that will be released in 1 hour from the largest relief device connected to the discharge pipe.

53.2.2.3.2
The water used shall be prevented from freezing without the use of salt or chemicals by burial of the discharge pipe below frost depth or other approved means.

53.2.2.3.3
The discharge pipe from the pressure relief device shall distribute ammonia in the bottom of the tank, but no lower than 33 ft (10 m) below the maximum liquid level.

53.2.2.3.4
The tank shall contain the volume of water and ammonia, described in 53.2.2.3.1, without overflowing.

53.2.2.3.5
The tank shall be substantially constructed of not less than $\frac{1}{8}$ in. (2.51 mm) (10 gauge) steel.

53.2.2.3.6
The horizontal dimensions of the tank shall be equal to or less than one half of the height.

53.2.2.3.7
The tank shall have a hinged cover or, if of the enclosed type, shall have a vent hole at the top.

53.2.2.3.8
Pipe connections shall be through the top of the tank.
Refrigeration Machinery Rooms.

Where required by the mechanical code, refrigeration systems shall be provided with a refrigeration machinery room, which shall comply with 53.2.3.1 through 53.2.3.4.

53.2.3.1 Refrigerant Vapor Detection, Monitoring, Alarm, and Electrical Systems.

Refrigeration machinery rooms shall have an approved refrigerant vapor detection, monitoring, and alarm system in accordance with 53.2.3.1.1 through 53.2.3.1.7 and the mechanical code.

53.2.3.1.1 Alarm Threshold.

The refrigerant vapor detector shall activate approved visual and audible alarm signaling devices at one of the following refrigerant thresholds: At a value not greater than the corresponding TLV-TWA (or toxicity measure consistent therewith); not to exceed 25 percent of the lower flammable limit (LFL) for ammonia, at a concentration not exceeding 25 parts per million.

53.2.3.1.2 Location of Signaling Devices.

Audible and visual alarm signaling devices shall be located inside the refrigeration machinery room and outside the room at each entrance into the room.

53.2.3.1.3 Audibility.

Audible alarm signaling devices shall provide a sound level of at least 15 dB above the operating ambient noise sound pressure level of the space in which they are installed and shall provide approved, distinctive audible and visual alarms.

53.2.3.1.4 * Emergency Shutoff Interface.

Where the quantity of a Group A2, B2, A3, or B3 refrigerant other than ammonia, in an independent circuit would exceed 25 percent of the LFL if released to the surrounding room, either of the following shall apply:

(1) Electrical equipment shall comply with the requirements of NFPA 70 for Class I, Division 2.

(2) The refrigerant vapor detection system required by 53.2.3.1 shall automatically de-energize all electrical power within the space at vapor concentrations at or above 25 percent of the LFL.

53.2.3.1.5 Power and Supervision.

Refrigerant vapor detection and alarm systems shall be powered and supervised as required for fire alarm systems in accordance with NFPA 72.

53.2.3.1.6 Monitoring and Annunciation.

Refrigerant vapor detection and alarm systems shall transmit a signal to an approved location.

53.2.3.1.7 Installation and Maintenance.

Detection and alarm systems shall be installed and maintained in accordance with the equipment manufacturers' specifications. (Also see 53.3.2.1.)

53.2.3.2 * Prohibited Sources of Ignition.

Open flames or devices having an exposed surface temperature exceeding 800°F (427°C) shall be prohibited in refrigeration machinery rooms except as follows:

(1) Momentary temperature excursions such as electrical contacts in Group A1 and B1 systems shall be permitted.

(2) Open flames or devices having an exposed surface temperature exceeding 800°F (427°C) shall be permitted in refrigeration machinery rooms used exclusively for direct-fired absorption equipment.

(3) Existing nonconforming installations shall be permitted where approved by the AHJ, where the combustion system is interlocked with the refrigerant detection system to shut off at the permissible exposure limit (PEL).

(4) Direct-vented combustion equipment shall be permitted in accordance with the mechanical code.

53.2.3.3 Ventilation Systems.
53.2.3.3.1
Fans providing emergency purge ventilation for refrigerant escape from a refrigeration room shall have a clearly identified switch of the break-glass type providing on-only control immediately adjacent to, and outside of, each refrigerant machinery room means of egress.

53.2.3.3.2
An emergency purge control shall be provided with a manual reset only.

53.2.3.3.3
For systems using a refrigerant other than ammonia, purge fans shall also respond automatically to the refrigerant concentration detection system set to activate the ventilation system at the threshold levels set forth in 53.2.3.1.1.

For systems using ammonia, purge fans shall also respond automatically to the refrigerant concentration detection system set to activate the ventilation system at an ammonia concentration not exceeding 150 parts per million.

53.2.3.3.4
Mechanical ventilation systems serving refrigeration rooms shall have switches to control the power to each fan.

53.2.3.3.5
The switches shall be key-operated or within a locked glass-covered or tamper-resistant enclosure at an approved location adjacent to and outside of the principal entrance to the refrigeration machinery room.

53.2.3.3.6
Keys necessary for operation of ventilation systems shall be located in a single approved location.

53.2.3.3.7
Switches controlling fans providing continuous ventilation shall be of the two-position, on/off type.

53.2.3.3.8
Switches controlling fans providing intermittent or emergency ventilation shall be of the three-position, automatic on/off type.

53.2.3.3.9
Switches shall be labeled identifying both the function and the specific fan being controlled.

53.2.3.3.10
Two colored and labeled indicator lamps responding to the differential pressure created by airflow shall be provided for each switch.

53.2.3.3.11
One lamp shall indicate flow, and the other shall indicate no flow.

53.2.3.3.12
Exhaust from mechanical ventilation systems in refrigeration rooms shall be discharged 20 ft (6.1 m) or more from a property line or openings into buildings.

53.2.3.3.13
Discharges capable of exceeding 25 percent of the LFL or 50 percent of the immediately dangerous to life and health (IDLH) value shall be equipped with approved treatment systems to reduce the discharge concentrations to these values or lower, except as provided in 53.2.3.3.13.1 and 53.2.3.3.13.2. (Also see 53.2.2.1.)

53.2.3.3.13.1
A treatment system shall not be required when an approved engineering analysis of plume dispersion demonstrates that the limiting value will not be exceeded at the property line.

53.2.3.3.13.2
A treatment system shall not be required for ventilation provided for an ammonia refrigeration system.
4  Electrical.

53.2.3.4.1  The refrigeration machinery room shall not be required to be classified as a hazardous location for electrical equipment except as provided in the mechanical code or NFPA 70.

53.2.3.4.2  Refrigeration machinery rooms used exclusively for direct-fired absorption equipment shall be permitted not to be classified as a hazardous location for electrical equipment in accordance with NFPA 70.

53.2.3.4.3  Electrical equipment and electrical installations in refrigeration machinery rooms shall comply with Section 11.1.

53.2.3.4.4  Where treatment, detection, or alarm systems are required, such systems shall be connected to a secondary source of power to automatically supply electrical power in the event of loss of power from the primary source.

53.2.3.4.5  A clearly identified switch of the break-glass type or with an approved tamper-resistant cover shall provide off-only control of refrigerant compressors, refrigerant pumps, and normally closed, automatic refrigerant valves located in the machinery room. In addition, this equipment shall be automatically shut off whenever the refrigerant vapor concentration in the machinery room exceeds the vapor detector’s upper detection limit or 25 percent of the LFL, whichever is lower.

53.2.3.4.5.1  In machinery rooms where only nonflammable refrigerants are used, only compressors shall be required to be stopped by vapor detection or the cut-off switch. (Also see 53.2.3.1.4.)

53.2.4  Signs and Labels.

53.2.4.1  General.

Refrigeration units or systems shall be provided with approved hazard identification signs in accordance with NFPA 704, emergency operational signs, charts, and labels in accordance with the mechanical code, and the following:

(1)  Name and address of the manufacturer or installer
(2)  Type and total number of pounds of refrigerant contained in the system
(3)  Field test pressure applied

53.2.4.2  Systems with More Than 110 lb (50 kg) of Refrigerant.

Systems containing more than 110 lb (50 kg) of refrigerant shall be provided with signs having letters not less than \( \frac{1}{2} \) in. (12.7 mm) high, designating the following:

(1)  Main shutoff valves to each vessel
(2)  Mainstream or electrical controls
(3)  Remote control switch
(4)  Pressure-limiting device

53.3  Operations, Maintenance, Testing, and Decommissioning.

53.3.1  Operations and Maintenance.

53.3.1.1  General.

Refrigeration systems shall be operated and maintained in a safe and operable condition, free from accumulations of oil, dirt, waste, excessive corrosion, other debris, or leaks, and in accordance with ASHRAE 15, Safety Standard for Refrigeration Systems, and the mechanical code.

Ammonia refrigerator systems shall be operated and maintained in accordance with ANSI/IIAR 7, Developing Operating Procedures for Closed-Circuit Ammonia Mechanical Refrigerating Systems.
53.3.1.2 Access to System.
Refrigeration systems shall be maintained accessible to the fire department as required by the AHJ.

53.3.1.3 Storage in Machinery Rooms.

53.3.1.3.1 Flammable and combustible materials shall not be stored in refrigeration machinery rooms except for incidental materials necessary for the safe and proper operation and maintenance of the system.

53.3.1.3.2 Storage of materials in a refrigeration machinery room, including reserve supplies of refrigerants or refrigerant oils, shall be in accordance with other applicable chapters of this Code.

53.3.1.4 Changing of Refrigerant Type.
Refrigerant types shall not be changed without prior notification and approval of the AHJ.

53.3.1.5 Records of Refrigerant Quantities.
The person in charge of the premises on which a refrigeration unit or system subject to these regulations is installed or maintained shall keep a written record of refrigerant quantities brought onto and removed from the premises, which shall be made available to the AHJ upon request.

53.3.1.6 Permissible Refrigerant Discharges.
Refrigerant shall be only permitted to be released to atmosphere in the following circumstances:

1. Refrigeration systems operating at pressures below atmospheric and incorporating automatic purge cycles
2. Incidental operation of automatic pressure relief valves resulting in minor release of the refrigerant charge
3. Incidental minor releases associated with service operations after system pumpdown has been accomplished
4. In an emergency

53.3.1.7 Notification of Fugitive Releases.
Where required by the fire department, the fire department shall be notified upon discharges of refrigerant that are not in accordance with 53.3.1.6(1), (2), or (3).

53.3.2 Testing of Equipment.

53.3.2.1 Acceptance Testing.
The following emergency devices or systems shall be tested to demonstrate their safety and effectiveness upon completion of the installation or alteration:

1. Treatment and flaring systems

- Ammonia-diffusion systems
Fans and associated equipment intended to operate emergency purge ventilation systems
Refrigerant vapor detection and alarm systems

53.3.2.2 Periodic Testing.
The following emergency devices or systems shall be tested in accordance with the manufacturers’ specifications at intervals not exceeding one year:
(1) Treatment and flaring systems
(2) Fans and associated equipment intended to operate emergency purge ventilation systems
(3) Refrigerant vapor detection and alarm systems

53.3.2.3 Records of Required Testing.
A written record of required testing shall be maintained on the premises.

53.3.2.4 Testing Personnel Qualifications.
Tests of emergency devices or systems required by Chapter 53 shall be conducted by persons trained in such testing.

53.3.3 Decommissioning of Ammonia Refrigeration Systems.
Decommissioning of closed-circuit ammonia refrigeration systems shall comply with ANSI/IllAR 8, Decommissioning of Closed-Circuit Ammonia Mechanical Refrigerating Systems.

Statement of Problem and Substantiation for Public Input
IIAR is an ANSI accredited standards developer with a complete suite of standards to regulate ammonia refrigeration from initial design through decommissioning of systems. Provisions currently included in the NFPA 1 are largely design oriented, and when IIAR 2 was completely rewritten in 2014 to become both a code and a standard, a gap analysis was performed with NFPA 1 and other model codes to confirm or facilitate alignment. As a result, the IIAR standards referenced in this proposal and by model mechanical codes comprehensively regulate ammonia refrigeration and go well beyond what is currently provided in fire and mechanical codes, except for IIAR 2 treating EPCS as an optional feature and IIAR 2 specifying a preference for atmospheric release locations for PRV outlets.

This proposal will simplify regulation of ammonia refrigeration systems by eliminating the complexity of overlapping requirements between NFPA 1 and the reference standards published by IIAR. In similar actions, the 2018 Uniform Mechanical Code has dropped specific regulations for ammonia refrigeration in favor of deferring to IIAR standard. The IMC Code Development Committee approved a similar proposal for the 2021 edition of the IMC, and ASHRAE 15 is currently finalizing Addendum A, which proposes to delete ammonia requirements from ASHRAE 15.

Related Public Inputs for This Document

<table>
<thead>
<tr>
<th>Related Input</th>
<th>Relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Input No. 64-NFPA 1-2018 [Section No. 2.3.11]</td>
<td></td>
</tr>
</tbody>
</table>

Submitter Information Verification
Submitter Full Name: Jeffrey Shapiro
Organization: International Code Consultants
Affiliation: International Institute of Ammonia Refrigeration
Street Address: 
City: 
State: 
Zip: 
Submittal Date: Thu May 24 09:31:48 EDT 2018
Committee: 

Committee Statement
Resolution: FR-45-NFPA 1-2018

Statement: IIAR is an ANSI accredited standards developer with a complete suite of standards to regulate ammonia refrigeration from initial design through decommissioning of systems. Provisions currently included in the NFPA 1 are largely design oriented, and when IIAR 2 was completely rewritten in 2014 to become both a code and a standard, a gap analysis was performed with NFPA 1 and other model codes to confirm or facilitate alignment. As a result, the IIAR standards referenced in this proposal and by model mechanical codes comprehensively regulate ammonia refrigeration and go well beyond what is currently provided in fire and mechanical codes, except for IIAR 2 treating EPCS as an optional feature and IIAR 2 specifying a preference for atmospheric release locations for PRV outlets.

This will simplify regulation of ammonia refrigeration systems by eliminating the complexity of overlapping requirements between NFPA 1 and the reference standards published by IIAR. In similar actions, the 2018 Uniform Mechanical Code has dropped specific regulations for ammonia refrigeration in favor of deferring to IIAR standard. The IMC Code Development Committee approved a similar proposal for the 2021 edition of the IMC, and ASHRAE 15 is currently finalizing Addendum A, which proposes to delete ammonia requirements from ASHRAE 15.
No Title Required

54.1.2.1 Ozone-generating equipment that existed or was approved for construction or installation prior to the effective date of the standard.

54.1.2.2 Ozone-generating equipment used in one- and two-family dwellings or lodging or rooming house occupancies.

Statement of Problem and Substantiation for Public Input

Refer to Public Input No. 39-NFPA 1-2018.

Related Public Inputs for This Document

<table>
<thead>
<tr>
<th>Related Input</th>
<th>Relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Input No. 38-NFPA 1-2018 [Section No. 1.3.1]</td>
<td></td>
</tr>
<tr>
<td>Public Input No. 39-NFPA 1-2018 [Section No. 54.1.2]</td>
<td></td>
</tr>
</tbody>
</table>

Submitter Information Verification

Submitter Full Name: Robert Vaughn
Organization: Fire Protection Engineering
Affiliation: SRS
Street Address: 
City: 
State: 
Zip: 
Submittal Date: Mon Feb 05 13:20:08 EST 2018
Committee: 

Committee Statement

Resolution: The ozone generating equipment is very dangerous and all installations, including existing installations should comply with Chapter 54.
Public Input No. 39-NFPA 1-2018 [Section No. 54.1.2]

54.1.2
Chapter 54 shall not apply to ozone-generating equipment used in one- and two-family dwellings or lodging or rooming house occupancies. the following:

Statement of Problem and Substantiation for Public Input

The relocation of this information from the Appendix to Chapter 54 made this a mandatory requirement. This change is not feasible for existing systems that would create a significant monetary cost to modify/retrofit existing systems to comply with this standard.

Related Public Inputs for This Document

<table>
<thead>
<tr>
<th>Related Input</th>
<th>Relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Input No. 38-NFPA 1-2018 [Section No. 1.3.1]</td>
<td></td>
</tr>
<tr>
<td>Public Input No. 40-NFPA 1-2018 [New Section after 54.1.2]</td>
<td></td>
</tr>
</tbody>
</table>

Submitter Information Verification

Submitter Full Name: Robert Vaughn
Organization: Fire Protection Engineering
Affiliation: SRS
Street Address:
City:
State:
Zip:
Submittal Date: Mon Feb 05 13:16:15 EST 2018
Committee:

Committee Statement

Resolution: The ozone generating equipment is very dangerous and all installations, including existing installations should comply with Chapter 54.
Insert a new 65.3 and renumber the remaining:

65.3 Use of Consumer Fireworks.
65.3.1 In jurisdictions where the use of consumer fireworks by the public is permitted by the law, the use of such consumer fireworks shall comply with this section.
65.3.1.1 Consumer fireworks shall not be discharged on a public road right-of-way without authorization from the jurisdiction.
65.3.1.2 Consumer fireworks shall only be discharged on property where approval has been provided by the property owner of the discharge site and owners of properties located within 150 feet of the discharge site.
65.3.1.3 The discharge of any consumer fireworks aerial devices shall be at least 150 ft away from a building or structure.
65.3.1.4 The discharge of any consumer fireworks shall be at least 500 ft away from a storage of flammable or combustible liquids, flammable or combustible gases or a service station.
65.3.1.5 Consumer fireworks shall only be discharged by those 16 years of age or older.
65.3.1.6 Consumer fireworks shall not be discharged by anyone that is impaired or under the influence of alcohol or recreational drugs.
65.3.1.7 A connected water hose or other water source shall be available to assist in fire control in the direct area where consumer fireworks are being discharged.
65.3.1.8 Users of consumer fireworks shall utilize eye protection.
65.3.1.9 Users of consumer fireworks shall ensure the discharge of aerial devices is directed in a near vertical manner and not over or towards a building, woods or grassland.
65.3.2 The AHJ is authorized to prohibit the use of consumer fireworks when drought conditions exist.
65.3.3 The AHJ or the local Law Enforcement Agency is authorized to confiscate and destroy consumer fireworks when a user has demonstrated an unsafe use practice or has violated this section.

Statement of Problem and Substantiation for Public Input

The provisions in the PI provide for basic mitigation provisions for the use of consumer fireworks by the public. Most of the provisions are intuitive, such as not discharging devices on property one does not own and not shooting devices at or over buildings. Other provisions, such as the 150 foot setback, are based on provisions in existing state regulations.

It is important to note that the language from SC#14-3-31 only restricts NFPA TC's from addressing the storage and sale of consumer fireworks.

Submitter Information Verification

Submitter Full Name: Anthony Apfelbeck
Organization: Altamonte Springs Building/Fire Safety Divisions
Street Address: 
City: 
State: 
Zip: 
Submittal Date: Wed Jan 17 14:49:40 EST 2018
Committee: 

Committee Statement

Resolution: FR-34-NFPA 1-2018
Statement: Consumer fireworks are inherently dangerous and there is generally no safe way for use by the untrained public. It is recognized that state or local jurisdictions may override this requirement.
Public Input No. 129-NFPA 1-2018 [ Section No. 75.1.1 ]

75.1.1
The storage, use, and handling of organic peroxide solids and liquids shall comply with the requirements of Chapter 60.

This is to exempt sodium percarbonate (peroxide) powder containing oxygen generators from this requirement. Rapid Oxygen Company's R15 is a non-explosively activated FDA Class II medical device designated as 'chemical portable oxygen generator.' Since this device must be mechanically activated by both removing protective tape & turning a lever 1/4 turn for emergency oxygen to be produced, it may be safely stored similar to 'Oxyclean' detergent on a supermarket or any public space shelf.

Statement of Problem and Substantiation for Public Input

This exempts safe, emergency oxygen devices from expensive housings, designed for high pressure oxygen cylinders to be stored safely as soap powders.

Submitter Information Verification

Submitter Full Name: Richard Imbruce
Organization: Rapid Oxygen Co
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jun 26 17:04:32 EDT 2018
Committee:

Committee Statement

Resolution: There is no technical substantiation for the exemption proposed and the proposal is proprietary.
Public Input No. 16-NFPA 1-2018 [ New Section after A.1.4.1.1.2 ]

TITLE OF NEW CONTENT
A.1.4.3 The term "practical difficulties" is meant to convey that there is a significant environmental impediment to complying with the code due to existing construction features, topography or other existing constraints that would make compliance technically infeasible. Physical limitations can cause the need for disproportionate effort or expense with little increase in safety. A claimed financial hardship, without a corresponding technical compliance difficulty, would not be justification for requesting a modification to the code or for an AHJ to grant such a modification under this section.

Statement of Problem and Substantiation for Public Input

This annex text provides some added clarity to the language in section 1.4.3 to convey the spirit and intent of the section. The added language will assist the AHJ in interpreting this section to determine how far it is appropriate to go in providing modification allowances.

This PI was modified as a result of comments provided by the TC at the PreROP stage. The language from NFPA 101 stating "Physical limitations can cause..." was added from section A.4.6.5 from NFPA 101.

Submitter Information Verification

Submitter Full Name: Anthony Apfelbeck
Organization: Altamonte Springs Building/Fire Safety Division
Street Address: 
City: 
State: 
Zip: 
Submittal Date: Wed Jan 24 09:41:27 EST 2018
Committee:

Committee Statement

Resolution: FR-2-NFPA 1-2018
Statement: Section 1.4.2 has clear language that states the AHJ is the one that determines if the criteria for an Alternative has been satisfied. That language is lacking in section 1.4.3 for modifications. This revision inserts similar language in section 1.4.3 to ensure this issue has clarity. The new annex text provides some added clarity to the language in section 1.4.3 to convey the spirit and intent of the section. The added language will assist the AHJ in interpreting this section to determine how far it is appropriate to go in providing modification allowances.
A.1.3.2.2
This section provides a basis for regulating an occupancy or hazard not specifically regulated by NFPA 1 or its referenced standards (e.g., retail sales and associated storage of consumer fireworks; wind turbines; amusement structures not defined as special amusement buildings, such as outdoor roller coasters and water slides). The AHJ has the authority to use any available resource and its own discretion to develop an appropriate protection scheme, including use of the provisions of Chapter 1, Administration; Chapter 4, Goals and Objectives; Chapter 5, Performance-Based Option; or other nationally recognized standards as indicated in 1.3.2.2 to regulate such occupancies or hazards.

Statement of Problem and Substantiation for Public Input

Two Public Inputs have been submitted to NFPA 1124 to re-institute Chapters 6 and 7 addressing consumer fireworks. The Public Input references fire testing to be performed under the direction of Factory Mutual that will supplement the fire testing that was previously performed regarding sprinkler performance and consumer fireworks. The testing may not be done prior to the First Draft meeting but is scheduled to be completed prior to the Second Draft meeting of this Committee.

There is a companion Public Input to undo what was done by a TIA to the 2015 Edition so that consumer fireworks are properly addressed in NFPA 1. Presently, fire officials are provided with no guidance other than this Annex note and an annex note regarding using the performance based approach for consumer fireworks facilities.

Related Public Inputs for This Document

<table>
<thead>
<tr>
<th>Related Input</th>
<th>Relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Input No. 139-NFPA 1-2018 [Global Input]</td>
<td></td>
</tr>
</tbody>
</table>

Submitter Information Verification

Submitter Full Name: William Koffel
Organization: Koffel Associates, Inc.
Affiliation: American Pyrotechnics Association
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 27 10:40:52 EDT 2018
Committee:

Committee Statement

Resolution: NFPA 1124 has been moved to the A2021 revision cycle. The Committee reviewed the submitter's request but no action can be taken with NFPA 1 at this time.
A.4.1.1
These highest level goals are intentionally general in nature. Each includes a broad spectrum of topics as shown in 4.1.3. The property protection goal is not just a goal unto itself, as it is also achieved in part as a result of designing to achieve the other stated goals. A reasonable level of safety is further defined by subsequent language in the Code. The facility/property owner or an insurance representative might also have other goals, which might necessitate more stringent objectives as well as more demanding criteria. The safety from security threats goal of this Code shall be to provide an environment for the occupants in a building or facility and to those adjacent to a building or facility that is reasonably safe from criminal threats to life safety from intruders intending to harm building occupants. This goal shall ensure protection requirements balance the need for intruder protection with emergency evacuation as identified in NFPA 731 and NFPA 3000.

Statement of Problem and Substantiation for Public Input

This proposal expands the scope of the fire code to recognize and address occupant risks associated with intruders who seek to kill or injury occupants while maintaining the original the intent of building, fire, and life safety codes. This language will ensure that long standing model code requirements that allow rapid evacuation and a safe means of egress for building occupants are not compromised by implementation of security or lockdown measures.

Related Public Inputs for This Document

<table>
<thead>
<tr>
<th>Related Input</th>
<th>Relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Input No. 92-NFPA 1-2018 [Section No. 1.2]</td>
<td></td>
</tr>
<tr>
<td>Public Input No. 95-NFPA 1-2018 [Section No. 4.1.1]</td>
<td></td>
</tr>
<tr>
<td>Public Input No. 96-NFPA 1-2018 [Section No. 4.1.3]</td>
<td></td>
</tr>
</tbody>
</table>

Submitter Information Verification

Submitter Full Name: Kelly Nicolello
Organization: UL LLC
Street Address:  
City:  
State:  
Zip:  
Submittal Date: Mon Jun 25 14:47:42 EDT 2018
Committee:  

Committee Statement

Resolution: FR-50-NFPA 1-2018
Statement: New text provides clarification on the application of the Fire Code with regards to addressing security. Today, there is an ever growing need for model codes to balance the fire related provisions for building safety, life safety, fire fighter safety with the security. This language clarifies that it is not the primary consideration of this Code to address security threat mitigation. It may be addressed indirectly through other provisions. See also the new text for Section A.1.1. It should be noted that this issue is very important to the development of NFPA 1, 101 and 5000. NFPA 1 will continue to address this topic through the revision cycle as well as monitor any developments of NFPA 101 and NFPA 5000 for consistency.
A.5.1
The performance option of this Code establishes acceptable levels of risk for facilities (i.e., buildings and other structures and the operations therewith associated) as addressed in Section 1.3. (Note that “facility” and “building” can be used interchangeably with facility being the more general term.) While the performance option of this Code does contain goals, objectives, and performance criteria necessary to provide for an acceptable level of risk, it does not describe how to meet these goals, objectives, and performance criteria. Design and engineering are needed to meet the provisions of Chapter 5. For fire protection designs, the SFPE Engineering Guide to Performance-Based Fire Protection: Analysis and Design of Buildings provides a framework for these assessments. Pre-construction design requirements address those issues, which have to be considered before the certificate of occupancy is issued for a facility.

Statement of Problem and Substantiation for Public Input

Edit needed to provide correct title of the SFPE Guide.

Submitter Information Verification

Submitter Full Name: Chris Jelenewicz
Organization: Society of Fire Protection Eng
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jun 26 11:35:09 EDT 2018
Committee:

Committee Statement

Resolution: FR-81-NFPA 1-2018
Statement: Edit needed to provide correct title of the SFPE Guide.
A.5.1.4
The SFPE Engineering Guide to Performance-Based Fire Protection, *Analysis and Design of Buildings*, outlines a process for using a performance-based approach in the design and assessment of building fire safety design and identifies parameters that should be considered in the analysis of a performance-based design. As can be seen, this process requires the involvement of all stakeholders who have a share or interest in the successful completion of the project. The steps that are recommended by the SFPE Engineering Guide to Performance-Based Fire Protection, *Analysis and Design of Buildings*, for this process are shown in Figure A.5.1.4.

The guide specifically addresses building fire safety performance-based design. It might not be directly applicable to performance-based designs involving other systems and operations covered within this Code, such as hot work operations or hazardous materials storage. However, the various steps for defining, developing, evaluating, and documenting the performance-based design should still provide a useful framework for the overall design process.

**Figure A.5.1.4 Steps in the Performance-Based Analysis and the Conceptual Design Procedure for Fire Protection Design.**

The steps in the performance-based design process are as follows:

1. **Step 1: Defining Project Scope.** The first step in a performance-based design is to define the scope of the project. Defining the scope consists of identifying and documenting the following:
   
   (2) **Constraints on the design and project schedule**
   
   (3) **The stakeholders associated with project**
   
   (4) **The proposed building construction and features desired by the owner or tenant**
   
   (5) **Occupant and building characteristics**
   
   (6) **The intended use and occupancy of the building**
   
   (7) **Applicable codes and regulations**

   An understanding of these items is needed to ensure that a performance-based design meets the stakeholders' needs.

2. **Step 2: Identifying Goals.** Once the scope of the project is defined, the next step in the performance-
based design process is to identify and document the fire safety goals of various stakeholders. Fire safety goals could include levels of protection for people and property, or they could provide for continuity of operations, historical preservation, and environmental protection. Goals could be unique for different projects, based on the stakeholders needs and desires. The stakeholders should discuss which goals are the most important for the project. In order to avoid problems later in the design process, all stakeholders should be aware of and agree to the goals prior to proceeding with the performance-based design process (see Step 7).

(9) **Step 3: Defining Stakeholder and Design Objectives.** The third step in the design process is to develop objectives. The objectives are essentially the design goals that are further refined into tangible values that can be quantified in engineering terms. Objectives could include mitigating the consequences of a fire expressed in terms of dollar values, loss of life, or other impact on property operations, or maximum allowable conditions, such as extent of fire spread, temperature, spread of combustion products, and so forth.

(10) **Step 4: Developing Performance Criteria.** The fourth step in the design process is the development of performance criteria to be met by the design. These criteria are a further refinement of the design objectives and are numerical values to which the expected performance of the trial designs can be compared. Performance criteria could include threshold values for temperatures of materials, gas temperatures, carboxyhemoglobin (COHb) levels, smoke obscuration, and thermal exposure levels.

(11) **Step 5: Developing Design Scenarios.** Once the performance criteria have been established, the engineer will develop and analyze design alternatives to meet performance criteria. The first part of this process is the identification of possible scenarios and design scenarios. Fire scenarios are descriptions of possible fire events, and consist of fire characteristics, building characteristics (including facility operations), and occupant characteristics. The fire scenarios identified will subsequently be filtered (i.e., combined or eliminated) into a subset of design fire scenarios against which trial designs will be evaluated. Hazardous materials scenarios can be treated similarly.

(12) **Step 6: Developing Trial Design(s).** Once the project scope, performance criteria, and design scenarios are established, the engineer develops preliminary designs, referred to as trial designs, intended to meet the project requirements. The trial design(s) include proposed fire protection systems, construction features, and operation that are provided in order for a design to meet the performance criteria when evaluated using the design fire scenarios. The evaluation method should also be determined at this point. The evaluation methods used should be appropriate for the situation and agreeable to the stakeholders.

(13) **Step 7: Developing a Fire Protection Engineering Design Brief.** At this point in the process a fire protection engineering design brief should be prepared and provided to all stakeholders for their review and concurrence. This brief should document the project scope, goals, objectives, trial designs, performance criteria, design fire scenarios, and analysis methods. Documenting and agreeing upon these factors at this point in the design process will help avoid possible misunderstandings later.

(14) **Step 8: Evaluating Trial Designs.** Each trial design is then evaluated using each design scenario. The evaluation results will indicate whether the trial design will meet the performance criteria. Only trial design(s) that meet the performance criteria can be considered as final design proposals. Yet, the performance criteria can be revised with the stakeholders' approval. The criteria cannot be arbitrarily changed to ensure that a trial design meets a criterion, but can be changed based on additional analysis and the consideration of additional data.

(15) **Step 9: Modifying Designs or Objectives.** If none of the trial designs evaluated comply with the previously agreed upon performance criteria, it could be necessary to either develop and evaluate new trial designs, or revisit the objectives and performance criteria previously agreed upon by the stakeholders to determine if stakeholder objectives and performance criteria should be modified.

(16) **Step 10: Selecting the Final Design.** Once an acceptable trial design is identified using the evaluation, it can be considered for the final project design. If multiple trial designs are evaluated, further analysis will be needed to select a final design. The selection of an acceptable trial design for the final design could be based on a variety of factors, such as financial considerations, timeliness of installation, system and material availability, ease of installation, maintenance and use, and other factors.

(17) **Step 11: Preparing Performance-Based Design Report.** Once the final design is identified, design documents need to be prepared. Proper documentation will ensure that all stakeholders understand what is necessary for the design implementation, maintenance, and continuity of the fire protection design. The documentation should include the fire protection engineering design brief, a performance design report, detailed specifications and drawings, and a facility operations and maintenance manual.

(18) **Step 12: Preparing Specifications, Drawings, and Operations and Maintenance Manual.** The specifications and drawings portion of the performance-based design report convey to building and system designers and installing contractors how to implement the performance design. Specifications and drawings could include required sprinkler densities, hydraulic characteristics and spacing requirements, the fire detection and alarm system components and programming, special construction
requirements including means of egress and location of fire-resistive walls, compartmentation, and the coordination of interactive systems. The detailed specifications are the implementation document of the performance-based design report. The detailed drawings will graphically represent the results of the performance design. The Operations and Maintenance (O&M) Manual clearly states the requirement of the facility operator to ensure that the components of the performance design are in place and operating properly. The O&M Manual describes the commissioning requirements and the interaction of the different systems' interfaces. All subsystems are identified, and inspection and testing regimes and schedules are created.

The O&M Manual also gives instruction to the facility operator on restrictions placed on facility operations. These limitations are based on the engineering assumptions made during the design and analysis. These limiting factors could include critical fire load, sprinkler design requirements, building use and occupancy, and reliability and maintenance of systems. The O&M Manual can be used to communicate to tenants and occupants these limits and their responsibilities as a tenant. It could also be used as a guide for renovations and changes. It also can be used to document agreements between stakeholders.

**Statement of Problem and Substantiation for Public Input**

Edits needed to provide the correct title of the SFPE Guide.

**Submitter Information Verification**

**Submitter Full Name:** Chris Jelenewicz  
**Organization:** Society of Fire Protection Eng  
**Street Address:**  
**City:**  
**State:**  
**Zip:**  
**Submittal Date:** Tue Jun 26 11:37:29 EDT 2018

**Committee Statement**

**Resolution:** FR-82-NFPA 1-2018  
**Statement:** Edits needed to provide the correct title of the SFPE Guide.
A third-party reviewer is a person or group of persons chosen by the AHJ to review proposed performance-based designs. Qualifications of the third-party reviewer should include experience, education, and credentials that demonstrate knowledgeable and responsible use of applicable models and methods. The SFPE Guide for Peer Review in the Fire Protection Design Process provides a method for the initiation, scope, conduct and report of a peer review for a fire protection engineering design.

**Statement of Problem and Substantiation for Public Input**

The SFPE Guide will assist the designer and the AHJ in developing a plan for conducting a third-party review.

**Submitter Information Verification**

- **Submitter Full Name:** Chris Jelenewicz
- **Organization:** Society of Fire Protection Eng
- **Street Address:**
- **City:**
- **State:**
- **Zip:**
- **Submittal Date:** Tue Jun 26 11:47:10 EDT 2018
- **Committee:**

**Committee Statement**

- **Resolution:** FR-83-NFPA 1-2018
- **Statement:** The SFPE Guide will assist the designer and the AHJ in developing a plan for conducting a third-party review.
A.5.2.2.8
Performance-based design of structural fire resistance requires three major steps: (1) determination of the thermal exposure to a structure resulting from a fire, (2) determination of the temperature history within the structure, or portion thereof, and (3) determination of the structural response. SFPE Standard S.01 Calculating Fire Exposures to Structures provides methodologies to predict thermal boundary conditions for fully developed fires to a structure (Step 1). SFPE Standard S.02 Calculation Methods to Predict the Thermal Performance of Structural and Fire Resistive Assemblies provides to predict the thermal response of structures (Step 2). ASCE/SEI 7-16 Appendix E (Performance-Based Design Procedures for Fire Effects on Structures) provides a methodologies to predict the structural response (Step 3).

Statement of Problem and Substantiation for Public Input

The suggested content for A.5.2.2.8 outlines a process on how to conduct a performance-based approach to structural fire protection engineering. The three documents suggested will help in ensuring a consistent process is adopted for structural fire protection engineering.

Submitter Information Verification

Submitter Full Name: Chris Jelenewicz
Organization: Society of Fire Protection Eng
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jun 26 12:06:25 EDT 2018
Committee:

Committee Statement

Resolution: FR-100-NFPA 1-2018
Statement: The suggested content for A.5.2.2.8 outlines a process on how to conduct a performance-based approach to structural fire protection engineering. The three documents suggested will help in ensuring a consistent process is adopted for structural fire protection engineering.
A.5.4.1.2


Statement of Problem and Substantiation for Public Input

Edit needed to indicate correct title of the SFPE Guide.

Submitter Information Verification

Submitter Full Name: Chris Jelenewicz
Organization: Society of Fire Protection Eng
Street Address: 
City: 
State: 
Zip: 
Submittal Date: Tue Jun 26 12:22:17 EDT 2018
Committee: 

Committee Statement

Resolution: FR-85-NFPA 1-2018
Statement: Edit needed to indicate correct title of the SFPE Guide.
Public Input No. 119-NFPA 1-2018 [ New Section after A.5.4.5.1 ]

A. 5.5.3.1
The SFPE Handbook of Fire Protection Engineering provides a listing of typical input data that can be in a performance-based fire protection design.

Statement of Problem and Substantiation for Public Input

The SFPE Handbook provides a comprehensive listing of possible input data that engineers can use for a fire protection analysis.

Submitter Information Verification

Submitter Full Name: Chris Jelenewicz
Organization: Society of Fire Protection Eng
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jun 26 12:28:21 EDT 2018
Committee:

Committee Statement

Resolution: FR-101-NFPA 1-2018
Statement: The SFPE Handbook provides a comprehensive listing of possible input data that engineers can use for a fire protection analysis.
Public Input No. 123-NFPA 1-2018 [ New Section after A.5.4.5.1 ]

A.5.5.5
The SFPE Guide for Substantiating a Fire Model for a Given Application provides a framework for ensuring a selected fire model is valid and verified for a specific application.

Statement of Problem and Substantiation for Public Input

The SFPE Guide has a specific chapter on how to ensure a selected fire model is validated and verified. Referencing this guide will ensure that a standardized approach will be used in the industry.

Submitter Information Verification

Submitter Full Name: Chris Jelenewicz
Organization: Society of Fire Protection Eng
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jun 26 12:48:40 EDT 2018
Committee:

Committee Statement

Resolution: FR-102-NFPA 1-2018
Statement: The SFPE Guide has a specific chapter on how to ensure a selected fire model is validated and verified. Referencing this guide will ensure that a standardized approach will be used in the industry.
The assessment of precision required in 5.7.2 requires a sensitivity and uncertainty analysis, which can be translated into safety factors.

**Sensitivity Analysis.** The first run a model user makes should be labeled as the base case, using the nominal values of the various input parameters. However, the model user should not rely on a single run as the basis for any performance-based fire safety system design. Ideally, each variable or parameter that the model user made to develop the nominal input data should have multiple runs associated with it, as should combinations of key variables and parameters. Thus, a sensitivity analysis should be conducted that provides the model user with data that indicates how the effects of a real fire could vary and how the response of the proposed fire safety design could also vary.

The interpretation of a model's predictions can be a difficult exercise if the model user does not have knowledge of fire dynamics or human behavior.

**Reasonableness Check.** The model user should first try to determine whether the predictions actually make sense, that is, they don't upset intuition or preconceived expectations. Most likely, if the results don't pass this test, an input error has been committed.

Sometimes the predictions appear to be reasonable but are, in fact, incorrect. For example, a model can predict higher temperatures farther from the fire than close to it. The values themselves could be reasonable, for example, they are not hotter than the fire, but they don't "flow" down the energy as expected.

A margin of safety can be developed using the results of the sensitivity analysis in conjunction with the performance criteria to provide the possible range of time during which a condition is estimated to occur.

Safety factors and margin of safety are two concepts used to quantify the amount of uncertainty in engineering analyses. Safety factors are used to provide a margin of safety and represent, or address, the gap in knowledge between the theoretically perfect model, that is, reality and the engineering models that can only partially represent reality.

Safety factors can be applied to either the predicted level of a physical condition or to the time at which the condition is predicted to occur. Thus, a physical or a temporal safety factor, or both, can be applied to any predicted condition. A predicted condition (that is, a parameter's value) and the time at which it occurs are best represented as distributions. Ideally, a computer fire model predicts the expected or nominal value of the distribution. Safety factors are intended to represent the spread of these distributions.

Given the uncertainty associated with data acquisition and reduction, and the limitations of computer modeling, any condition predicted by a computer model can be thought of as an expected or nominal value within a broader range. For example, an upper layer temperature of 1110°F (600°C) is predicted at a given time. If the modeled scenario is then tested (that is, full-scale experiment based on the computer model's input data), the actual temperature at that given time could be 1185°F or 1085°F (640°C or 585°C). Therefore, the temperature should be reported as 1110°F + 75°F, –25°F (600°C + 40°C, –15°C) or as a range of 1085°F to 1184°F (585°C to 640°C).

Ideally, predictions are reported as a nominal value, a percentage, or an absolute value. As an example, an upper layer temperature prediction could be reported as 1112°F (600°C), 86°F (30°C) or 1112°F (600°C), 5 percent. In this case, the physical safety factor is 0.05 (that is, the amount by which the nominal value should be degraded and enhanced). Given the state-of-the-art of computer fire modeling, this is a very low safety factor. Physical safety factors tend to be on the order of tens of percent. A safety factor of 50 percent is not unheard of.

Part of the problem in establishing safety factors is that it is difficult to state the percentage or range that is appropriate. These values can be obtained when the computer model predictions are compared to test data. However, using computer fire models in a design mode does not facilitate this since (1) the room being analyzed has not been built yet and (2) test scenarios do not necessarily depict the intended design.

A sensitivity analysis should be performed based on the assumptions that affect the condition of interest. A base case that uses all nominal values for input parameters should be developed. The input parameters should be varied over reasonable ranges, and the variation in predicted output should be noted. This output variation can then become the basis for physical safety factors.

The temporal safety factor addresses the issue of when a condition is predicted and is a function of the rate at which processes are expected to occur. If a condition is predicted to occur 2 minutes after the start of the fire, then this can be used as a nominal value. A process similar to that described for physical safety factors can also be employed to develop temporal safety factors. In this case, however, the rates (for example, of heat release and toxic product generation) will be varied instead of absolute values (for example, material properties).

The margin of safety can be thought of as a reflection of societal values and can be imposed by the AHJ for that purpose. Since the time for which a condition is predicted is most likely the focus of the AHJ (for example, the model predicts occupants have 5 minutes to safely evacuate), the margin of safety is characterized by temporal aspects and tacitly applied to the physical margin of safety.
Escaping the harmful effects of fire (or mitigating them) is, effectively, a race against time. When assessing fire safety system designs based on computer model predictions, the choice of an acceptable time is important. When an AHJ is faced with the predicted time of untenability, a decision needs to be made regarding whether sufficient time is available to ensure the safety of facility occupants. The AHJ is assessing the margin of safety. Is there sufficient time to get everyone out safely? If the AHJ feels that the predicted egress time is too close to the time of untenability, then the AHJ can impose an additional time that the designer has to incorporate into the system design. In other words, the AHJ can impose a greater margin of safety than that originally proposed by the designer.

The SFPE Handbook of Fire Protection Engineering has a discussion on the use of safety factors and the evaluation of uncertainty in a performance-based design.

Statement of Problem and Substantiation for Public Input

When conducting a performance-based fire protection design, an understanding of the uncertainties can be important. The overview of the methods that can be used to evaluate uncertainties outlined in the SFPE Handbook ensures that an adequate process is implemented.

Submitter Information Verification

Submitter Full Name: Chris Jelenewicz
Organization: Society of Fire Protection Eng
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jun 26 12:36:59 EDT 2018
Committee:

Committee Statement

Resolution: FR-88-NFPA 1-2018
Statement: When conducting a performance-based fire protection design, an understanding of the uncertainties can be important. The overview of the methods that can be used to evaluate uncertainties outlined in the SFPE Handbook ensures that an adequate process is implemented.
Public Input No. 121-NFPA 1-2018 [ Section No. A.5.7.1 ]

A.5.7.1

The SFPE Engineering Guide to Performance-Based Fire Protection. Analysis and Design of Buildings describes the documentation that should be provided for a performance-based design.

Proper documentation of a performance design is critical to the design acceptance and construction. Proper documentation also ensures that all parties involved understand what is necessary for the design implementation, maintenance, and continuity of the fire protection design. If attention to details is maintained in the documentation, then there should be little dispute during approval, construction, start-up, and use.

Poor documentation could result in rejection of an otherwise good design, poor implementation of the design, inadequate system maintenance and reliability, and an incomplete record for future changes or for testing the design forensically.

Statement of Problem and Substantiation for Public Input

Edit needed to indicate the correct version of the SFPE Guide.

Submitter Information Verification

Submitter Full Name: Chris Jelenewicz
Organization: Society of Fire Protection Eng
Street Address: 
City: 
State: 
Zip: 
Submittal Date: Tue Jun 26 12:41:32 EDT 2018
Committee: 

Committee Statement

Resolution: FR-89-NFPA 1-2018
Statement: Edit needed to indicate the correct version of the SFPE Guide.
A.5.7.11 Documentation for modeling should conform to ASTM E1472, Standard Guide for Documenting Computer Software for Fire Models, although most, if not all, models were originally developed before this standard was promulgated and the SFPE Guide for Substantiating a Fire Model for a Given Application.

Statement of Problem and Substantiation for Public Input

The deleted part of the comment is no longer true as models have been developed since the referenced standard was published. Also, the SFPE Guide provides a framework that is specifically focused on fire models.

Submitter Information Verification

Submitter Full Name: Chris Jelenewicz
Organization: Society of Fire Protection Eng
Street Address: 
City: 
State: 
Zip: 
Submittal Date: Tue Jun 26 12:44:48 EDT 2018
Committee: 

Committee Statement

Resolution: FR-90-NFPA 1-2018
Statement: The deleted part of the comment is no longer true as models have been developed since the referenced standard was published. Also, the SFPE Guide provides a framework that is specifically focused on fire models.
A.10.13.3

A qualitative example of acceptable fire retardance performance is for the individual decorative artificial vegetation item to exhibit a maximum heat release rate of 100 kilowatts (kW) when tested in accordance with UL 1975, Standard for Fire Tests for Foamed Plastics Used for Decorative Purposes, or NFPA 289 using the 20 kW ignition source. Another example of acceptable fire retardance is for the individual artificial Christmas trees, such as a Christmas tree, when exposed to the flames from 1 lb of shredded newspaper distributed around the tree, to meet the following three criteria:

1. To have flames that do not extend more than 3 ft (0.9 m) above the tree
2. To have no significant lateral flame spread away from the area affected by the ignition source
3. To have no flaming droplets that continue flaming after reaching the floor

Statement of Problem and Substantiation for Public Input

This public input is associated with the public input 73 on section 10.13.3 and it eliminates the recommended requirement, which is being moved to the body of the code. The other change proposed is to state that the method with the newspaper, that remains in this annex, is a qualitative test.

Related Public Inputs for This Document

<table>
<thead>
<tr>
<th>Related Input</th>
<th>Relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Input No. 73-NFPA 1-2018 [Section No. 10.13.3]</td>
<td></td>
</tr>
<tr>
<td>Public Input No. 73-NFPA 1-2018 [Section No. 10.13.3]</td>
<td></td>
</tr>
</tbody>
</table>

Submitter Information Verification

<table>
<thead>
<tr>
<th>Submitter Full Name:</th>
<th>Marcelo Hirschler</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organization:</td>
<td>GBH International</td>
</tr>
<tr>
<td>Street Address:</td>
<td></td>
</tr>
<tr>
<td>City:</td>
<td></td>
</tr>
<tr>
<td>State:</td>
<td></td>
</tr>
<tr>
<td>Zip:</td>
<td></td>
</tr>
<tr>
<td>Submittal Date:</td>
<td>Tue Jun 05 19:35:51 EDT 2018</td>
</tr>
<tr>
<td>Committee:</td>
<td></td>
</tr>
</tbody>
</table>

Committee Statement

<table>
<thead>
<tr>
<th>Resolution:</th>
<th>FR-54-NFPA 1-2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Statement:</td>
<td>The proposed change brings in actual verifiable requirements instead of vague unenforceable criteria. The requirements based on NFPA 701 are similar to those contained in Chapter 12 for furnishings and decorations, and decorative vegetation is a decoration. The requirements based on NFPA 289 or on UL 1975 are recommendations from the annex that are being brought into the body. The title change is because the term &quot;fire retardance&quot; is a function of the actual criterion. (5) is being added to address those artificial vegetation that may be all noncombustible. Annex: This public input is associated with the public input 73 on section 10.13.3 and it eliminates the recommended requirement, which is being moved to the body of the code. The other change proposed is to state that the method with the newspaper, that remains in this annex, is a qualitative test.</td>
</tr>
</tbody>
</table>

Page 269 of 290
The SFPE Engineering Guide to Fire Risk Assessment provides a methodology on how to evaluate the fire risks associated with the conditions outlined in Section 10.14.3.2.

Statement of Problem and Substantiation for Public Input

The SFPE Guide provides a methodology on conducting a risk assessment related to the identified conditions. This methodology will help ensure these types of evaluations are conducted in a consistent manor.

Submitter Information Verification

Submitter Full Name: Chris Jelenewicz
Organization: Society of Fire Protection Eng
Street Address: 
City: 
State: 
Zip: 
Submittal Date: Tue Jun 26 13:37:24 EDT 2018
Committee: 

Committee Statement

Resolution: FR-103-NFPA 1-2018
Statement: The SFPE Guide provides a methodology on conducting a risk assessment related to the identified conditions. This methodology will help ensure these types of evaluations are conducted in a consistent manor.
A.10.14.3.1

Life safety evaluations are examples of performance-based approaches to life safety. In this respect, significant guidance in the form and process of life safety evaluations is provided by Chapter 5 of NFPA 101, keeping in mind the fire safety emphasis in Chapter 5 of NFPA 101. Performance criteria, scenarios, evaluation, safety factors, documentation, maintenance, and periodic assessment (including a warrant of fitness) all apply to the broader considerations in a life safety evaluation. A life safety evaluation deals not only with fire but also with storms, collapse, crowd behavior, and other related safety considerations for which a checklist is provided in A.10.14.3.3. Chapter 5 of NFPA 101 provides guidance, based on fire safety requirements, for establishing a documented case showing that products of combustion in all conceivable fire scenarios will not significantly endanger occupants using means of egress in the facility (for example, due to fire detection, automatic suppression, smoke control, large-volume space, or management procedures). Moreover, means of egress facilities plus facility management capabilities should be adequate to cope with scenarios where certain egress routes are blocked for some reason. [101:A.12.4.1.1]

In addition to making realistic assumptions about the capabilities of persons in the facility (e.g., an assembled crowd including many disabled persons or persons unfamiliar with the facility), the life safety evaluation should include a factor of safety of not less than 2.0 in all calculations relating to hazard development time and required egress time (the combination of flow time and other time needed to detect and assess an emergency condition, initiate egress, and move along the egress routes). The factor of safety takes into account the possibility that half of the egress routes might not be used (or be usable) in certain situations. [101:A.12.4.1.1]

Regarding crowd behavior, the potential hazards created by larger masses of people and greater crowd densities (which can be problematic during ingress, occupancy, and egress) demand that technology be used by designers, managers, and authorities responsible for buildings to compensate for the relaxed egress capacity provisions of Table 12.4.2.3 of NFPA 101. In very large buildings for assembly use, the hazard of crowd crushes can exceed that of fire or structural failure. Therefore, the building designers, managers, event planners, security personnel, police authorities, and fire authorities, as well as the building construction authorities, should understand the potential problems and solutions, including coordination of their activities. For crowd behavior, this understanding includes factors of space, energy, time, and information, as well as specific crowd management techniques, such as metering. Published guidance on these factors and techniques is found in the SFPE Handbook of Fire Protection Engineering, Section 3 Chapter 59 - Chapter 13, pp. 32115 - 342 - 3366 (Proulx, G., "Movement of People" 2151 (Gwynne and Rosenbaum, "Employing the Hydraulic Model in Assessing Emergency Movement"), and the publications referenced therein. [101:A.12.4.1.1]

Table 12.2.3.2 and Table 12.4.2.3 of NFPA 101 are based on a linear relationship between number of seats and nominal flow time, with not less than 200 seconds (3.3 minutes) for 2000 seats plus 1 second for every additional 50 seats up to 25,000. Beyond 25,000 total seats, the nominal flow time is limited to 660 seconds (11 minutes). Nominal flow time refers to the flow time for the most able group of patrons; some groups less familiar with the premises or less able groups might take longer to pass a point in the egress system. Although three or more digits are noted in the tables, the resulting calculations should be assumed to provide only two significant figures of precision. [101:A.12.4.1.1]

Statement of Problem and Substantiation for Public Input

Edit need to indicate correct chapter in the current edition of the SFPE Handbook.

Submitter Information Verification

Submitter Full Name: Chris Jelenewicz
Organization: Society of Fire Protection Eng
Street Address:
City:
State:
Zip:
Committee Statement

Resolution: Revisions cannot be made to extracted text. The submitter should direct his proposed changes to the source document, NFPA 101.
A.14.8.3.2

The effective capacity of stairways has been shown by research to be proportional to the effective width of the stairway, which is the nominal width minus 12 in. (305 mm). This phenomenon, and the supporting research, were described in the chapter, "Employing the Hydraulic Model in Assessing Emergency Movement" in the fifth edition of the SFPE Handbook of Fire Protection Engineering and was also addressed in Appendix D of the 1985 edition of NFPA 101, among several other publications. In 1988, this appendix was moved to form Chapter 2 of the 1988 edition of NFPA 101M, Alternative Approaches to Life Safety. (This document was later designated as NFPA 101A and this chapter remained in the document through the 1998 edition.) In essence, the effective width phenomenon recognizes that there is an edge or boundary effect at the sides of a circulation path. It has been best examined in relation to stairway width, where the edge effect was estimated to be 6 in. (150 mm) on each side, but a similar phenomenon occurs with other paths, such as corridors and doors, although quantitative estimates of their edge effect are not as well established as they have been for stairways, at least those stairways studied in Canada during the late 1960s through the 1970s in office building evacuation drills and in crowd movement in a variety of buildings with assembly occupancy. [101:A.7.3.3.2]

More recent studies have not been performed to determine how the edge effect might be changing (or has changed) with demographic changes to larger, heavier occupants moving more slowly, and thus swaying laterally, to maintain balance when walking. The impact of such demographic changes, which are significant and influential for evacuation flow and speed of movement on stairs, for example, has the effect of increasing the time of evacuation in a way that affects all stair widths, but will be most pronounced for nominal widths less than 56 in. (1422 mm). [101:A.7.3.3.2]

Without taking into account occupant demographic changes in the last few decades that affect evacuation performance, especially on stairs, the formula for enhanced capacity of stairways wider than 44 in. (1120 mm) assumes that any portion of the nominal width greater than 44 in. (1120 mm) is as effective proportionally as the effective width of a nominal 44 in. (1120 mm) stair, that is, 32 in. (810 mm). Thus, the denominator (0.218) in the equation is simply the effective width of 32 in. (810 mm) divided by the capacity of 147 persons that is credited, by the 0.3 in. (7.6 mm) capacity factor in Table A.14.8.3.2, to the corresponding nominal width, 44 in. (1120 mm). [101:A.7.3.3.2]

The resulting permitted stairway capacities, based on occupant load of single stories (in accordance with 7.3.1.4 of NFPA 101), for several stairway widths are shown in Table A.14.8.3.2. [101:A.7.3.3.2]

Table A.14.8.3.2 Stairway Capacities

<table>
<thead>
<tr>
<th>Permitted Capacity</th>
<th>Nominal Width</th>
<th>Clear Width Between Handrails</th>
<th>Effective Width</th>
</tr>
</thead>
<tbody>
<tr>
<td>(no. of persons)</td>
<td>in.</td>
<td>mm</td>
<td>in.</td>
</tr>
<tr>
<td>120 (^b)</td>
<td>36</td>
<td>915</td>
<td>- 28</td>
</tr>
<tr>
<td>147</td>
<td>44</td>
<td>1120</td>
<td>- 36</td>
</tr>
<tr>
<td>202</td>
<td>56</td>
<td>1420</td>
<td>- 48</td>
</tr>
<tr>
<td>257</td>
<td>68</td>
<td>1725</td>
<td>- 60</td>
</tr>
</tbody>
</table>

\(^a\) A reasonable handrail incursion of only 4 in. (100 mm), into the nominal width, is assumed on each side of the stair, although 7.3.3.2 of NFPA 101 permits a maximum incursion of 4½ in. (114 mm) on each side. 

\(^b\) Other Code sections limit the occupant load for such stairs more severely, (e.g., 50 persons in 7.2.2.1.2 of NFPA 101). Such lower limits are partly justified by the relatively small effective width of such stairs, which, if taken into account by Table 7.3.3.1 of NFPA 101, would result in a correspondingly low effective capacity of only 110 persons (24 divided by 0.218), or a more realistic capacity factor of 0.327, applicable to nominal width.

\(^c\) A clear width of 60 in. (1525 mm) is the maximum permitted by the handrail reachability criteria of 7.2.2.4.1.2 of NFPA 101. Although some prior editions of the Code permitted wider portions of stairs [up to 88 in. (2240 mm), between handrails], such wider portions are less effective for reasonably safe crowd flow and generally should not be used for major crowd movement. To achieve the maximum possible, reasonably safe egress capacity for such stairs, retrofit of an intermediate — not necessarily central — handrail is recommended; for example, with an intermediate handrail located 36 in. (915 mm) from the closest side handrail. In this case, the effective capacity would be 358 persons for the formerly permitted, now retrofitted, stair. This is based on a retrofitted, effective width of about 78 in. (1980 mm) [subtracting 2 in. (51 mm) from each usable side of a handrail and assuming a 2 in. (51 mm) wide, retrofitted intermediate handrail]. [101:A.7.3.3.2]
Statement of Problem and Substantiation for Public Input

Edit need to reference correct chapter in the current edition of the SFPE Handbook

Submitter Information Verification

Submitter Full Name: Chris Jelenewicz
Organization: Society of Fire Protection Eng
Street Address: 
City: 
State: 
Zip: 
Submittal Date: Tue Jun 26 13:04:30 EDT 2018
Committee: 

Committee Statement

Resolution: Changes cannot be made to extracted text. Submitter should propose his changes to the source document, NFPA 101.
**Public Input No. 147-NFPA 1-2018 [Section No. A.52.2]**

**A.52.2**
The requirements in Section 52.2 supersede all the hazardous material designations, permits, and requirements in Chapter 60.

Aqueous batteries are those that utilize water-based electrolytes. The most familiar of these are traditional vented lead-acid batteries, but they also include Valve Regulated Lead-Acid (VRLA), nickel-cadmium, nickel-zinc and nickel-iron. The requirements in this section address the hazardous unique to aqueous type batteries.

**Statement of Problem and Substantiation for Public Input**
The added annex material provides clarity on the application of section 52.2 and the types of batteries to which these requirements pertain.

**Related Public Inputs for This Document**

<table>
<thead>
<tr>
<th>Related Input</th>
<th>Relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Input No. 137-NFPA 1-2018 [Section No. 52.2]</td>
<td>Annex material clarifies the language added to the body of the code.</td>
</tr>
</tbody>
</table>

**Submitter Information Verification**

- **Submitter Full Name:** Richard Kluge
- **Organization:** Ericsson
- **Affiliation:** ATIS
- **Street Address:**
- **City:**
- **State:**
- **Zip:**
- **Submittal Date:** Wed Jun 27 15:14:11 EDT 2018
- **Committee:**

**Committee Statement**

- **Resolution:** CI-35-NFPA 1-2018
- **Statement:** NFPA 855 is not complete but will be by NFPA 1 second draft meeting. This will allow the material to be extracted at the second draft meeting.
The following sample ordinance is provided to assist a jurisdiction in the adoption of this Code and is not part of this Code.

ORDINANCE NO. ________________

An ordinance of the [jurisdiction] adopting the [year] edition of NFPA 1, Fire Code, 2015-2021 edition; and documents listed in Chapter 2 of that Code; prescribing regulations governing conditions hazardous to life and property from fire or explosion; providing for the issuance of permits and collection of fees; repealing Ordinance No. _______ of the [jurisdiction] and all other ordinances and parts of ordinances in conflict therewith; providing a penalty; providing a severability clause; and providing for publication; and providing an effective date.

BE IT ORDAINED BY THE [governing body] OF THE [jurisdiction]:

SECTION 1 That the NFPA 1, Fire Code, 2015-2021 edition, and documents adopted by Chapter 2, three (3) copies of which are on file and are open to inspection by the public in the office of the [jurisdiction’s keeper of records] of the [jurisdiction], are hereby adopted and incorporated into this ordinance as fully as if set out at length herein, and from the date on which this ordinance shall take effect, the provisions thereof shall be controlling within the limits of the [jurisdiction]. The same are hereby adopted as the Code of the [jurisdiction] for the purpose of prescribing regulations governing conditions hazardous to life and property from fire or explosion and providing for issuance of permits and collection of fees.

SECTION 2 Any person who shall violate any provision of this code or standard hereby adopted or fail to comply therewith; or who shall violate or fail to comply with any order made thereunder; or who shall build in violation of any detailed statement of specifications or plans submitted and approved thereunder; or fail to operate in accordance with such permit or permit issued thereunder; and from which no appeal has been taken; or who shall fail to comply with such an order as affirmed or modified by a court of competent jurisdiction, within the time fixed herein, shall severally for each and every such violation and noncompliance, respectively, be guilty of a misdemeanor, punishable by a fine of not less than $ _____ nor more than $_____, or by imprisonment for not less than ______ days nor more than _______ days or by both such fine and imprisonment. The imposition of one penalty for any violation shall not excuse the violation or permit it to continue; and all such persons shall be required to correct or remedy such violations or defects within a reasonable time; and when not otherwise specified the application of the above penalty shall not be held to prevent the enforced removal of prohibited conditions. Each day that prohibited conditions are maintained shall constitute a separate offense.

SECTION 3 Additions, insertions, and changes — that the [year] edition of NFPA 1, Fire Code, 2015-2021 edition, is amended and changed in the following respects:

[List Amendments]

SECTION 4 That ordinance No. _______ of [jurisdiction] entitled [fill in the title of the ordinance or ordinances in effect at the present time] and all other ordinances or parts of ordinances in conflict herewith are hereby repealed.

SECTION 5 That if any section, subsection, sentence, clause, or phrase of this ordinance is, for any reason, held to be invalid or unconstitutional, such decision shall not affect the validity or constitutionality of the remaining portions of this ordinance. The [governing body] hereby declares that it would have passed this ordinance, and each section, subsection, clause, or phrase hereof, irrespective of the fact that any one or more sections, subsections, sentences, clauses, and phrases be declared unconstitutional.

SECTION 6 That the [jurisdiction’s keeper of records] is hereby ordered and directed to cause this ordinance to be published.

[NOTE: An additional provision may be required to direct the number of times the ordinance is to be published and to specify that it is to be in a newspaper in general circulation. Posting may also be required.]

SECTION 7 That this ordinance and the rules, regulations, provisions, requirements, orders, and matters established and adopted hereby shall take effect and be in full force and effect [time period] from and after the date of its final passage and adoption.

Statement of Problem and Substantiation for Public Input
During the 2018 update, it was not picked up on by the TC to update the dates in Annex C from 2015 to 2018. This PI is submitted to ensure this occurs for the 2021 edition.

Submitter Information Verification

Submitter Full Name: Anthony Apfelbeck
Organization: Altamonte Springs Building/Fire Safety Division
Street Address: 
City: 
State: 
Zip: 
Submittal Date: Thu Jan 25 16:25:44 EST 2018
Committee: 

Committee Statement

Resolution: FR-23-NFPA 1-2018
Statement: During the 2018 update, it was not picked up on by the TC to update the dates in Annex C. This revision updates the Code to the 2021 edition reference.
G.1.1 NFPA Publications.
National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471.


NFPA 1035, Standard on Fire and Life Safety Educator, Public Information Officer, Youth Firesetter Intervention Specialist, and Youth Firesetter Program Manager Professional Qualifications, 2016 edition.
Statement of Problem and Substantiation for Public Input

The SFPE Handbook is no longer published by NFPA. A new section will be submitted as a PI for an SFPE document section that will include the SFPE Handbook.

Submitter Information Verification

Submitter Full Name: Chris Jelenewicz
Organization: Society of Fire Protection Eng
Street Address: 
City: 
State: 
Zip:
Submittal Date: Tue Jun 26 13:09:08 EDT 2018
Committee: 

Committee Statement

Resolution: CI-97-NFPA 1-2018
Statement: This Committee Input incorporates the referenced updates that were received in public inputs in addition to newly referenced documents as a result of pending First Revisions. The Technical Committee will review the edition date of the referenced publications in Section G.1.2 at the Second Draft stage and update to the most current edition as necessary.
G.1.2.6 ASTM Publications.

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


Statement of Problem and Substantiation for Public Input

date updates

The technical committee might want to consider whether to cease referencing several withdrawn standards.

Submitter Information Verification

Submitter Full Name: Marcelo Hirschler
Organization: GBH International
Street Address: 
City: 
State: 
Zip: 
Submittal Date: Fri Jun 01 17:48:14 EDT 2018
Committee:

Committee Statement

Resolution: CI-97-NFPA 1-2018
Statement: This Committee Input incorporates the referenced updates that were received in public inputs in addition to newly referenced documents as a result of pending First Revisions. The Technical Committee will review the edition date of the referenced publications in Section G.1.2 at the Second Draft stage and update to the most current edition as necessary.
Public Input No. 127-NFPA 1-2018 [New Section after G.1.2.22]

G.1.2.23 SFPE Publications
9711 Washingtonian Blvd., SUITE 380, GAITHERSBURG, MD 20878
SFPE Engineering Guide to Human Behavior in Fire, 2nd edition, 2018

Statement of Problem and Substantiation for Public Input

The three SFPE documents referenced are currently in Appendix A.

Submitter Information Verification

Submitter Full Name: Chris Jelenewicz
Organization: Society of Fire Protection Eng
Street Address:
City: 
State: 
Zip: 
Submittal Date: Tue Jun 26 13:11:33 EDT 2018
Committee: 

Committee Statement

Resolution: CI-97-NFPA 1-2018
Statement: This Committee Input incorporates the referenced updates that were received in public inputs in addition to newly referenced documents as a result of pending First Revisions. The Technical Committee will review the edition date of the referenced publications in Section G.1.2 at the Second Draft stage and update to the most current edition as necessary.
G.1.2.25 UL Publications.

ANSI/UL 87A, Standard for Power-Operated Dispensing Devices for Gasoline and Gasoline/Ethanol Blends with Nominal Ethanol Concentrations Up to 85 Percent (E0-E85), 2015.
ANSI/
UL 711
ANSI/
UL 723
ANSI/
UL 737
UL 737, Standard for Fireplace Stoves, 2011, revised 2015
ANSI/
UL 842
ANSI/
UL 896
ANSI/
UL 913
UL 913, Standard for Intrinsically Safe Apparatus and Associated Apparatus for Use in Class I, II, and III Division 1, Hazardous (Classified) Locations, 2013, revised 2015.
ANSI/
UL 923
ANSI/
UL 969
ANSI/
UL 1040
ANSI/
UL 1278
ANSI/
UL 1313
ANSI/
UL 1479
ANSI/
UL 1709
ANSI/
UL 1715
ANSI/
UL 1746
UL 1975
ANSI/
UL 2085
ANSI/
UL 2129
<table>
<thead>
<tr>
<th>UL 2129</th>
<th>Halocarbon Clean Agent Fire Extinguishers</th>
<th>2014 2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>UL 2335</td>
<td></td>
<td></td>
</tr>
<tr>
<td>UL 2335</td>
<td>Standard for Fire Tests of Storage Pallets</td>
<td>2010</td>
</tr>
<tr>
<td>ANSI/</td>
<td></td>
<td></td>
</tr>
<tr>
<td>UL 2586</td>
<td></td>
<td></td>
</tr>
<tr>
<td>UL 2586</td>
<td>Standard for Hose Nozzle Valves</td>
<td>2011, revised 2014 2017</td>
</tr>
<tr>
<td>ANSI/</td>
<td></td>
<td></td>
</tr>
<tr>
<td>UL 60079</td>
<td></td>
<td></td>
</tr>
<tr>
<td>UL 60079</td>
<td>Explosive Atmospheres —</td>
<td></td>
</tr>
<tr>
<td>Part 11</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Part 11 : Equipment Protection by Intrinsic Safety 'i', 2013,
| UL Subject 199B, Outline of Investigation for, Control Cabinets for Automatic
| UL Subject 199E, Outline of Investigation for, Fire Testing of Sprinklers and
| Water Spray Nozzles for Protection of Deep Fat Fryers, 2004,
| UL Subject 2162, Outline of Investigation for, Fire Testing of Sprinklers and
| Water Spray Nozzles for Protection of Deep Fat Fryers, 2004,
| UL Subject 2162, Outline of Investigation for, Commercial Wood-Fired
| Baking Ovens — Refractory Type, 2004 2014
| UL Subject 2436, Outline of Investigation for, Fire Testing of Sprinklers and
| Water Spray Nozzles for Protection of Deep Fat Fryers, 2004,
| UL Subject 2436, Outline of Investigation for, Commercial Wood-Fired
| Baking Ovens — Refractory Type, 2004 2014
| UL Subject 2436, Outline of Investigation for, Commercial Wood-Fired
| Baking Ovens — Refractory Type, 2004 2014
|

**Statement of Problem and Substantiation for Public Input**

Update the publishing dates for each of the UL standards listed to reflect the most up to date edition.

**Submitter Information Verification**

Submitter Full Name: Kelly Nicoello
Organization: UL LLC
Street Address:  
City:  
State:  
Zip:  
Submittal Date: Mon Jun 25 15:49:32 EDT 2018
Committee:  

**Committee Statement**

Resolution: CI-97-NFPA 1-2018
Statement: This Committee Input incorporates the referenced updates that were received in public inputs in addition to newly referenced documents as a result of pending First Revisions. The Technical Committee will review the edition date of the referenced publications in Section G.1.2 at the Second Draft stage and update to the most current edition as necessary.