2016 GROUP B COMMITTEE ACTION HEARINGS

APRIL 17, 2016 – APRIL 27, 2016
KENTUCKY INTERNATIONAL
CONVENTION CENTER
LOUISVILLE, KY
2016 GROUP B – PROPOSED CHANGES TO THE INTERNATIONAL FIRE CODE

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Staff Secretariats:
Keith Enstrom, PE
Staff Engineer
International Code Council
Central Regional Office
The following is the tentative order in which the proposed changes to the code will be discussed at the public hearings. Proposed changes which impact the same subject have been grouped to permit consideration in consecutive changes.

Proposed change numbers that are indented are those which are being heard out of numerical order. Indentation does not necessarily indicate that one change is related to another. Proposed changes may be grouped for purposes of discussion at the hearing at the discretion of the chair. Note that some F code change proposals may not be included on this list, as they are being heard by another committee.

**NUMBER NOT USED**

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2015 International Fire Code

Add new text as follows:

SECTION 202 DEFINITIONS

ACCESSIBLE. Admitting close approach as a result of not being guarded by locked doors, elevation or other effective means. For the purposes of this code, the term accessible is not intended to refer to issues associated with Chapter 11 of the International Building Code or with the Americans with Disabilities Act. See definition of readily accessible.

SECTION 202 DEFINITIONS

READILY ACCESSIBLE. Capable of being reached quickly for operation, renewal or inspection without requiring those to whom ready access is requisite to climb over or remove obstacles or to resort to portable ladders or access equipment. See definition accessible.

Reason: There are multiple locations in the IFC where the term accessible is used and there is no intent for the term to be used in the context of the Americans with Disabilities Act or the compliance with Chapter 11 of the IBC. Adding these definitions to the IFC should clarify that. The definitions were taken from the IECC Commercial, except that a second sentence was added to the definition of “accessible” for emphasis.

Cost Impact: Will not increase the cost of construction
Clarifies existing language without changing code requirements.
F2-16
Proponent: Jonathan Roberts, representing Underwriters Laboratories (jonathan.roberts@ul.com)

2015 International Fire Code
Revise as follows:

SECTION 202 DEFINITIONS

ALCOHOL-BLENDED FUELS. Flammable liquids consisting of 10-percent or greater than 10 percent, by volume, ethanol or other alcohols blended with gasoline.

Reason: The current definition of alcohol-blended fuel describes it as a flammable liquids consisting of 10-percent or greater, by volume, ethanol or other alcohols blended with gasoline. This is not consistent with federal regulations that consider gasohol to be fuels with greater than 10 percent by volume of ethanol or alcohol. The proposed wording corrects this discrepancy.

Cost Impact: Will not increase the cost of construction
This code change provides consistency between federal guidelines and the definition within the code.
F3-16
Part I:
IFC: 202 (New)
Part II:
IRC: 202 (New)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE FIRE CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-BUILDING CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

Proponent: Edward Kulik, representing Building Code Action Committee (BCAC@iccsafe.org); Michael O’Brien, representing Fire Code Action Committee (fcac@iccsafe.org)

Part I
2015 International Fire Code
Add new definition as follows:

SECTION 202 DEFINITIONS

CARBON MONOXIDE ALARM. A single- or multiple station alarm intended to detect carbon monoxide gas and alert occupants by a distinct audible signal. It incorporates a sensor, control components, and an alarm notification appliance in a single unit.

SECTION 202 DEFINITIONS

CARBON MONOXIDE DETECTOR. A device with an integral sensor to detect carbon monoxide gas and transmit an alarm signal to a connected alarm control unit.

Part II
2015 International Residential Code
Add new definition as follows:

SECTION 202 DEFINITIONS

CARBON MONOXIDE ALARM. A single- or multiple station alarm intended to detect carbon monoxide gas and alert occupants by a distinct audible signal. It incorporates a sensor, control components, and an alarm notification appliance in a single unit.

SECTION 202 DEFINITIONS

CARBON MONOXIDE DETECTORS. A device with an integral sensor to detect carbon monoxide gas and transmit an alarm signal to a connected alarm control unit.

Reason: The proposal provides definitions for terms that are used in Section 915. Having these definitions in the code will help ensure code compliance for those not familiar with the two types of Co detection devices.

This proposal is submitted by the ICC Building Code Action Committee (BCAC) and the ICC Fire Code Action Committee (FCAC).

BCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2014 and 2015 the BCAC has held 5 open meetings. In addition, there were numerous Working Group meetings and conference calls for the current code development cycle, which
included members of the committee as well as any interested party to discuss and debate the proposed changes. Related documentation and reports are posted on the BCAC website at: BCAC.

The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire safety and hazardous materials in new and existing buildings and facilities and the protection of life and property in wildland urban interface areas. In 2014 and 2015 the Fire-CAC has held 5 open meetings. In addition, there were numerous conference calls, Regional Work Group and Task Group meetings for the current code development cycle, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC

Cost Impact: Will not increase the cost of construction
Added new definitions only, not new code requirements.
2015 International Fire Code

SECTION 202 DEFINITIONS

MATERIAL SAFETY DATA SHEET (MSDS). Information concerning a hazardous material which is prepared in accordance with the provisions of DOL 29 CFR Part 1910.1200 or in accordance with the provisions of a federally approved state OSHA plan. A document titled as a Safety Data Sheet (SDS) is equivalent to an MSDS for the purposes of this code.

Reason: The Hazard Communication Standard (HCS) (29 CFR 1910.1200(g)) was revised in 2012. The revisions require that the chemical manufacturer, distributor, or importer provide Safety Data Sheets (SDSs) (formerly MSDSs or Material Safety Data Sheets) for each hazardous chemical to downstream users to communicate information on these hazards. The information contained in a SDS is largely the same as a MSDS, but an SDS is required to be presented in a standardized 16-section format.

In reviewing the sections of the IFC that reference a MSDS, there is no reason the newer SDS format would not be considered as equivalent.

To be clear, this proposal does not adopt the hazardous material classification scheme used by the Globally Harmonized System that OSHA and DOT have adopted. If a SDS does not provide hazardous classifications that are consistent with the IFC, IBC and NFPA material classification scheme, it remains incumbent on the owner/occupant/designer to determine material classifications, as necessary, to apply IFC and IBC code requirements.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire safety and hazardous materials in new and existing buildings and facilities and the protection of life and property in wildland urban interface areas. In 2014 and 2015 the Fire-CAC has held 5 open meetings. In addition, there were numerous conference calls, Regional Work Group and Task Group meetings for the current code development cycle, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC

Cost Impact: Will not increase the cost of construction
This is only a change in terminology to a definition only.
2015 International Fire Code

Add new definition as follows:

SECTION 202  DEFINITIONS

GENERAL DEFINITIONS

RUBBERIZED ASPHALT MELTER (Melter). Portable equipment used for the heating of rubberized asphalt material. The term applies only if both the material being heated is a mix of asphalt and inert material and when an indirect method of heating is used. An indirect method of heating refers to a fully enclosed double-shell oil or air system that transfers heat from a burner(s) or electric heating element(s) to the oil or air jacket around the outside of a material vat which then heats the rubberized asphalt material. Melters can be fueled by means of diesel or electric means. Melters are not considered asphalt (tar) kettles or pots as addressed in Section 303.

Add new text as follows:

SECTION 304  RUBBERIZED ASPHALT MELTERS FOR ROOF DECK SYSTEMS

304.1 General The provisions of this section shall apply to any type of fully enclosed chassis-mounted or portable rubberized asphalt melter using indirect heating of a mix of asphalt and inert material for application on roofs decks. There shall be no direct burner or flame impingement on the material vat with indirect heating. Temperature rise in the material vat is gradual and controlled.

304.2 Permits Permits shall be required in accordance with Section 105.6 and Chapter 35.

304.2.1 Torches. Any use of torches or burners shall require a separate permit in accordance with Chapter 35.

304.3 Location. The melter shall be located and operated in a controlled area. The area shall be as designated by the fire code official and identified by the use of traffic cones, barriers, and other suitable means. Where rubberized asphalt melters are staged and operated on roof decks, the design load of the roof deck shall be capable of supporting the weight of the rubberized asphalt melter where loaded to capacity with rubberized asphalt material. The design load of the roof deck shall be as determined on building drawings or by a design professional as approved by the fire code official. Rubberized asphalt melters shall be chocked in place on the roof deck at locations identified by the design professional and as approved by the fire code official. Rubberized asphalt cakes for use in rubberized asphalt melters shall be located on the roof at a location agreed upon by the design professional and the fire code official.

304.3.1 Buildings. Rubberized Asphalt Melters shall not be located inside buildings.

304.3.2 Air intakes. Air intakes into the building in the area of work shall be identified and shut
off and an alternate supply of outdoor air into the building shall be coordinated, such as by temporarily covering air intakes to make them smoke and odor proof.

304.3.3 Exits. Rubberized asphalt melters shall not be located within 20 feet of any exit or combustible material. Rubberized asphalt melters shall not block any means of egress.

304.3.4 Combustible materials. Combustible materials on the roof deck shall be protected in accordance with Section 3504.

304.4 Fire Extinguishers. Not less than two approved 4-A:40-B:C fire extinguishers complying with Section 906 shall be provided and maintained within 25 ft. of the rubberized asphalt melter. A minimum of one approved 4-A:40-B:C fire extinguisher shall be provided in close proximity to the roofing material application. Each employee shall be instructed on the proper use of fire extinguishers and in the event of a fire to turn off all rubberized asphalt melter power supply, engines, and burners. Employees shall notify the fire department.

304.5 Attendant Supervision. An operating rubberized asphalt melter shall be attended by an employee who is knowledgeable and solely dedicated to the operation of the equipment and associated hazards. The employee shall always be within 25 ft. of the Melter and shall have the Melter within sight. The employee shall remain in the area of the Melter for a minimum of one-hour after the device is shut down in compliance with Section 3504.2.

304.6 Minimum Melter Design Requirements. Rubberized asphalt melter shall be operated as a complete unit as designed and built by the manufacturer. Field changes that override controls or safety features are prohibited. Material vats shall be a permanent integral part of the rubberized asphalt melter unit. The rubberized asphalt melter chassis shall be substantially constructed and capable of carrying the load imposed upon it whether it is standing still or being transported.

304.6.1 Lids. Rubberized asphalt melter shall have lids permanently attached. The lids shall be kept closed at all times, except to add rubberized asphalt membrane cakes to the rubberized asphalt melter. Loading doors shall be designed as a safety door integral to the roofing material tank and shall be provided with handles that allow rubberized asphalt cakes to be lowered into the tank without operator exposure to the vat material.

304.7 Melter Operation Rubberized asphalt melters shall be operated according to manufacturer instructions. Rubberized asphalt melters shall operate using integral control systems that include shut off controls for the electric or diesel-fired burner, temperature controls for the oil or air system, and the material vat. Where a diesel burner is utilized, it shall fire into a burner flue assembly for the oil or air jacketed shell for uniform heat transfer to the material vat. There shall be no open flame devices on rubberized asphalt melters. All rubberized asphalt melters shall have an approved, working visible temperature gauge(s) that indicate the temperature of the rubberized material being heated and, in the case of oil jacketed rubberized asphalt melters, the temperature of the heat transfer oil heating the material vat. The rubberized asphalt melter shall have limit switches that prevent the material vat from heating beyond 400 degrees F.

304.8 Fuel System and containers. Fuel containers for diesel-powered melters shall be constructed and approved for the use for which they were designed. Rubberized asphalt melter fuel tanks shall be attached to the frame of the melter. Portable fuel tanks shall not be utilized to power rubberized asphalt melters. Diesel tanks and engines integral to rubberized asphalt melters shall be maintained in accordance with manufacturer instructions.
304.8.1 **Refueling.** Refueling of diesel tanks shall be performed when the *rubberized asphalt melter* is off. A refueling and spill prevention plan approved by the *fire code official* shall be utilized. Refueling shall be conducted using approved safety cans. No open flames shall be present within 20 feet of the refueling operation.

304.9 **Maintenance.** *Rubberized asphalt melters* and integral working parts shall be in good working condition and shall be maintained free of excessive residue.

304.10 **Transporting.** *Rubberized asphalt melters* shall not be transported over a highway, road, or street when the heat source for the melter is operating.

3317.1 **General.** Roofing operations utilizing heat-producing systems or other ignition sources shall be conducted in accordance with Sections 3317.2, 3317.3, and 3317.4 and Chapter 35.

3317.4 **Rubberized Asphalt Melters.** Rubberized Asphalt Melters shall be operated in accordance with Section 304.

**Reason:** The inherent dangers of open flames as a part of construction processes has been recognized with particular emphasis on the use of torch applied roofing systems and asphalt (tar) kettles for decades. Tar kettles lack temperature controls, are open flame fired, and operate at higher temperatures than Rubberized Asphalt Melters. The IFC contains requirements and cautions for tar kettles and torch applied roofing systems in Chapter 3 that specifically addresses use of tar kettles with heavy reliance on Chapter 35 requirements. Tar kettles are not permitted to be staged on roof decks in Section 303.2. Rubberized Asphalt Melters due to the inherent materials application requirement in close proximity to the roof deck requires that Melters be permitted on roof decks. The historical need for improved deck coatings resulted in the development and long-term positive record of hot-applied rubberized asphaltic materials. Rubberized asphalt can only be melted in Rubberized Asphalt Melters that control temperatures. Currently each AHJ must independently develop and approve safe work practices for each construction job using Rubberized Asphalt Melters without the benefit of established requirements.

There have been no roof deck failures with zero fires and zero litigation from the use of these materials and equipment on over 30 million square feet of roof decks in Florida alone. Nationally the submitter cannot find an instance where a roofing fire was initiated by a Rubberized Asphalt Melter; a notable record in comparison to asphalt tar kettle fire events.

This code change is to establish that Melters are NOT tar kettles and must comply with a different set of fire safety provisions as proposed here. Significantly, Melter equipment is operated without an open flame. Melters have controls built into manufactured units. Material vats are fully enclosed. Melter equipment enables the use of advanced roof covering materials that protect the structural integrity of concrete high-rise or commercial structures.

The proposed change to the IFC is important in establishing the safe use requirements for Rubberized Asphalt Melters. Tar kettle and Melter operations need safeguards against the potential for fire, but with different constraints. This proposal separates out Rubberized Asphalt Melters for use on roof decks and brings with it recognition of fire safety as an integral part of the roofing operation. Propane fueled equipment is not part of the safe work practices in this proposal as called out in Section 304.1.1. With this change a propane fueled Rubberized Asphalt Melter could only be utilized with AHJ approval that would include additional locally established controls and work practices for propane.

Rubberized Asphalt Melters operate and perform differently from tar kettles as listed in the table below. Importantly, indirect heating of the Rubberized Asphalt Melter is via fully enclosed electric or diesel heating elements. Further, there are temperature controls inherent in melters in part due to the need to maintain the roofing material at 350 to 380 degrees F. Overheating into the temperature range of ordinary combustibles makes the rubberized asphalt product unsuitable for roof deck application. Due to the lower application temperature, the potential for fire with Rubberized Asphalt Melters is greatly decreased when compared to tar kettles and torches. Tar kettles operate in temperature ranges 475-500 degrees F.

The proposal provides for only approved equipment and methods to be permitted on non-combustible roof locations, insures exit access is always maintained, and to provides for fire extinguishers and responsible operation of equipment consistent with existing IFC requirements in Chapter 35. The equipment construction and operation
requirements are such that only a properly manufactured unit can be used. Multiple national manufacturers have equipment capable of meeting the requirements proposed herein. Confirmation of roof deck ability to accommodate equipment loads prior to work beginning is a key part of the AHJ review and permitting process.

The goal of these new requirements is to define operations necessary during construction as needing to be performed in a safe manner that will not put workers or the building at unnecessary risk from fire. This proposal for Rubberized Asphalt Melters is consistent with the intent of the code.
<table>
<thead>
<tr>
<th>Tar Kettles Versus Rubberized Asphalt Melters</th>
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</thead>
<tbody>
<tr>
<td>Tar Kettles</td>
<td>Rubberized Asphalt Melters</td>
</tr>
<tr>
<td>1. Exposed Burner Flame</td>
<td>1. Fully Enclosed Burner Flame</td>
</tr>
<tr>
<td>2. Burner Type: LP Fired</td>
<td>2. Diesel or Electric Fired</td>
</tr>
<tr>
<td>3. Gasoline Fueled Engine</td>
<td>3. Diesel or Electric Fueled</td>
</tr>
<tr>
<td>4. Tar Kettles don’t require temperature controls</td>
<td>4. Cannot purchase a Melter without temperature controls</td>
</tr>
<tr>
<td>5. Temperature controls if present may be bypassed</td>
<td>5. Temperature controls cannot be bypassed</td>
</tr>
<tr>
<td>6. Tar Kettle will operate if control system is down</td>
<td>6. Control systems must be operating correctly for Melter to run</td>
</tr>
<tr>
<td>7. Burners fire into flue unit for high heat transfer</td>
<td>7. Burner fires into air or oil jacketed tank for uniform heat transfer and better temperature control</td>
</tr>
<tr>
<td>9. BTU Output: 1 Million BTU per burner X 2 burners</td>
<td>9. BTU Output 250 K BTU's with one burner on Melter</td>
</tr>
<tr>
<td>10. Typical application temp 475-500 degrees F</td>
<td>10. Typical Asphalt application 350-380 degrees F</td>
</tr>
</tbody>
</table>

**Bibliography:** none

**Cost Impact:** Will not increase the cost of construction

Rubberized Asphalt roof coverings are installed throughout the U.S. and internationally. In each jurisdiction, because they do not have a code mandated criteria for Safe Working Practices, each jobsite must produce for review and acceptance a procedure. The codifying of these Safe Work Practice provisions will mean AHJ's will have clear established criteria for enforcement that contractors must abide by. By eliminating a 'one off' criteria for every roofing installation in favor of these changes Rubberized Asphalt Melter acceptance time and costs for AHJ review and contractor compliance will be reduced.
Revise as follows:

**304.3.3 Capacity exceeding 1.5 cubic yards.** Dumpsters and containers with an individual capacity of 1.5 cubic yards [40.5 cubic feet (1.15 m$^3$)] or more shall not be stored in buildings or placed within 5 feet (1524 mm) of combustible walls, openings or combustible roof eave lines.

**Exceptions:**

1. Dumpsters or containers that are placed inside buildings in areas protected by an approved automatic sprinkler system installed throughout in accordance with Section 903.3.1.1, 903.3.1.2 or 903.3.1.3.
2. Storage in a structure shall not be prohibited where the structure is of Type I or IIA construction, located not less than 10 feet (3048 mm) from other buildings and used exclusively for dumpster or container storage.
3. Dumpsters or containers that are located adjacent to buildings where the exterior area is protected by an approved automatic sprinkler system.

**Reason:** This proposal is a clarification of the requirements. The first exception simply "dumpsters or containers in areas protected" by sprinklers. Does this mean that it would be allowed outside adjacent to the building if the building is sprinklered? Probably not, since the sprinklers would afford no protection over the dumpster.

Therefore, Exception 1 is reworded to be specific to indoor locations and Exception 3 is added to address outdoor locations where the dumpster is not required to be separated 5 feet.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire safety and hazardous materials in new and existing buildings and facilities and the protection of life and property in wildland urban interface areas. In 2014 and 2015 the Fire-CAC has held 5 open meetings. In addition, there were numerous conference calls, Regional Work Group and Task Group meetings for the current code development cycle, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: [FCAC](https://www.iccsafe.org).

**Cost Impact:** Will not increase the cost of construction

This proposal does not address construction, it addresses the location of the dumpster in relation to the building.
F7-16

IFC: 308.4.1.

Proponent: William Freer, New York State Office of Fire Prevention and Control, representing New York State Office of Fire Prevention and Control (william.freer@dhses.ny.gov)

2015 International Fire Code

308.4.1 Group R-2 dormitories. Candles, incense and similar open-flame-producing items shall not be allowed in sleeping units—prohibited in Group R-2 dormitory occupancies.

Reason: This code change clarifies where the code applies. In the previous version it was questionable whether or not the code applied to apartment or suite style dormitories.

Cost Impact: Will not increase the cost of construction

There is no impact to the cost of construction. The code change clarifies where items are allowed and does not have an effect on the construction of the space.
2015 International Fire Code

Add new text as follows:

309.2 Use in hazardous (classified) locations. Powered industrial trucks used in areas designated as hazardous (classified) locations in accordance with NFPA 70 shall be listed and labeled for use in the environment intended in accordance with NFPA 505.

Revise as follows:

5003.7.3 Industrial trucks. Powered industrial trucks used in areas designated as hazardous (classified) locations in accordance with NFPA 70 shall be listed and labeled for use in the environment intended in accordance with NFPA 505 Section 309.2.

Reason: This proposal simply relocates the requirement for powered industrial trucks to meet NFPA 505. Powered industrial trucks have specific regulations in Section 309. The reference to NFPA 505 should occur in this section rather than in Chapter 50. Section 5003.7.3 will still hold a reference to Section 309.2, but the requirement for complying with NFPA 505 is relocated.

There are many situations where an environment could occur which requires a specific level of protection for the industrial truck. This proposal moves the requirement to comply with NFPA 505 so that all powered industrial trucks need to comply.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire safety and hazardous materials in new and existing buildings and facilities and the protection of life and property in wildland urban interface areas. In 2014 and 2015 the Fire-CAC has held 5 open meetings. In addition, there were numerous conference calls, Regional Work Group and Task Group meetings for the current code development cycle, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC

Cost Impact: Will not increase the cost of construction

This proposal is only a relocation of code requirements.

F8-16 : 309.2 (NEW)-
O'BRIAN11022
310.2 Prohibited areas. Smoking shall be prohibited where conditions are such as to make smoking a hazard, and in spaces where flammable or combustible materials are stored or handled.

Add new text as follows:

310.2.1 Group R-2 dormitories. Smoking shall be prohibited in Group R-2 dormitory occupancies.

Reason: Some inspectors are using the open flame section of the code to cite smoking in R-2 dormitories. It is questionable whether or not the smoking can be considered an open flame. This code change provides clarification. Most campuses already have no smoking policies in place. NFPA report "The Smoking-Material Fire Problem", July 2013 states "One out of four fatal victims of smoking-material fires is not the smoker whose cigarette started the fire." With dormitories being a communal living environment with no relationship between the parties, it is in the best interest to take away as many potential ignition sources as possible. In NFPA's Structure Fires in Dormitories, Fraternities, Sororities and Barracks", November 2015, it states "Just 3% of fires were caused by smoking materials, but these fires caused 9% of civilian injuries. (Note that because this figure draws causal information from several NFIRS fields, the causes are not mutually exclusive)." With this information and the information on health effects with second hand smoke, this change makes dormitories a safer environment.

Bibliography: Report: NFPA's "Structure Fires in Dormitories, Fraternities, Sororities and Barracks"
Author: Richard Campbell
Issued: November 2015
Pg 4


Report: NFPA's "The Smoking-Material Fire Problem"
Author: John R. Hall, Jr.
Issued: July 2013
Pg ii (Abstract)

Cost Impact: Will not increase the cost of construction
There is no impact to the cost of construction. The code change deals with operational issues and whether an action is allowed in the building, but has no impact to the cost of construction.
**F10-16**

**IFC: 310.2, 310.3.**

**Proponent:** John Williams, CBO, representing Adhoc Healthcare Committee (AHC@iccsafe.org)

### 2015 International Fire Code

**Revise as follows:**

**310.2 Prohibited areas.** Smoking shall be prohibited where conditions are such as to make smoking a hazard, and in spaces where flammable liquids or combustible materials—gases and dusts or oxygen—are used, stored or handled.

**310.3 "No Smoking" signs.** The fire code official is authorized to order the posting of "No Smoking" signs in a conspicuous location in each structure or location in which smoking is prohibited. The content, lettering, size, color and location of required "No Smoking" signs shall be approved.

**Exception:** In Group I-2 occupancies and ambulatory care facilities where smoking is prohibited throughout the facility, "No Smoking" signs are not required in interior locations of the facility where signs are displayed at all major entrances into the facility.

**Reason:** The intention of this code change is to provide clarification for the spaces and hazards where smoking shall be prohibited. Also, to clarify where "No Smoking" signage is applicable and the I- Occupancies exceptions to the "No Smoking" signage locations based on a totally smoke free facility.

This proposal is submitted by the ICC Ad Hoc Committee on Healthcare (AHC). The AHC was established by the ICC Board to evaluate and assess contemporary code issues relating to hospitals and ambulatory healthcare facilities. This is a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. In 2014 and 2015 the ICC Ad Hoc Committee has held 4 open meetings and numerous Work Group meetings and conference calls for the current code development cycle which included members of the committees as well as any interested party to discuss and debate the proposed changes. Information on the AHC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the AHC effort can be downloaded from the AHC website at: AHC.

**Cost Impact:** Will not increase the cost of construction

The result would be a decrease in the number of signs needed in a building.
2015 International Fire Code

Add new text as follows:

310.9  **E Cigarettes Areas Prohibited**  Electronic simulated smoking or similar devices shall not cause the activation of, interference with, or disruption of any fire alarm, fire detection, or fire suppression system or obscure the means of egress illumination or visibility of exit signs. The fire code official is authorized to prohibit the use of such devices. The fire code official is authorized to order the posting of signs in a conspicuous locations in each area in which the use of such devices is prohibited.

**Reason:** Reason: E-cigarettes, vapor cigarettes, and other devices have become very popular as an alternative to cigarettes. Although they may be safer in the aspect of causing unwanted fires, they produce a lot of sustain vapor. I have seen firsthand when several people get together and the vapor cloud is to the point that it could or would have set off the fire alarm or detection system. The only reason it did not in this case was because the space did not have an active fire alarm system. As these things grow we will see alarm activation, which will cause thousands of dollars to local fire departments to respond. More businesses are coming into shopping centers offering a lounge atmosphere where customers can stay and try the various products. This causes the heavy white cloud to develop at the ceiling level. Without proper ventilation, this heavy white cloud of byproducts would obstruct the view of the exit lighting or egress lighting.
Bibliography: I do not know of any current publications supporting my proposal. I have seen this first hand as the fire code official in the City of Colonial Heights.

Cost Impact: Will not increase the cost of construction
This proposal will not increase the cost of construction. The only cost to the property owner will be the posting of an approved sign prohibiting the e cigarettes. I see that business would benefit because they will not lose business during a false activation. The fire department would not have to spend man hours and apparatus cost responding to an e cigarette causing the alarm.
2015 International Fire Code

105.6.16 Fire hydrants and valves. An operational permit is required to use or operate fire hydrants or valves intended for fire suppression purposes that are installed on water systems and accessible, provided with access to a fire apparatus access road that is open to or generally used by the public.

**Exception:** A permit is not required for authorized employees of the water company that supplies the system or the fire department to use or operate fire hydrants or valves.

[A] 106.3 Concealed work. It shall be the duty of the permit applicant to cause the work to remain accessible, open for access and exposed for inspection purposes. Where any installation subject to inspection prior to use is covered or concealed without having first been inspected, the fire code official shall have the authority to require that such work be exposed for inspection. Neither the fire code official nor the jurisdiction shall be liable for expense entailed in the removal or replacement of any material required to allow inspection.

107.5 Rendering equipment inoperable. Portable or fixed fire-extinguishing systems or devices, and fire-warning systems, shall not be rendered inoperative or inaccessible, not available for access, except as necessary during emergencies, maintenance, repairs, alterations, drills or prescribed testing.

**Add new definition as follows:**

SECTION 202 DEFINITIONS

GENERAL DEFINITIONS
**ACCESS (TO).** That which enables a device, appliance or equipment to be reached by ready access or by a means that first requires the removal or movement of a panel, door or similar obstruction [see also "Ready access (to)"].

**READY ACCESS (TO).** That which enables a device, appliance or equipment to be directly reached, without requiring the removal or movement of any panel, door or similar obstruction [see "Access (to)"].

**WILDFIRE RISK AREA.** Land that is covered with grass, grain, brush or forest, whether privately or publicly owned, which is so situated or is of such inaccessible location that a fire originating upon it would present an abnormally difficult job of suppression or would result in great or unusual damage through fire or such areas designated by the fire code official.

**309.2 Battery chargers.** Battery chargers shall be of an approved type. Combustible storage shall be kept not less than 3 feet (915 mm) from battery chargers. Battery charging shall not be conducted in areas accessible to the public.

**311.2 Security.** Exterior and interior openings accessible to other tenants or unauthorized persons shall be boarded, locked, blocked or otherwise protected to prevent entry by unauthorized individuals. The fire code official is authorized to placard, post signs, erect barrier tape or take similar measures as necessary to secure public safety.

**315.6 Storage in plenums.** Storage shall not be permitted in plenums. Abandoned material in plenums shall be deemed to be storage and shall be removed. Where located in plenums, the accessible portion of abandoned cables that is open for access and that are not identified for future use with a tag shall be deemed storage and shall be removed.

**316.2.1 Exterior access to shaftways.** Outside openings accessible to the fire department and that open directly on a hoistway or shaftway communicating between two or more floors in a building shall be plainly marked with the word "SHAFTWAY" in red letters not less than 6 inches (152 mm) high on a white background. Such warning signs shall be placed so as to be readily discernible from the outside of the building.

**403.10.2.2.1 Guide contents.** A fire emergency guide shall describe the location, function and use of fire protection equipment and appliances accessible to available for use by residents, including fire alarm systems, smoke alarms and portable fire extinguishers. Guides shall include an emergency evacuation plan for each dwelling unit.

**504.1 Required access.** Exterior doors and openings required by this code or the International Building Codes shall be maintained readily accessible with ready access for emergency access by the fire department. An approved access walkway leading from fire apparatus access roads to exterior openings shall be provided when required by the fire code official.

**509.2 Equipment access.** Approved access shall be provided and maintained for all fire protection equipment to permit immediate safe operation and maintenance of such equipment. Storage, trash and other materials or objects shall not be placed or kept in such a manner that would prevent such equipment from being readily accessible having ready access.

**603.1.5 Access.** The installation shall be readily accessible having ready access for cleaning hot surfaces; removing burners; replacing motors, controls, air filters, chimney connectors, draft regulators and other working parts; and for adjusting, cleaning and lubricating parts.

**603.1.6.1 Diagrams.** Contractors installing industrial oil-burning systems shall furnish not less than two copies of diagrams showing the main oil lines and controlling valves, one copy of which
shall be posted at the oil-burning equipment and another at an approved location that will be accessible in case of emergency.

605.12 Abandoned wiring in plenums. Accessible portions of abandoned cables in air-handling plenums that have access shall be removed. Cables that are unused and have not been tagged for future use shall be considered abandoned.

606.5 Access. Refrigeration systems having a refrigerant circuit containing more than 220 pounds (100 kg) of Group A1 or 30 pounds (14 kg) of any other group refrigerant shall be accessible to have access for the fire department at all times as required by the fire code official.

608.4.1 Separate rooms. Where stationary batteries are installed in a separate equipment room accessible with access to only to authorized personnel, they shall be permitted to be installed on an open rack for ease of maintenance.

703.1 Maintenance. The required fire-resistance rating of fire-resistance-rated construction, including, but not limited to, walls, firestops, shaft enclosures, partitions, smoke barriers, floors, fire-resistive coatings and sprayed fire-resistant materials applied to structural members and fire-resistant joint systems, shall be maintained. Such elements shall be visually inspected by the owner annually and properly repaired, restored or replaced where damaged, altered, breached or penetrated. Records of inspections and repairs shall be maintained. Where concealed, such elements shall not be required to be visually inspected by the owner unless the concealed space is accessible by the removal or movement of a panel, access door, ceiling tile or similar movable entry to the space. Openings made therein for the passage of pipes, electrical conduit, wires, ducts, air transfer openings and holes made for any reason shall be protected with approved methods capable of resisting the passage of smoke and fire. Openings through fire-resistance-rated assemblies shall be protected by self- or automatic-closing doors of approved construction meeting the fire protection requirements for the assembly.

903.2.11.1.1 Opening dimensions and access. Openings shall have a minimum dimension of not less than 30 inches (762 mm). Such openings shall be accessible to have access for the fire department from the exterior and shall not be obstructed in a manner such that fire fighting or rescue cannot be accomplished from the exterior.

903.2.11.2 Rubbish and linen chutes. An automatic sprinkler system shall be installed at the top of rubbish and linen chutes and in their terminal rooms. Chutes shall have additional sprinkler heads installed at alternate floors and at the lowest intake. Where a rubbish chute extends through a building more than one floor below the lowest intake, the extension shall have sprinklers installed that are recessed from the drop area of the chute and protected from freezing in accordance with Section 903.3.1.1. Such sprinklers shall be installed at alternate floors beginning with the second level below the last intake and ending with the floor above the discharge. Chute sprinklers shall be accessible for servicing.

904.12.4 Special provisions for automatic sprinkler systems. Automatic sprinkler systems protecting commercial-type cooking equipment shall be supplied from a separate, readily accessible, indicating-type control valve that is identified.

905.5 Location of Class II standpipe hose connections. Class II standpipe hose connections shall be accessible and shall be located so that all portions of the building are within 30 feet (9144 mm) of a nozzle attached to 100 feet (30 480 mm) of hose.

906.5 Conspicuous location. Portable fire extinguishers shall be located in conspicuous locations where they will be readily accessible and be immediately available.
for use. These locations shall be along normal paths of travel, unless the fire code official determines that the hazard posed indicates the need for placement away from normal paths of travel.

907.2 Where required—new buildings and structures. An approved fire alarm system installed in accordance with the provisions of this code and NFPA 72 shall be provided in new buildings and structures in accordance with Sections 907.2.1 through 907.2.23 and provide occupant notification in accordance with Section 907.5, unless other requirements are provided by another section of this code.

Not fewer than one manual fire alarm box shall be provided in an approved location to initiate a fire alarm signal for fire alarm systems employing automatic fire detectors or waterflow detection devices. Where other sections of this code allow elimination of fire alarm boxes due to sprinklers, a single fire alarm box shall be installed.

Exceptions:
1. The manual fire alarm box is not required for fire alarm systems dedicated to elevator recall control and supervisory service.
2. The manual fire alarm box is not required for Group R-2 occupancies unless required by the fire code official to provide a means for fire watch personnel to initiate an alarm during a sprinkler system impairment event. Where provided, the manual fire alarm box shall not be located in an area that is accessible open to the public.

907.2.6 Group I. A manual fire alarm system that activates the occupant notification system in accordance with Section 907.5 shall be installed in Group I occupancies. An automatic smoke detection system that activates the occupant notification system in accordance with Section 907.5 shall be provided in accordance with Sections 907.2.6.1, 907.2.6.2 and 907.2.6.3.3.

Exceptions:
1. Manual fire alarm boxes in sleeping units of Group I-1 and I-2 occupancies shall not be required at exits if located at all care providers’ control stations or other constantly attended staff locations, provided such stations are visible and continuously accessible open for access and that the distances of travel required in Section 907.4.2.1 are not exceeded.
2. Occupant notification systems are not required to be activated where private mode signaling installed in accordance with NFPA 72 is approved by the fire code official and staff evacuation responsibilities are included in the fire safety and evacuation plan required by Section 404.

907.2.6.3.3 Automatic smoke detection system. An automatic smoke detection system shall be installed throughout resident housing areas, including sleeping units and contiguous day rooms, group activity spaces and other common spaces normally accessible open to residents.

Exceptions:
1. Other approved smoke detection arrangements providing equivalent protection, including, but not limited to, placing detectors in exhaust ducts from cells or behind protective guards listed for the purpose, are allowed when necessary to prevent damage or tampering.
2. Sleeping units in Use Conditions 2 and 3 as described in Section 308 of the International Building Code.
3. Smoke detectors are not required in sleeping units with four or fewer occupants in smoke compartments that are equipped throughout with an
automatic sprinkler system installed in accordance with Section 903.3.1.1.

907.2.10.1 Manual fire alarm system. A manual fire alarm system that activates the occupant notification system in accordance with Section 907.5 shall be installed in Group R-4 occupancies.

Exceptions:
1. A manual fire alarm system is not required in buildings not more than two stories in height where all individual sleeping units and contiguous attic and crawl spaces to those units are separated from each other and public or common areas by not less than 1-hour fire partitions and each individual sleeping unit has an exit directly to a public way, egress court or yard.
2. Manual fire alarm boxes are not required throughout the building where all of the following conditions are met:
   2.1. The building is equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2.
   2.2. The notification appliances will activate upon sprinkler water flow.
   2.3. Not fewer than one manual fire alarm box is installed at an approved location.
   2.4. Manual fire alarm boxes in resident or patient sleeping areas shall not be required at exits where located at all nurses' control stations or other constantly attended staff locations, provided such stations are visible and continuously accessible and that the distances of travel required in Section 907.4.2.1 are not exceeded.

907.2.20 Covered and open mall buildings. Where the total floor area exceeds 50,000 square feet (4645 m$^2$) within either a covered mall building or within the perimeter line of an open mall building, an emergency voice/alarm communication system shall be provided. Emergency voice/alarm communication systems serving a mall, required or otherwise, shall be accessible to have access for the fire department. The system shall be provided in accordance with Section 907.5.2.2.

907.2.22.2 Other airport traffic control towers. Airport traffic control towers with a single exit or where sprinklers are not installed throughout shall be provided with smoke detectors in all of the following locations:

1. Airport traffic control cab.
2. Electrical and mechanical equipment rooms.
3. Airport terminal radar and electronics rooms.
4. Office spaces incidental to the tower operation.
5. Lounges for employees, including sanitary facilities.
7. Accessible utility shafts with access.

907.4.2.6 Unobstructed and unobscured. Manual fire alarm boxes shall be accessible, unobstructed, unobscured and visible at all times.

907.8.2 Testing. Testing shall be performed in accordance with the schedules in NFPA 72 or more frequently where required by the fire code official. Records of testing shall be maintained.
Exception: Devices or equipment that are inaccessible, not available for access for safety considerations shall be tested during scheduled shutdowns where approved by the fire code official, but not less than every 18 months.

909.12.4 Automatic control. Where completely automatic control is required or used, the automatic-control sequences shall be initiated from an appropriately zoned automatic sprinkler system complying with Section 903.3.1.1, manual controls that are readily accessible to have ready access for the fire department and any smoke detectors required by the engineering analysis.

910.4.5 Manual control location. Manual controls shall be located so as to be accessible to have access for the fire service from an exterior door of the building and protected against interior fire exposure by not less than 1-hour fire barriers constructed in accordance with Section 707 of the International Building Code or horizontal assemblies constructed in accordance with Section 711 of the International Building Code, or both.

914.2.3 Emergency voice/alarm communication system. Where the total floor area exceeds 50,000 square feet (4645 m²) within either a covered mall building or within the perimeter line of an open mall building, an emergency voice/alarm communication system shall be provided. Emergency voice/alarm communication systems serving a mall, required or otherwise, shall be accessible to have access for the fire department. The system shall be provided in accordance with Section 907.5.2.2.

1105.9 Group I-2 automatic fire alarm system. An automatic fire alarm system shall be installed in existing Group I-2 occupancies in accordance with Section 907.2.6.2.

Exception: Manual fire alarm boxes in patient sleeping areas shall not be required at exits if located at all nurses’ control stations or other constantly attended staff locations, provided such stations are visible and continuously accessible, open for access and that travel distances required in Section 907.4.2.1 are not exceeded.

2005.4 On aircraft fuel-servicing tank vehicles. Aircraft fuel-servicing tank vehicles shall be equipped with not less than two listed portable fire extinguishers complying with Section 906, each having a minimum rating of 20-B:C. A portable fire extinguisher shall be readily accessible provided with ready access from either side of the vehicle.

2005.7 Fire extinguisher access. Portable fire extinguishers required by this chapter shall be accessible to have access at all times. Where necessary, provisions shall be made to clear accumulations of snow, ice and other forms of weather-induced obstructions.

2005.7.1 Cabinets. Cabinets and enclosed compartments used to house portable fire extinguishers shall be clearly marked with the words FIRE EXTINGUISHER in letters not less than 2 inches (51 mm) high. Cabinets and compartments shall be readily accessible provided with ready access at all times.

2006.6.1 Accessibility. Emergency fuel shutoff controls shall be readily accessible provided with ready access at all times when the fueling system is being operated.

2301.1 Scope. Automotive motor fuel-dispensing facilities, marine motor fuel-dispensing facilities, fleet vehicle motor fuel-dispensing facilities, aircraft motor-vehicle fuel-dispensing facilities and repair garages shall be in accordance with this chapter and the International Building Code, International Fuel Gas Code and International Mechanical Code. Such operations shall include both those that are accessible, open to the public and private operations.
2303.2 Emergency disconnect switches. An approved, clearly identified and readily accessible emergency disconnect switch with ready access shall be provided at an approved location to stop the transfer of fuel to the fuel dispensers in the event of a fuel spill or other emergency. The emergency disconnect switch for exterior fuel dispensers shall be located within 100 feet (30 480 mm) of, but not less than 20 feet (6096 mm) from, the fuel dispensers. For interior fuel-dispensing operations, the emergency disconnect switch shall be installed at an approved location. Such devices shall be distinctly labeled as: EMERGENCY FUEL SHUTOFF. Signs shall be provided in approved locations.

2306.2.5 Portable tanks. Where approved by the fire code official, portable tanks are allowed to be temporarily used in conjunction with the dispensing of Class I, II or III liquids into the fuel tanks of motor vehicles or motorized equipment on premises not normally accessible open to the public. The approval shall include a definite time limit.

2308.6 Valves. Gas piping to equipment shall be provided with a remote, readily accessible manual shutoff valve that is readily accessible.

2310.6.3 Access. Where the pier is accessible open to vehicular traffic, an unobstructed roadway to the shore end of the wharf shall be maintained for access by fire apparatus.

2404.3.2.5 Clear space. Spray booths shall be installed so that all parts of the booth are readily accessible open for cleaning. A clear space of not less than 3 feet (914 mm) shall be maintained on all sides of the spray booth. This clear space shall be kept free of any storage or combustible construction.

Exceptions:
1. This requirement shall not prohibit locating a spray booth closer than 3 feet (914 mm) to or directly against an interior partition, wall or floor/ceiling assembly that has a fire-resistance rating of not less than 1 hour, provided the spray booth can be adequately maintained and cleaned.
2. This requirement shall not prohibit locating a spray booth closer than 3 feet (914 mm) to an exterior wall or a roof assembly, provided the wall or roof is constructed of noncombustible material and the spray booth can be adequately maintained and cleaned.

2405.3.2 Bottom drains. Dip tanks greater than 500 gallons (1893 L) in liquid capacity shall be equipped with bottom drains that are arranged to automatically and manually drain the tank quickly in the event of a fire unless the viscosity of the liquid at normal atmospheric temperature makes this impractical. Manual operation shall be from a safe, accessible location with access. Where gravity flow is not practicable, automatic pumps shall be provided. Such drains shall be trapped and discharged to a closed, vented salvage tank or to an approved outside location.

Exception: Dip tanks containing Class IIIIB combustible liquids where the liquids are not heated above room temperature and the process area is protected by automatic sprinklers.

2404.8.1.2 Alarm station location. Not less than one manual fire alarm and emergency system shutdown station shall be readily accessible to have ready access for operating personnel. Where access to this station is likely to involve exposure to danger, an additional station shall be located adjacent to an exit from the area.

2404.7.8.2 Attachment. Overspray collection filters shall be readily removable and accessible have access for cleaning or replacement.
2703.10.1.1 Combustible workstations. A sprinkler head shall be installed within each branch exhaust connection or individual plenums of workstations of combustible construction. The sprinkler head in the exhaust connection or plenum shall be located not more than 2 feet (610 mm) from the point of the duct connection or the connection to the plenum. Where necessary to prevent corrosion, the sprinkler head and connecting piping in the duct shall be coated with approved or listed corrosion-resistant materials. The sprinkler head shall be accessible for periodic inspection.

Exceptions:
1. Approved alternative automatic fire-extinguishing systems are allowed. Activation of such systems shall deactivate the related processing equipment.
2. Process equipment that operates at temperatures exceeding 932°F (500°C) and is provided with automatic shutdown capabilities for hazardous materials.
3. Exhaust ducts 10 inches (254 mm) or less in diameter from flammable gas storage cabinets that are part of a workstation.
4. Ducts listed or approved for use without internal automatic sprinkler protection.

2703.10.4.4.5 Maintenance and inspection. Sprinklers in exhaust ducts shall be accessible for periodic inspection and maintenance.

2903.3 Fire-fighting access. Organic coating manufacturing operations shall be accessible from not less than one side for the purpose of fire control. Approved aisles shall be maintained for the unobstructed movement of personnel and fire suppression equipment.

3201.4 Evacuation plan. Where required by the fire code official, an evacuation plan for areas open to the public accessible areas and a separate set of plans indicating location and width of aisles, location of exits, exit access doors, exit signs, height of storage, and locations of hazardous materials shall be submitted at the time of permit application for review and approval. Following approval of the plans, a copy of the approved plans shall be maintained on the premises in an approved location.

### TABLE 3206.2
GENERAL FIRE PROTECTION AND LIFE SAFETY REQUIREMENTS

<table>
<thead>
<tr>
<th>COMMODITY CLASS</th>
<th>SIZE OF HIGH-PILED STORAGE AREA (square feet) (see Sections 3206.2 and 3206.4)</th>
<th>ALL STORAGE AREAS (see Sections 3206, 3207 and 3208)</th>
<th>SOLID-PILED STORAGE, SHELF STORAGE AND PALLETIZED STORAGE (see Section 3207.3)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Automatic fire-extinguishing system (see Section 3206.4)</td>
<td>Fire detection system (see Section 3206.5)</td>
<td>Building access (see Section 3206.6)</td>
</tr>
<tr>
<td>D-500</td>
<td>Not Requireda</td>
<td>Not Required</td>
<td>Not Requirede</td>
</tr>
</tbody>
</table>

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ICC COMMITTEE ACTION HEARINGS :: April, 2016

F30
| 501-2,500 | Not Required<sup>a</sup> | Yes<sup>j</sup> | Not Required<sup>e</sup> | Not Required | 100 | 40 | 100,000 |
| 2,501-12,000 | Open to the Public | Yes<sup>j</sup> | Not Required<sup>e</sup> | Not Required | 100 | 40 | 400,000 |
| 501-2,500 | Not Required<sup>a</sup> | Yes<sup>j</sup> | Not Required<sup>e</sup> | Not Required | 100 | 40 | 400,000 |
| Greater than 500,000 | Yes | Not Required<sup>e</sup> | Not Required<sup>e</sup> | Not Required<sup>e</sup> | 100 | 50 | 50,000 |
| ICC COMMITTEE ACTION HEARINGS ::: April, 2016 | F31 |
For SI: 1 foot = 304.8 mm, 1 cubic foot = 0.02832 m³, 1 square foot = 0.0929 m².

a. Where automatic sprinklers are required for reasons other than those in Chapter 32, the portion of the sprinkler system protecting the high-piled storage area shall be designed and installed in accordance with Sections 3207 and 3208.

b. For aisles, see Section 3206.9.

c. Piles shall be separated by aisles complying with Section 3206.9.

d. For storage in excess of the height indicated, special fire protection shall be provided in accordance with Note g where required by the fire code official. See Chapters 51 and 57 for special limitations for aerosols and flammable and combustible liquids, respectively.

e. Section 503 shall apply for fire apparatus access.

f. For storage exceeding 30 feet in height, Option 1 shall be used.

g. Special fire protection provisions including, but not limited to, fire protection of exposed steel columns; increased sprinkler density; additional in-rack sprinklers, without associated reductions in ceiling sprinkler density; or additional fire department hose connections shall be provided required by the fire code official.

h. High-piled storage areas shall not exceed 500,000 square feet. A 2-hour fire wall constructed in accordance with Section 706 the International Building Code shall be used to divide high-piled storage exceeding 500,000 square feet in area.

i. Not required where an automatic fire-extinguishing system is designed and installed to protect the high-piled storage area in accordance with Sections 3207 and 3208.

j. Not required where storage areas are protected by either early suppression fast response (ESFR) sprinkler systems or control mode special application sprinklers with a response time index of \( \frac{50 \text{ (m} \cdot \text{s})^{1/2}}{12} \) or less that are listed to control a fire in the stored commodities with 12 or fewer sprinklers, installed in accordance with NFPA 13.

3206.6.1 Access doors. Where building access is required by Table 3206.2, fire department access doors shall be provided in accordance with this section. Access doors shall be accessible- reachable without the use of a ladder.

3206.9.1.1 Sprinklered buildings. Aisles in sprinklered buildings shall be not less than 44 inches (1118 mm) wide. Aisles shall be not less than 96 inches (2438 mm) wide in high-piled storage areas exceeding 2,500 square feet (232 m²) in area, that are accessible to the public and designated to contain high-hazard commodities.

Exception: Aisles in high-piled storage areas exceeding 2,500 square feet (232 m²) in area, that are accessible- open to the public and designated to contain high-hazard commodities, are protected by a sprinkler system designed for multiple-row racks of high-hazard commodities shall be not less than 44 inches (1118 mm) wide.

Aisles shall be not less than 96 inches (2438 mm) wide in areas accessible- open to the public where mechanical stocking methods are used.

3309.1 Emergency telephone. Readily accessible emergency Emergency telephone facilities with ready access shall be provided in an approved location at the construction site. The street address of the construction site and the emergency telephone number of the fire department shall be posted adjacent to the telephone.

3313.1 Where required. In buildings required to have standpipes by Section 905.3.1, not less than one standpipe shall be provided for use during construction. Such standpipes shall be installed prior to construction exceeding 40 feet (12 192 mm) in height above the lowest level of fire department vehicle access. Such standpipe shall be provided with fire department hose connections at accessible locations adjacent to usable stairways. Such standpipes shall be extended as construction progresses to within one floor of the highest point of construction having secured decking or flooring.

3503.6 Signage. Visible hazard identification signs shall be provided where required by Chapter
50. Where the hot work area is accessible to persons other than the operator of the hot work equipment, conspicuous signs shall be posted to warn others before they enter the hot work area. Such signs shall display the following warning:

CAUTION HOT WORK IN PROGRESS STAY CLEAR

3504.2.6 Fire extinguisher. Not less than one portable fire extinguisher complying with Section 906 and with a minimum 2-A:20-B:C rating shall be readily accessible within 30 feet (9144 mm) of the location where hot work is performed.

5003.2.2.1 Design and construction. Piping, tubing, valves, fittings and related components used for hazardous materials shall be in accordance with the following:

1. Piping, tubing, valves, fittings and related components shall be designed and fabricated from materials that are compatible with the material to be contained and shall be of adequate strength and durability to withstand the pressure, structural and seismic stress and exposure to which they are subject.
2. Piping and tubing shall be identified in accordance with ASME A13.1 to indicate the material conveyed.
3. Readily accessible manual or automatic remotely activated fail-safe emergency shutoff valves shall be installed on supply piping and tubing at the following locations:
   3.1. The point of use.
   3.2. The tank, cylinder or bulk source.
4. Manual emergency shutoff valves and controls for remotely activated emergency shutoff valves shall be identified and the location shall have access be clearly visible, accessible and indicated by means of a sign.
5. Backflow prevention or check valves shall be provided where the backflow of hazardous materials could create a hazardous condition or cause the unauthorized discharge of hazardous materials.
6. Where gases or liquids having a hazard ranking of:

Health Class 3 or 4
Flammability Class 4
Instability Class 3 or 4
in accordance with NFPA 704 are carried in pressurized piping above 15 pounds per square inch gauge (psig) (103 kPa), an approved means of leak detection and emergency shutoff or excess flow control shall be provided. Where the piping originates from within a hazardous material storage room or area, the excess flow control shall be located within the storage room or area. Where the piping originates from a bulk source, the excess flow control shall be located as close to the bulk source as practical.

Exceptions:
1. Piping for inlet connections designed to prevent backflow.
2. Piping for pressure relief devices.

5004.2.3 Containment pallets. Where used as an alternative to spill control and secondary containment for outdoor storage in accordance with the exception in Section 5004.2, containment pallets shall comply with all of the following:

1. A liquid-tight sump accessible for visual inspection shall be provided.
2. The sump shall be designed to contain not less than 66 gallons (250 L).
3. Exposed surfaces shall be compatible with material stored.
4. Containment pallets shall be protected to prevent collection of rainwater within the sump.

5303.5.3 Securing compressed gas containers, cylinders and tanks. Compressed gas containers, cylinders and tanks shall be secured to prevent falling caused by contact, vibration or seismic activity. Securing of compressed gas containers, cylinders and tanks shall be by one of the following methods:

1. Securing containers, cylinders and tanks to a fixed object with one or more restraints.
2. Securing containers, cylinders and tanks on a cart or other mobile device designed for the movement of compressed gas containers, cylinders or tanks.
3. Nesting of compressed gas containers, cylinders and tanks at container filling or servicing facilities or in sellers' warehouses not accessible open to the public. Nesting shall be allowed provided the nested containers, cylinders or tanks, if dislodged, do not obstruct the required means of egress.
4. Securing of compressed gas containers, cylinders and tanks to or within a rack, framework, cabinet or similar assembly designed for such use.

   Exception: Compressed gas containers, cylinders and tanks in the process of examination, filling, transport or servicing.

5305.4 Valves. Valves utilized on compressed gas systems shall be suitable for the use intended and shall be accessible in a location with access. Valve handles or operators for required shutoff valves shall not be removed or otherwise altered to prevent access.

5503.4.3 Identification of containers. Stationary containers shall be identified with the manufacturing specification and maximum allowable working pressure with a permanent nameplate. The nameplate shall be installed on the container in an accessible location with access. The nameplate shall be marked in accordance with the ASME Boiler and Pressure Vessel Code or DOTn 49 CFR Parts 100-185.

5606.5.2.1 Smokeless propellant. Commercial stocks of smokeless propellants shall be stored as follows:

1. Quantities exceeding 20 pounds (9 kg), but not exceeding 100 pounds (45 kg) shall be stored in portable wooden boxes having walls of not less than 1 inch (25 mm) nominal thickness.
2. Quantities exceeding 100 pounds (45 kg), but not exceeding 800 pounds (363 kg), shall be stored in nonportable storage cabinets having walls not less than 1 inch (25 mm) nominal thickness. Not more than 400 pounds (182 kg) shall be stored in any one cabinet, and cabinets shall be separated by a distance of not less than 25 feet (7620 mm) or by a fire partition having a fire-resistance rating of not less than 1 hour.
3. Storage of quantities exceeding 800 pounds (363 kg), but not exceeding 5,000 pounds (2270 kg) in a building shall comply with all of the following:
   3.1. The warehouse or storage room is inaccessible not open to unauthorized personnel.
   3.2. Smokeless propellant shall be stored in nonportable storage cabinets having wood walls not less than 1 inch (25 mm) nominal thickness and having shelves with not more than 3 feet (914 mm) of separation between shelves.
   3.3. Not more than 400 pounds (182 kg) is stored in any one cabinet.
   3.4. Cabinets shall be located against walls of the storage room or warehouse with not less than 40 feet (12 192 mm) between cabinets.
3.5. The minimum required separation between cabinets shall be 20 feet (6096 mm) provided that barricades twice the height of the cabinets are attached to the wall, midway between each cabinet. The barricades must extend not less than 10 feet (3048 mm) outward, be firmly attached to the wall and be constructed of steel not less than \(\frac{1}{4}\) inch thick (6.4 mm), 2-inch (51 mm) nominal thickness wood, brick or concrete block.

3.6. Smokeless propellant shall be separated from materials classified as combustible liquids, flammable liquids, flammable solids or oxidizing materials by a distance of 25 feet (7620 mm) or by a fire partition having a fire-resistance rating of 1 hour.

3.7. The building shall be equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1.

4. Smokeless propellants not stored in accordance with Item 1, 2, or 3 above shall be stored in a Type 2 or 4 magazine in accordance with Section 5604 and NFPA 495.

5606.5.2.3 Small arms primers. Commercial stocks of small arms primers shall be stored as follows:

1. Quantities not to exceed 750,000 small arms primers stored in a building shall be arranged such that not more than 100,000 small arms primers are stored in any one pile and piles are not less than 15 feet (4572 mm) apart.

2. Quantities exceeding 750,000 small arms primers stored in a building shall comply with all of the following:
   2.1. The warehouse or storage building shall be accessible to unauthorized personnel.
   2.2. Small arms primers shall be stored in cabinets. Not more than 200,000 small arms primers shall be stored in any one cabinet.
   2.3. Shelves in cabinets shall have vertical separation of not less than 2 feet (610 mm).
   2.4. Cabinets shall be located against walls of the warehouse or storage room with not less than 40 feet (12 192 mm) between cabinets. The minimum required separation between cabinets shall be allowed to be reduced to 20 feet (6096 mm) provided that barricades twice the height of the cabinets are attached to the wall, midway between each cabinet. The barricades shall be firmly attached to the wall and shall be constructed of steel not less than \(\frac{1}{4}\) inch thick (6.4 mm), 2-inch (51 mm) nominal thickness wood, brick or concrete block.
   2.5. Small arms primers shall be separated from materials classified as combustible liquids, flammable liquids, flammable solids or oxidizing materials by a distance of 25 feet (7620 mm) by a fire partition having a fire-resistance rating of 1 hour.
   2.6. The building shall be protected throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1.

3. Small arms primers not stored in accordance with Item 1 or 2 of this section shall be stored in a magazine meeting the requirements of Section 5604 and NFPA 495.

5703.6.2.1 Special materials. Low-melting-point materials (such as aluminum, copper or brass), materials that soften on fire exposure (such as nonmetallic materials) and nonductile material (such as cast iron) shall be acceptable for use underground in accordance with the applicable standard listed in Table 5703.6.2. Where such materials are used outdoors in above-
ground piping systems or within buildings, they shall be in accordance with the applicable standard listed in Table 5703.6.2 and one of the following:

1. Suitably protected against fire exposure.
2. Located where leakage from failure would not unduly expose people or structures.
3. Located where leakage can be readily controlled by operation of accessible remotely located valves in a location with access.

In all cases, nonmetallic piping shall be used in accordance with Section 27.4.6 of NFPA 30.

5703.6.6.1 Backflow protections. Connections to pipelines or piping by which equipment (such as tank cars, tank vehicles or marine vessels) discharges liquids into storage tanks shall be provided with check valves or block valves for automatic protection against backflow where the piping arrangement is such that backflow from the system is possible. Where loading and unloading is done through a common pipe system, a check valve is not required. However, a block valve, located so as to be readily accessible with ready access or remotely operable, shall be provided.

5704.2.9.6.2 Separation between adjacent stable or unstable liquid tanks. The separation between tanks containing stable liquids shall be in accordance with Table 22.4.2.1 of NFPA 30. Where tanks are in a diked area containing Class I or II liquids, or in the drainage path of Class I or II liquids, and are compacted in three or more rows or in an irregular pattern, the fire code official is authorized to require greater separation than specified in Table 22.4.2.1 of NFPA 30 or other means to make tanks in the interior of the pattern accessible open for fire-fighting purposes.

**Exception:** Tanks used for storing Class IIIB liquids are allowed to be spaced 3 feet (914 mm) apart unless within a diked area or drainage path for a tank storing Class I or II liquids.

The separation between tanks containing unstable liquids shall be not less than one-half the sum of their diameters.

5704.2.9.7.5.1 Information signs. A permanent sign shall be provided at the fill point for the tank, documenting the filling procedure and the tank calibration chart.

**Exception:** Where climatic conditions are such that the sign may be obscured by ice or snow, or weathered beyond readability or otherwise impaired, said procedures and chart shall be located in the office window, lock box or other area accessible open to the person filling the tank.

5704.3.5.4 Combustible materials. In areas that are inaccessible not open to the public, Class I, II and IIIA liquids shall not be stored in the same pile or rack section as ordinary combustible commodities unless such materials are packaged together as kits.

5704.3.6.2 Container capacity. Containers for Class I liquids shall not exceed a capacity of 5 gallons (19 L).

**Exception:** Metal containers not exceeding 55 gallons (208 L) are allowed to store up to 240 gallons (908 L) of the maximum allowable quantity per control area of Class IB and IC liquids in a control area. The building shall be equipped throughout with an approved automatic sprinkler system in accordance with Table 5704.3.4.1. The containers shall be provided with plastic caps without cap seals and shall be stored upright. Containers shall
not be stacked or stored in racks and shall not be located in areas accessible open to the public.

5706.4.7.6 Piping, valves and fittings. Piping valves and fittings shall be in accordance with Section 5703.6 except as modified by the following:

1. Flexibility of piping shall be ensured by appropriate layout and arrangement of piping supports so that motion of the wharf structure resulting from wave action, currents, tides or the mooring of vessels will not subject the pipe to repeated excessive strain.
2. Pipe joints that depend on the friction characteristics of combustible materials or on the grooving of pipe ends for mechanical continuity of piping shall not be used.
3. Swivel joints are allowed in piping to which hoses are connected and for articulated, swivel-joint transfer systems, provided the design is such that the mechanical strength of the joint will not be impaired if the packing materials fail such as by exposure to fire.
4. Each line conveying Class I or II liquids leading to a wharf shall be provided with a readily accessible block valve located with ready access and on shore near the approach to the wharf and outside of any diked area. Where more than one line is involved, the valves shall be grouped in one location.
5. Means shall be provided for easy access to cargo line valves located below the wharf deck.
6. Piping systems shall contain a sufficient number of valves to operate the system properly and to control the flow of liquid in normal operation and in the event of physical damage.
7. Piping on wharves shall be bonded and grounded where Class I and II liquids are transported. Where excessive stray currents are encountered, insulating joints shall be installed. Bonding and grounding connections on piping shall be located on the wharf side of hose riser insulating flanges, where used, and shall be accessible in a location with ready access for inspection.
8. Hose or articulated swivel-joint pipe connections used for cargo transfer shall be capable of accommodating the combined effects of change in draft and maximum tidal range, and mooring lines shall be kept adjusted to prevent surge of the vessel from placing stress on the cargo transfer system.
9. Hoses shall be supported to avoid kinking and damage from chafing.

5706.4.10.4 Fire apparatus access. Where the wharf is accessible open to vehicular traffic, an unobstructed fire apparatus access road to the shore end of the wharf shall be maintained in accordance with Chapter 5.

5706.5.3.1.1 Shutoff valves. Approved automatically or manually activated shutoff valves shall be provided where the transfer hose connects to the process piping, and on both sides of any exterior fire-resistance-rated wall through which the piping passes. Manual shutoff valves shall be arranged so that they are accessible have access from grade. Valves shall not be locked in the open position.

5706.5.4.5 Commercial, industrial, governmental or manufacturing. Dispensing of Class II and III motor vehicle fuel from tank vehicles into the fuel tanks of motor vehicles located at commercial, industrial, governmental or manufacturing establishments is allowed where permitted, provided such dispensing operations are conducted in accordance with the following:

1. Dispensing shall occur only at sites that have been issued a permit to conduct mobile fueling.
2. The *owner* of a mobile fueling operation shall provide to the jurisdiction a written response plan which demonstrates readiness to respond to a fuel spill and carry out appropriate mitigation measures, and describes the process to dispose properly of contaminated materials.

3. A detailed site plan shall be submitted with each application for a permit. The site plan shall indicate: all buildings, structures and appurtenances on site and their use or function; all uses adjacent to the lot lines of the site; the locations of all storm drain openings, adjacent waterways or wetlands; information regarding slope, natural drainage, curbing, impounding and how a spill will be retained upon the site property; and the scale of the site plan. Provisions shall be made to prevent liquids spilled during dispensing operations from flowing into buildings or off-site. Acceptable methods include, but shall not be limited to, grading driveways, raising doorsills or other *approved* means.

4. The *fire code official* is allowed to impose limits on the times and days during which mobile fueling operations is allowed to take place, and specific locations on a site where fueling is permitted.

5. Mobile fueling operations shall be conducted in areas not *accessible* open to the public or shall be limited to times when the public is not present.

6. Mobile fueling shall not take place within 15 feet (4572 mm) of buildings, property lines, combustible storage or storm drains.

**Exceptions:**

1. The distance to storm drains shall not apply where an *approved* storm drain cover or an *approved* equivalent that will prevent any fuel from reaching the drain is in place prior to fueling or a fueling hose being placed within 15 feet (4572 mm) of the drain. Where placement of a storm drain cover will cause the accumulation of excessive water or difficulty in conducting the fueling, such cover shall not be used and the fueling shall not take place within 15 feet (4572 mm) of a drain.

2. The distance to storm drains shall not apply for drains that direct influent to *approved* oil interceptors.

9. The tank vehicle shall comply with the requirements of NFPA 385 and local, state and federal requirements. The tank vehicle's specific functions shall include that of supplying fuel to motor vehicle fuel tanks. The vehicle and all its equipment shall be maintained in good repair.

10. Signs prohibiting smoking or open flames within 25 feet (7620 mm) of the tank vehicle or the point of fueling shall be prominently posted on three sides of the vehicle including the back and both sides.

11. A portable fire extinguisher with a minimum rating of 40:BC shall be provided on the vehicle with signage clearly indicating its location.

12. The dispensing nozzles and hoses shall be of an *approved* and *listed* type.

13. The dispensing hose shall not be extended from the reel more than 100 feet (30 480 mm) in length.

14. Absorbent materials, nonwater-absorbent pads, a 10-foot-long (3048 mm) containment boom, an *approved* container with lid and a nonmetallic shovel shall be provided to mitigate a minimum 5-gallon (19 L) fuel spill.

15. Tank vehicles shall be equipped with a "fuel limit" switch such as a count-back switch, to limit the amount of a single fueling operation to not more than 500 gallons (1893 L) before resetting the limit switch.

**Exception:** Tank vehicles where the operator carries and can utilize a remote emergency shutoff device which, when activated, immediately causes flow of
fuel from the tank vehicle to cease.

16. Persons responsible for dispensing operations shall be trained in the appropriate mitigating actions in the event of a fire, leak or spill. Training records shall be maintained by the dispensing company.

17. Operators of tank vehicles used for mobile fueling operations shall have in their possession at all times an emergency communications device to notify the proper authorities in the event of an emergency.

18. The tank vehicle dispensing equipment shall be constantly attended and operated only by designated personnel who are trained to handle and dispense motor fuels.

19. Fuel dispensing shall be prohibited within 25 feet (7620 mm) of any source of ignition.

20. The engines of vehicles being fueled shall be shut off during dispensing operations.

21. Nighttime fueling operations shall only take place in adequately lighted areas.

22. The tank vehicle shall be positioned with respect to vehicles being fueled to prevent traffic from driving over the delivery hose.

23. During fueling operations, tank vehicle brakes shall be set, chock blocks shall be in place and warning lights shall be in operation.

24. Motor vehicle fuel tanks shall not be topped off.

25. The dispensing hose shall be properly placed on an approved reel or in an approved compartment prior to moving the tank vehicle.

26. The fire code official and other appropriate authorities shall be notified when a reportable spill or unauthorized discharge occurs.

27. Operators shall place a drip pan or an absorbent pillow under each fuel fill opening prior to and during dispensing operations. Drip pans shall be liquid-tight. The pan or absorbent pillow shall have a capacity of not less than 3 gallons (11.36 L). Spills retained in the drip pan or absorbent pillow need not be reported. Operators, when fueling, shall have on their person an absorbent pad capable of capturing diesel fuel overfills. Except during fueling, the nozzle shall face upward and an absorbent pad shall be kept under the nozzle to catch drips. Contaminated absorbent pads or pillows shall be disposed of regularly in accordance with local, state and federal requirements.

6004.2.2.10.3 Shut off of gas supply. The gas-detection system shall automatically close the shutoff valve at the source on gas supply piping and tubing related to the system being monitored for whichever gas is detected.

Exception: Automatic shutdown is not required for reactors utilized for the production of highly toxic or toxic compressed gases where such reactors are:

1. Operated at pressures less than 15 pounds per square inch gauge (psig) (103.4 kPa).
2. Constantly attended.
3. Provided with readily accessible emergency shutoff valves with ready access.

6109.9 Storage within buildings accessible open to the public. Department of Transportation (DOTn) specification cylinders with maximum water capacity of \(2^{1/2}\) pounds (1 kg) used in completely self-contained hand torches and similar applications are allowed to be stored or displayed in a building accessible open to the public. The quantity of LP-gas shall not exceed 200 pounds (91 kg) except as provided in Section 6109.11.

6109.10 Storage within buildings not accessible open to the public. The maximum quantity allowed in one storage location in buildings not accessible open to the public, such as industrial buildings, shall not exceed a water capacity of 735 pounds (334 kg) [nominal 300 pounds (136
kg) of LP-gas]. Where additional storage locations are required on the same floor within the same building, they shall be separated by not less than 300 feet (91 440 mm). Storage beyond these limitations shall comply with Section 6109.11.

6109.15 LP-gas cylinder exchange for resale. In addition to other applicable requirements of this chapter, facilities operating LP-gas cylinder exchange stations that are accessible open to the public shall comply with the following requirements.

1. Cylinders shall be secured in a lockable, ventilated metal cabinet or other approved enclosure.
2. Cylinders shall be accessible available only by authorized personnel or by use of an automated exchange system in accordance with Section 6109.15.1.
3. A sign shall be posted on the entry door of the business operating the cylinder exchange stating "DO NOT BRING LP-GAS CYLINDERS INTO THE BUILDING" or similar approved wording.
4. An emergency contact information sign shall be posted within 10 feet (3048 mm) of the cylinder storage cabinet. The content, lettering, size, color and location of the required sign shall be as required by the fire code official.

D102.1 Access and loading. Facilities, buildings or portions of buildings hereafter constructed shall be accessible open for fire department apparatus by way of an approved fire apparatus access road with an asphalt, concrete or other approved driving surface capable of supporting the imposed load of fire apparatus weighing at least 75,000 pounds (34 050 kg).

I101.3 Noncompliant conditions requiring component repair or replacement. The following shall be deemed noncompliant conditions and shall cause the related component(s) to be repaired or replaced to comply with the provisions of this code:

1. Sprinkler and standpipe system piping and fittings having any of the following conditions:
   1.1. Signs of leakage.
   1.2. Evidence of corrosion.
   1.3. Misalignment.
   1.4. Mechanical damage.
2. Sprinkler piping support having any of the following conditions:
   2.1. Materials resting on or hung from sprinkler piping.
   2.2. Damaged or loose hangers or braces.
3. Class II and Class III standpipe systems having any of the following conditions:
   3.1. No hose or nozzle, where required.
   3.2. Hose threads incompatible with fire department hose threads.
   3.3. Hose connection cap missing.
   3.4. Mildew, cuts, abrasions and deterioration evident.
   3.5. Coupling damaged.
   3.6. Gaskets missing or deteriorated.
   3.7. Nozzle missing or obstructed.
4. Hose racks and cabinets having any of the following conditions:
   4.1. Difficult to operate or damaged.
   4.2. Hose improperly racked or rolled.
   4.3. Inability of rack to swing 90 degrees (1.57 rad) out of the cabinet.
   4.4. Cabinet locked, except as permitted by this code.
   4.5. Cabinet door will not fully open.
   4.6. Door glazing cracked or broken.
5. Portable fire extinguishers having any of the following conditions:
   5.1. Broken seal or tamper indicator.
   5.2. Expired maintenance tag.
   5.3. Pressure gauge indicator in "red."
   5.4. Signs of leakage or corrosion.
   5.5. Mechanical damage, denting or abrasion of tank.
   5.6. Presence of repairs such as welding, soldering or brazing.
   5.7. Damaged threads.
   5.8. Damaged hose assembly, couplings or swivel joints.

6. Fire alarm and detection control equipment, initiating devices and notification appliances having any of the following conditions:
   6.1. Corroded or leaking batteries or terminals.
   6.2. Smoke detectors having paint or other ornamentation that is not factory-applied.
   6.3. Mechanical damage to heat or smoke detectors.
   6.4. Tripped fuses.

7. Fire department connections having any of the following conditions:
   7.1. Fire department connections are not visible or accessible available for access from the fire apparatus access road.
   7.2. Couplings or swivels are damaged
   7.3. Plugs and caps are missing or damaged.
   7.4. Gaskets are deteriorated.
   7.5. Check valve is leaking.
   7.6. Identification signs are missing.

8. Fire pumps having any of the following conditions:
   8.1. Pump room temperature is less than 40°F (4.4°C).
   8.2. Ventilating louvers are not freely operable.
   8.3. Corroded or leaking system piping.
   8.4. Diesel fuel tank is less than two-thirds full.
   8.5. Battery readings, lubrication oil or cooling water levels are abnormal.

L104.6 Isolation valves. System isolation valves that are accessible available for access by the fire department shall be installed on the system riser to allow piping beyond any air cylinder refill panel to be blocked.

L104.14.1 Location. The location of the external mobile air connection shall be accessible available for access by mobile air apparatus and approved by the fire chief.

2015 International Wildland-Urban Interface Code

[A] 109.1.1 General. Construction or work for which a permit is required by this code shall be subject to inspection by the code official and such construction or work shall remain accessible open for access and exposed for inspection purposes until approved by the code official.

It shall be the duty of the permit applicant to cause the work to remain accessible open for access and exposed for inspection purposes. Neither the code official nor the jurisdiction shall be liable for expense entailed in the removal or replacement of any material required to allow inspection.

Approval as a result of an inspection shall not be construed to be an approval of a violation of the provisions of this code or of other ordinances of the jurisdiction. Inspections presuming to give authority to violate or cancel the provisions of this code or of other ordinances of the jurisdiction shall not be valid.
Where required by the code official, a survey of the lot shall be provided to verify that the mitigation features are provided and the building or structure is located in accordance with the approved plans.

**403.1 Restricted access.** Where emergency vehicle access is restricted because of secured access roads or driveways or where immediate access is necessary for life-saving or fire-fighting purposes, the code official is authorized to require a key box to be installed in an accessible location with access. The key box shall be of a type approved by the code official and shall contain keys to gain necessary access as required by the code official.

**ALTERNATIVE CONCEPTS**

This appendix chapter provides consideration of the following alternatives: (1) exterior sprinkler systems, (2) alternative water supply systems for exposure protection, (3) Class A foam systems, (4) enhanced exterior fire protection, (5) sheltering in place, and (6) building location.

**Exterior sprinkler systems.** Currently, there is no nationally accepted standard for the design and installation of exterior fire sprinkler systems. Interior sprinkler systems are regulated by nationally recognized standards that have specific requirements. However, exterior sprinkler systems lack such uniformity. What is generally proposed is a type of sprinkler system, placed on the roofs or eaves of a building, whose primary purpose is to wet down the roof. These types of systems can be activated either manually or automatically. However, the contemporary thought on exterior sprinkler systems is that if the roof classification is of sufficient fire resistance, exterior sprinklers are of little or no value.

Another option and alternative with exterior sprinklers is to use them to improve the relative humidity and fuel moisture in the defensible space. In this case, the exterior sprinkler is not used to protect the structure as much as it attempts to alter the fuel situation. However, studies do not support the idea that merely spraying water into the air in the immediate vicinity of a rapidly advancing wildland-urban fire does much good. Clearly, irrigation systems that keep plants healthy and fire-resistant plants that resist convection and radiated heat can accomplish the same purpose.

**Alternative water supply systems for exposure protection.** Pools and spas are often offered as an alternative water source for fire departments. These water sources must be accessible, open for access, and reliable to be of any use by fire protection forces. Accessibility means that the fire department must be able to withdraw the water without having to go through extraordinary measures such as knocking down fences or having to set up drafting situations. Designs have been created to put liquid- or gas-fueled pumps or gravity valves on pools and spas to allow fire departments to access these water systems. A key vulnerability to the use of these alternative water systems is loss of electrical power. When the reliability of a water system depends on external power sources, it cannot be relied upon by fire fighters to be available in a worst-case scenario.

**Class A foam systems.** A new and emerging technology is the concept of Class A foam devices. These are devices that allow a homeowner to literally coat the exterior of their house with a thick layer of foam that prevents the penetration of embers and radiant heat to the structure. There is no nationally recognized standard for Class A foam technology; however, experiments in various wildland fire agencies seem to advocate foaming houses in advance of fire and flame fronts. To be accepted by the code official, the Class A foam system should pass rigorous scrutiny with regard to the manner and needs in which it is activated, the ways and means in which it is properly maintained, and a ways and means to test the system for its operational readiness during hiatus between emergencies.

**Enhanced exterior fire protection.** This alternative method would increase the degree of fire resistance on the exterior of a building. This is most often an alternative recommended as a retroactive application when individual properties cannot achieve adequate defensible space on the...
exterior of a building. Normally, fire resistance and building scenarios are concerned with containing a fire. Fire-resistance ratings within building design infer resistance to a fire for the specified time to compartmentalize the building's interior.

To improve fire resistance on the exterior of the structure, the primary emphasis is on preventing intrusion into the building. This means protection of apertures and openings that may or may not be required to have any degree of fire resistance by accepted building codes. The option that is available here is for individuals to provide coverage in the form of shutters or closures to these areas, which, along with maintenance of perimeter-free combustibles, can often prevent intrusion.

There are obvious limitations to this alternative. First and foremost is the means of adequately evaluating the proposed fire resistance of any given assembly. Testing techniques to determine fire resistance for such objects as drywall and other forms of construction may not be applicable to exterior application. Nonetheless, code officials should determine the utility of a specific fire resistance proposal by extrapolating conservatively.

**Shelter in place.** Developments in the wildland-urban interface may be designed to allow occupants to "Shelter in Place." Use of this design alternative should include ignition-resistant construction, access, water supply, automatic sprinkler systems, provisions for and maintenance of defensible space, and a Fire Protection Plan.

A Fire Protection Plan describes ways to minimize the fire problems created by a specific project or development. The purpose for the Fire Protection Plan is to reduce the burden and impact of the project or development on the community's fire protection delivery system. The plan may utilize components of land use, building construction, vegetation management and other design techniques and technologies. It should include specific mitigation measures consistent with the unique problems resulting from the location, topography, geology, flammable vegetation and climate of the proposed site. The plan shall be consistent with this code, and approved by the fire code official. The cost of preparation and review is to be borne by the project or development proponent.

**Building location.** The location of a new building within lot lines should be considered as it relates to topography and fire behavior. Buildings located in natural chimneys, such as narrow canyons and saddles, are especially fire prone because winds are funneled into these areas and eddies are created. Buildings located on narrow ridges without setbacks may be subjected to increased flame and convective heat exposure from a fire advancing from below. Stone or masonry walls can act as heat shields and deflect the flames. Swimming pools and rated or noncombustible decks and patios can be used to create a setback, decreasing the exposure to the structure. Attic and under floor vents, picture windows and sliding glass doors should not face possible corridors due to the increased risk of flame or ember penetration.

### 2015 International Mechanical Code

**[F] 513.12.4 Automatic control.** Where complete automatic control is required or used, the automatic control sequences shall be initiated from an appropriately zoned automatic sprinkler system complying with Section 903.3.1.1 of the International Fire Code, from manual controls that are readily accessible to with access by the fire department, and any smoke detectors required by engineering analysis.

**Reason:** Coordination with P84-15 which replaced the term 'accessibility' with the clarification of providing access for repair or replacement or open to a location or fire department access. The term 'accessible' is defined in the IBC and relates to elements and facilities that serve or have special accommodations for persons with mobility impairments. The IPC and IMC use the term "Access (to)" or "Ready Access" – see below. This will clarify that the provisions are for access for repair, not accessibility for persons with disabilities.

**[M] ACCESS (TO).** That which enables a device, appliance or equipment to be reached by ready access or by a means that first requires the removal or movement of a panel, door or similar obstruction [see also "Ready access
READY ACCESS (TO). That which enables a device, appliance or equipment to be directly reached, without requiring the removal or movement of any panel, door or similar obstruction [see "Access (to)"].

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire safety and hazardous materials in new and existing buildings and facilities and the protection of life and property in wildland urban interface areas. In 2014 and 2015 the Fire-CAC has held 5 open meetings. In addition, there were numerous conference calls, Regional Work Group and Task Group meetings for the current code development cycle, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC

Cost Impact: Will not increase the cost of construction
This is a change in terminology for clarity and will have not technical changes to the codes.

F12-16 : 311.2.1-O'BRIAN13441
2015 International Fire Code

Add new text as follows:

311.2.2 Fire protection. Fire alarm, sprinkler and stand-pipe systems shall be maintained in an operable condition at all times.

Exceptions:

1. Where the premises have been cleared of all combustible materials and debris and, in the opinion of the fire code official, the type of construction, fire separation distance and security of the premises do not create a fire hazard.

2. Where approved by the fire chief, buildings that will not be heated and where fire protection systems will be exposed to freezing temperatures, fire alarm and sprinkler systems are permitted to be placed out of service and standpipes are permitted to be maintained as dry systems (without an automatic water supply), provided the building has no contents or storage, and windows, doors and other openings are secured to prohibit entry by unauthorized persons.

3. Seasonally occupied buildings that will not be heated and where fire protection systems will be exposed to freezing temperatures, fire alarm and sprinkler systems are permitted to be placed out of service in buildings that have fire areas not exceeding 12,000 square feet and do not store motor vehicles or hazardous materials.

Reason: Seasonally occupied buildings are currently addressed in Section 311.3 to permit combustible material to remain inside of vacant buildings. This is common practice during the off season, basically making an occupied building into a storage building. However, this allowance is not carried over to buildings with fire protection systems. This proposal permits a seasonally occupied building that would be subject to freezing temperatures to be treated like a storage occupancy rather than another type that has fire protection systems; mainly assembly occupancies. It incorporates the limitation of 12,000 square feet as the maximum fire area since this is the maximum size a Group S-1 fire area can be without sprinkler protection. Even though a Type Vb can only be 9,000 square feet per IBC Table 506.2, allowing up to 12,000 square feet in line with the sprinkler requirements is more appropriate since these buildings generally have the access around them and the heating system is not operational. Further, the limitation of vehicles and hazardous materials is done to address areas where sprinkler protection would be required at a lower threshold.

Even though the thresholds have been focused on sprinkler systems, the disabling of fire alarm systems and smoke alarms is lesser of an issue in seasonally occupied buildings since they are mainly based on the type and ability of occupants.

The goal of this proposal is to assist fire code officials deal with a issue in many areas of the country that are seasonal in nature.

Cost Impact: Will not increase the cost of construction
This is a maintenance issue therefore no construction cost is associated with this requirement.
311.2.2 Fire protection. Fire alarm, sprinkler and stand-pipe systems shall be maintained in an operable condition at all times.

Exceptions:

1. Where the premises have been cleared of all combustible materials and debris and, in the opinion of the fire code official, the type of construction, fire separation distance and security of the premises do not create a fire hazard.
2. Where approved by the fire chief code official, buildings that will not be heated and where fire protection systems will be exposed to freezing temperatures, fire alarm and sprinkler systems are permitted to be placed out of service and standpipes are permitted to be maintained as dry systems (without an automatic water supply), provided the building has no contents or storage, and windows, doors and other openings are secured to prohibit entry by unauthorized persons.

503.6 Security gates. The installation of security gates across a fire apparatus access road shall be approved by the fire chief code official. Where security gates are installed, they shall have an approved means of emergency operation. The security gates and the emergency operation shall be maintained operational at all times. Electric gate operators, where provided, shall be listed in accordance with UL 325. Gates intended for automatic operation shall be designed, constructed and installed to comply with the requirements of ASTM F 2200.

508.1.1 (IBC [F] 911.1.1) Location and access. The location and accessibility of the fire command center shall be approved by the fire chief code official.

907.5.1 Presignal feature. A presignal feature shall not be installed unless approved by the fire code official and the fire department. Where a presignal feature is provided, a signal shall be annunciated at a constantly attended location approved by the fire department, fire code official, so that occupant notification can be activated in the event of fire or other emergency.

909.15 Control diagrams. Identical control diagrams showing all devices in the system and identifying their location and function shall be maintained current and kept on file with the fire code official, the fire department and in the fire command center in a format and manner approved by the fire chief fire code official.

912.2 Location. With respect to hydrants, driveways, buildings and landscaping, fire department connections shall be so located that fire apparatus and hose connected to supply the system will not obstruct access to the buildings for other fire apparatus. The location of fire department connections shall be approved by the fire chief fire code official.
912.2.1 Visible location. Fire department connections shall be located on the street side of buildings, fully visible and recognizable from the street or nearest point of fire department vehicle access or as otherwise approved by the fire chief.

912.4 Access. Immediate access to fire department connections shall be maintained at all times and without obstruction by fences, bushes, trees, walls or any other fixed or moveable object. Access to fire department connections shall be approved by the fire chief.

Exception: Fences, where provided with an access gate equipped with a sign complying with the legend requirements of Section 912.5 and a means of emergency operation. The gate and the means of emergency operation shall be approved by the fire chief.

912.4.2 Clear space around connections. A working space of not less than 36 inches (914 mm) in width, 36 inches (914 mm) in depth and 78 inches (1981 mm) in height shall be provided and maintained in front of and to the sides of wall-mounted fire department connections and around the circumference of free-standing fire department connections, except as otherwise required or approved by the fire chief.

3209.4 Automated rack storage. High-piled storage areas with automated rack storage shall be provided with a manually activated emergency shutdown switch for use by emergency personnel. The switch shall be clearly identified and shall be in a location approved by the fire chief.

B103.1 Decreases. The fire chief is authorized to reduce the fire-flow requirements for isolated buildings or a group of buildings in rural areas or small communities where the development of full fire-flow requirements is impractical.

B103.2 Increases. The fire chief is authorized to increase the fire-flow requirements where conditions indicate an unusual susceptibility to group fires or conflagrations. An increase shall not be more than twice that required for the building under consideration.

D103.2 Grade. Fire apparatus access roads shall not exceed 10 percent in grade.

Exception: Grades steeper than 10 percent as approved by the fire chief.

L104.14.1 Location. The location of the external mobile air connection shall be accessible to mobile air apparatus and approved by the fire chief.

2015 International Building Code

Revise as follows:

[F] 403.4.6 Fire command. A fire command center complying with Section 911 shall be provided in a location approved by the fire department.

Reason: This proposal will provide consistency when approval is needed for items utilized during firefighting operations. The IFC and IBC both contain requirements where either the "fire code official", or the "fire chief", or the "fire department" needs to provide approval. Most sections in the IFC and IBC require approval by the fire code official, but for example, IBC Section 403.4.6 refers to the "fire department" for approval of the location of the fire command center.

The definition of "fire code official" states, "The fire chief or other designated authority charged with the administration and enforcement of the code, or a duly authorized representative." Therefore, when approval is required, this proposal is suggesting that the fire code official is the appropriate term.

If the fire code official is not the fire chief, then the fire code official still has the ability to confer with the fire chief to
obtain their input. The authority and responsibility will be assigned to the fire code official as it is done throughout the rest of the code.

The change to the title in IBC Section 403.4.6 is merely editorial, but it more appropriately describes the content of the section.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire safety and hazardous materials in new and existing buildings and facilities and the protection of life and property in wildland urban interface areas. In 2014 and 2015 the Fire-CAC has held 5 open meetings. In addition, there were numerous conference calls, Regional Work Group and Task Group meetings for the current code development cycle, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC

Cost Impact: Will not increase the cost of construction
This is only a change in terminology.
2015 International Fire Code
SECTION 313 FUELED EQUIPMENT

Revise as follows:

313.1 General. Fueled equipment including, but not limited to, motorcycles, mopeds, lawn-care equipment, portable generators and portable cooking equipment, shall not be stored, operated or repaired within a building.

Exceptions:

1. Buildings or rooms constructed for such use in accordance with the International Building Code.
2. Where allowed by Section 314.
3. Storage of equipment utilized for maintenance purposes is allowed in approved locations where the aggregate fuel capacity of the stored equipment does not exceed 10 gallons (38 L) and the building is equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or an automatic water mist system installed in accordance with Section 904.11.

Reason: Water mist systems are listed/approved by UL and FM Global for use in Light and Ordinary Hazard occupancies and machinery spaces. The spaces described in this section are consistent with the listings/approvals. Automatic water mist systems provide a water efficient alternative to sprinkler systems. Water mist systems reduce the water supply demand which can be of significance in areas where municipal water supplies may be marginal or inadequate for conventional sprinklers. Reducing the water demand for automatic fire protection systems that are tested in the same manner by recognized laboratories to conventional sprinklers, will encourage the installation of fire protection where water shortages due to drought may be a problem. Furthermore, the reduced discharge from water mist systems, compared to conventional sprinklers, in turn reduces the potential water damage.

Water have been used for years in buildings and on passenger ships specifically as a "sprinkler equivalent system" per Resolution A.800(19), November 1995 (IMO A800). The listings of the systems have been used as design guidance in buildings.

Water mist works to extinguish, suppress or control fires in fully open or enclosed compartments. Water-mist systems tested in environments identical to automatic sprinkler testing and have been found to achieve at least equal performance using less water than conventional sprinklers.

Cost Impact: Will not increase the cost of construction
This provides another suppression option only.
F16-16
IFC: 314.4.
Proponent: William Freer, New York State Office of Fire Prevention and Control
(william.freer@dhses.ny.gov)

2015 International Fire Code
Revise as follows:

314.4 Vehicles. Liquid- or gas-fueled vehicles, boats or other motorcraft shall not be located indoors except as follows:

1. Batteries are disconnected except where the fire code official requires that the batteries remain connected to maintain safety features.
2. Fuel in fuel tanks does not exceed one-quarter tank or 5 gallons (19 L) (whichever is least).
3. Fuel tanks and fill openings are closed and sealed to prevent tampering.
4. Vehicles, boats or other motorcraft equipment are not fueled or defueled within the building.

Reason: The intent of this section of the code is to safely be able to display fueled vehicles indoors. For normal gasoline or diesel fueled vehicles this would section is appropriate as it stands, but technology has now brought us alternative fueled vehicles. Some alternative fuel sourced vehicles have gas alarms that would be shut off if the batteries were disconnected. This code change allows the Fire Code Official to determine which method of safeguarding is more appropriate for the vehicle in question.

Cost Impact: Will not increase the cost of construction
There is no impact to the cost of construction. The code changes deals with operational issues. It provides clarification to code officials in dealing with newer technology type vehicles.
F17-16
IFC: 314.4.
Proponent: Martin Gresho, representing FP2FIRE (marty@fp2fire.com)

2015 International Fire Code

314.4 Vehicles. Liquid-fueled or gas-fueled vehicles, boats or other motorcraft shall not be located indoors except as follows:

1. Batteries are disconnected.
2. Fuel in fuel tanks does not exceed one-quarter tank or 5 gallons (19 L) (whichever is least).
3. Fuel tanks and fill openings are closed and sealed to prevent tampering.
4. Vehicles, boats or other motorcraft equipment are not fueled or defueled within the building.

Reason: This change is intended to improve clarity. The code intent is that liquid fueled vehicles means those that use gasoline, diesel etc as a fuel. Gas fueled refers to those that are fueled by compressed natural gas, propane and more recently, hydrogen. The current wording has left some jurisdictions think the code is silent on gaseous fueled vehicles because the term "gas-fueled" has been interpreted to mean liquid gasoline not gaseous fuels. This has led to a requirement to completely defuel hydrogen fueled vehicles in these vehicle prior to including them in an indoor display. This causes difficulty in moving the vehicles in and out of the show. The term "gaseous fuel" is used in other locations within the code and better communicates actual intent of the requirement.

Cost Impact: Will increase the cost of construction
This change affects operational requirements associated with indoor displays of vehicles. There is no impact to the cost of construction.
2015 International Fire Code
CHAPTER 1 SCOPE AND ADMINISTRATION
SECTION 105 PERMITS

105.6.30 Miscellaneous combustible storage. An operational permit is required to store in any building or upon any premises in excess of 2,500 cubic feet (71 m³) gross volume of combustible material, empty packing cases, boxes, barrels or similar containers, combustible pallets, rubber tires, rubber, cork or similar combustible material.

CHAPTER 3 GENERAL REQUIREMENTS
SECTION 315 GENERAL STORAGE

Revise as follows:

315.1 General. Storage shall be in accordance with Sections 315.2 through 315.6. Outdoor pallet storage shall be in accordance with Section 315.2 and 315.7.

Add new text as follows:

315.7 Outdoor Pallet Storage Pallets shall be stored outdoors and shall comply with Sections 315.7 through 315.7.8. Pallets stored within a building shall be protected in accordance with Chapter 32.

315.7.1 Storage beneath overhead projections from buildings Where buildings are equipped throughout with an automatic sprinkler system, the outdoor storage of pallets under eaves, canopies or other projections or overhangs are prohibited except where automatic sprinklers are installed under such eaves, canopies or other projections or overhangs.

315.7.2 Distance to lot line. Pallet storage shall not be located within 10 feet (3048 mm) of a lot line.

315.7.3 Storage height Pallet storage shall not exceed 20 feet (6096 mm) in height.

315.7.4 Pallet pile stability and size Pallet stacks shall be arranged to form stable piles. Individual pallet piles shall not cover an area of greater than 400 ft² (37 m²).

315.7.5 Pallet types Wood pallets shall be all wood with slatted or solid top or bottom, with metal fasteners or shall be plastic or composite pallets listed and labeled in accordance with UL 2335 or FM 4996. Plastic pallets shall be both solid and gridded deck, independent of the pallet manufacturing process, type of resin used in fabrication, or geometry of the pallet.

315.7.6 Pile separation distances In addition to the other requirements of this section, wood pallet stacks and piles shall be in accordance with the separation distances in Table 315.7.6(a) and plastic pallet stacks and piles shall be in accordance with separation distances in Table 315.7.6(b).

TABLE Table 315.7.6(a)
<table>
<thead>
<tr>
<th>Wall Construction</th>
<th>Type of Wall</th>
<th>Less than or equal to 50 Pallets</th>
<th>51 to 200 Pallets</th>
<th>More than 200 Pallets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Masonry None</td>
<td>Wired Glass with Open Sprinklers</td>
<td>2 (0.6)</td>
<td>5 (1.5)</td>
<td>20 (6.0)</td>
</tr>
<tr>
<td>Masonry Wired Glass</td>
<td>Wired Glass</td>
<td>10 (3.0)</td>
<td>5 (1.5)</td>
<td>20 (6.0)</td>
</tr>
<tr>
<td>Masonry Plain Glass with Open Sprinklers</td>
<td>10 (3.0)</td>
<td>5 (1.5)</td>
<td>20 (6.0)</td>
<td></td>
</tr>
<tr>
<td>Noncombustible None</td>
<td>None</td>
<td>10 (3.0)</td>
<td>5 (1.5)</td>
<td>20 (6.0)</td>
</tr>
<tr>
<td>Wood with Open Sprinklers</td>
<td>10 (3.0)</td>
<td>5 (1.5)</td>
<td>20 (6.0)</td>
<td></td>
</tr>
<tr>
<td>Wood None</td>
<td>Any Plain Glass</td>
<td>15 (4.5)</td>
<td>30 (9.0)</td>
<td>90 (27.0)</td>
</tr>
<tr>
<td>Any Between Pallet Piles</td>
<td></td>
<td>7.5 (2.3)</td>
<td>15 (4.5)</td>
<td>45 (13.5)</td>
</tr>
<tr>
<td>Other on-site storage</td>
<td></td>
<td>7.5 (2.3)</td>
<td>15 (4.5)</td>
<td>45 (13.5)</td>
</tr>
</tbody>
</table>

**TABLE 315.7.6(b)**
<table>
<thead>
<tr>
<th>Wall Construction</th>
<th>Type of Wall</th>
<th>Window Openings</th>
<th>Plastic Pallet Separation Distance, ft (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Masonry</td>
<td>Wired Glass</td>
<td>2 (0.6)</td>
</tr>
<tr>
<td>20</td>
<td>Masonry</td>
<td>Wired Glass</td>
<td>20 (6.0)</td>
</tr>
<tr>
<td>100</td>
<td>Masonry</td>
<td>Wired Glass</td>
<td>100 (30.0)</td>
</tr>
<tr>
<td>15</td>
<td>Masonry</td>
<td>Wired Glass</td>
<td>15 (4.5)</td>
</tr>
<tr>
<td>40</td>
<td>Masonry</td>
<td>Wired Glass</td>
<td>40 (12.0)</td>
</tr>
<tr>
<td>50</td>
<td>Masonry</td>
<td>Wired Glass</td>
<td>50 (15.0)</td>
</tr>
<tr>
<td>10</td>
<td>Masonry</td>
<td>Wired Glass</td>
<td>10 (3.0)</td>
</tr>
<tr>
<td>40</td>
<td>Masonry</td>
<td>Wired Glass</td>
<td>40 (12.0)</td>
</tr>
<tr>
<td>100</td>
<td>Masonry</td>
<td>Wired Glass</td>
<td>100 (30.0)</td>
</tr>
<tr>
<td>15</td>
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**315.7.7 Prohibited locations** Pallets shall not be stored underneath high-voltage transmission.
lines, elevated roadways or elevated railways.

**Reason:** There has been an increasing number of large scale fires involving the outdoor storage of combustible pallets. Numerous local jurisdictions have been adding local requirements to their fire code adoptions to deal with this increased fire threat. These new requirements are to provide code language in the IFC addressing the high challenge fire protection issues involving large amounts of idle pallets.

In prior additions of the IFC there was a reference to NFPA 230 Fire Protection of Storage. Within that document were requirements for outdoor storage of pallets, however, NFPA discontinued maintenance of that document and the storage requirements for pallets and other materials were placed within NFPA 1 Fire Code.

NFPA 1 Fire Code regulates the Storage of Idle Pallets at Section 34.10.1

NFPA 1 Fire Code partial extract with annex notes.


34.10 Storage of Idle Pallets.

34.10.1* General. Idle pallets shall be stored outside or in a separate building designated for pallet storage, unless permitted by 34.10.2.

A.34.10.1 Idle pallet storage introduces a severe fire condition. Stacking idle pallets in piles is the best arrangement of combustibles to promote rapid spread of fire, heat release, and complete combustion. After pallets are used for a short time in warehouses, they dry out and edges become frayed and splintered. In this condition they are subject to easy ignition from a small ignition source. Again, high piling increases considerably both the challenge to sprinklers and the probability of involving a large number of pallets when fire occurs. Therefore, storing idle pallets outdoors where possible is preferable. A fire in idle plastic or wooden pallets is one of the greatest challenges to sprinklers. The undersides of the pallets create a dry area on which a fire can grow and expand to other dry or partially wet areas. This process of jumping to other dry, closely located, parallel, combustible surfaces continues until the fire bursts through the top of the stack. Once this happens, very little water is able to reach the base of the fire. The only practical method of stopping a fire in a large concentration of pallets with ceiling sprinklers is by means of prewetting. In high stacks, prewetting cannot be done without abnormally high water supplies. The storage of idle pallets should not be permitted in an unsprinklered warehouse containing other storage.

34.10.2 Indoor Storage. Idle pallets shall be permitted to be stored in a building used for other storage or other purpose if the building is sprinklered in accordance with Section 13.3.

34.10.3* Outdoor Storage. Idle pallets stored outside shall be stored in accordance with Table 34.10.3(a) and Table 34.10.3(b).

A.34.10.3 The practice that some materials are stored on pallets in an open yard is recognized. Since stacks of idle pallets present a severe fire problem, attention needs to be paid to the storage arrangements of the pallets. Manual outside open sprinklers generally are not a reliable means of protection unless property is attended to at all times by plant emergency personnel. Open sprinklers with a deluge valve are preferred.

In addition to the old NFPA 230 and current NFPA 1 language. FM Global produces a Property Loss Prevention Data Sheet 8-24 Idle Pallet Storage which has similar requirements for outdoor pallet storage. One significant difference is that the FM Global document provides increased separation distances for the storage of plastic pallets.

This proposal utilized the general storage provisions currently in Section 315 of the IFC along with the provisions of the NFPA 1 and FM Global requirements to develop these outdoor storage requirements. The distances in the tables are primarily from the FM Global document with other distances extracted from NFPA 1 or the current IFC provisions. Since the requirements are currently in existence and have been for some time, they serve as an existing standard to be applied.

**Cost Impact:** Will not increase the cost of construction

This proposal addresses exterior storage of pallets and does not impact the cost of construction.
F19-16

IFC: 315.3.1.

Proponent: Daniel Nichols, New York State Division of Building Standards and Codes, representing New York State Division of Building Standards and Codes (dnichols@dos.state.ny.us)

2015 International Fire Code

315.3.1 Ceiling clearance. Storage shall be maintained 2 feet (610 mm) or more below the ceiling in nonsprinklered areas of buildings or not less than 18 inches (457 mm) below sprinkler head deflectors in sprinklered areas of buildings.

Exception: The 2 foot ceiling clearance is not required for storage along walls in nonsprinklered areas of buildings.

Reason: The limitation of storage heights in unsprinklered spaces is to address the ability for firefighters to direct hose streams over stored materials to extinguish fires in other spaces within a room. However, the storage of materials along the wall does not impede this ability.

The installation of built-in combustible cabinetry, such as wall-mounted cabinets without doors, is not prohibited by the section. The arrangement of the storage should not be regulated differently if it is in fixed cabinets or on shelves since the fire hazard does not change.

This proposal will assist fire code officials that routinely question whether the arrangement of storage along walls is permitted or not permitted because of the type of shelving or cabinetry the storage is located on.

Cost Impact: Will not increase the cost of construction
This is a maintenance issue and will not effect the cost of construction.
F20-16
IFC: 315.3.2.
Proponent: Jeffrey Shapiro, representing Self (jeff.shapiro@intlcodeconsultants.com)

2015 International Fire Code

Revise as follows:

315.3.2 Means of egress. Combustible materials shall not be stored in exits or exits; enclosures for stairways, stairways, and ramps, ramps; or exit access corridors serving an occupant load of 30 or more.

Reason: So as to not lose a good idea, this proposal takes another approach to what was attempted by Proposal F16-13, submitted by the ICC Fire Code Action Committee and seeking to place a restriction on storage in exit access corridors. It should be noted that the term "exit access corridor" appears in italics, as it does in other places in the code where it has been used, because the terms "exit access" and "corridor" are defined. The combined term is not.

Not having some restriction on combustible storage in exit access corridors is a significant hole in the IFC that has directly contributed to past multiple-fatality fires. Last cycle, the Fire Code Committee cited Section 1020 as an existing section of the code that adequately addresses this concern, but that is not correct. Section 1020 does address maintaining the required minimum width, but it does not address the concern of combustible materials in an exit access corridor which, if ignited, will cause the corridor to be unusable as a means of egress regardless of whether the physical dimension of minimum corridor width was reduced by the stored material. The committee statement also expressed concern about a lack of clarity associated with the term "stored," but this term is already in the existing code text that is applicable to exits and stairway/ramp enclosures. This proposal simply continues to use the existing term.

This issue originated as a result of rolled carpet, padding and adhesive being stored in the corridor of a hotel where ICC was holding committee meetings. The hotel was being remodeled. Fire code officials who were present at the meeting were concerned about the risk that this storage created, and we looked for a code section that could be cited as a basis for asking management to remove these materials from the exit access corridor. To our surprise, we couldn't come up with any such requirement in the IFC to address the issue (although many of us were sure that there must be one somew here).

It is understood that the committee had some heartburn with last cycle's proposal targeting all corridors, and this proposal takes a different approach. The basis of applying this provision to exit access corridors serving 30 or more occupants is an attempt to find a "reasonable" threshold for the requirement, avoiding broad application to all corridors. IFC Table 1020.1 was used as a guide. It establishes corridor fire-resistance thresholds which indicate that an increased level of safety is warranted for the means of egress, and the occupant load of 30 was considered to be a reasonable trigger from that table for corridor storage regulations.

Cost Impact: Will not increase the cost of construction
The proposal deals with use of existing buildings and does not affect construction.
F21-16

IFC: 315.3.2.1 (New).

Proponent: Stephen DiGiovanni, Clark County Department of Building and Fire Prevention, representing Southern Nevada Chapter of ICC (sdigiovanni@clarkcountynv.gov)

2015 International Fire Code

Add new text as follows:

315.3.2.1 Group A Occupancies  Corridors and hallways serving Group A Occupancies that are over-sized with floor space exceeding the required egress width are permitted to contain combustible storage incidental to the use of the occupancy where all of the following are provided:

1. Maximum height of storage is 8 feet with top of storage a minimum of 18 inches below sprinkler deflectors.
2. Quick response sprinklers designed in accordance with the requirements for an ordinary hazard group II occupancy, or higher design based on the items stored and the proposed storage configuration in accordance with NFPA 13.
3. Approved permanent durable floor plan(s) showing the assembly use, storage area, corridors and hallways are installed at a location(s) as required by the fire code official.
4. Plans approved by the code official identifying the minimum required width of the corridors or hallways.
5. Where required by the fire code official, a technical opinion and report shall be submitted addressing the parameters of storage, including protection requirements, separation requirements, and description of commodity type and configuration.
6. The approved storage area shall be separated from a demarcated egress path defined by full- or partial- height walls or similar construction that maintains the required width and lead directly from the assembly area to the exit without obstructions.

Exception: Where approved by the fire code official, the floor surface shall be marked as an alternative to full- or partial- height construction.

Reason: This amendment provides criteria for storing combustible materials within egress corridors serving Assembly occupancies. The amendment is mainly to address large convention back-of-house egress corridors where "staging" (i.e. temp storage) is commonly performed in corridors. These occupancies have high occupant loads and as such it is important to maintain minimum exit widths along exit access paths. Storage in corridors is not specifically addressed in the IBC or IFC; this amendment is expected to provide fire officials and inspectors clear guidance on where temporary staging is permitted in Group A egress corridors. The presence of storage in normally Light Hazard corridors requires an upgraded sprinkler system design density to address the increase in combustibles.

Cost Impact: Will increase the cost of construction
Will increase the cost of construction by requiring a report, potentially upgraded fire sprinklers, and construction of barriers to accommodate storage and staging.
2015 International Fire Code

Revise as follows:

SECTION 317 ROOFTOP GARDENS AND LANDSCAPED VEGETATIVE ROOFS

317.1 General. Rooftop gardens and landscaped vegetative roofs shall be installed and maintained in accordance with Sections 317.2 through 317.5 and Sections 1505 and 1507.16 of the International Building Code.

317.2 Rooftop garden or landscaped vegetative roof size. Rooftop garden or landscaped vegetative roof areas shall not exceed 15,625 square feet (1450 m²) in size for any single area with a maximum dimension of 125 feet (39 m) in length or width. A minimum 6-foot-wide (1.8 m) clearance consisting of a Class A-rated roof system complying with ASTM E 108 or UL 790 shall be provided between adjacent rooftop gardens or landscaped vegetative roof areas.

317.3 Rooftop structure and equipment clearance. For all vegetated roofing systems vegetative roofs, abutting combustible vertical surfaces, a Class A-rated roof system complying with ASTM E 108 or UL 790 shall be achieved for a minimum 6-foot-wide (1829 mm) continuous border placed around rooftop structures and all rooftop equipment including, but not limited to, mechanical and machine rooms, penthouses, skylights, roof vents, solar panels, antenna supports and building service equipment.

317.4.1 Irrigation. Supplemental irrigation shall be provided to maintain levels of hydration necessary to keep green vegetative roof plants alive and to keep dry foliage to a minimum.

317.4.3 Maintenance plan. The fire code official is authorized to require a maintenance plan for vegetation placed on roofs due to the size of a roof garden, materials used or where a fire hazard exists to the building or exposures due to the lack of maintenance.

504.3 Stairway access to roof. New buildings four or more stories above grade plane, except those with a roof slope greater than four units vertical in 12 units horizontal (33.3-percent slope), shall be provided with a stairway to the roof. Stairway access to the roof shall be in accordance with Section 1011.12. Such stairways shall be marked at street and floor levels with a sign indicating that the stairway continues to the roof. Where roofs are used for roof gardens vegetative roofs or for other purposes, stairways shall be provided as required for such occupancy classification.

905.3.8 Rooftop gardens and landscaped vegetative roofs. Buildings or structures that have rooftop gardens or landscaped vegetative roofs and that are equipped with a standpipe system shall have the standpipe system extended to the roof level on which the rooftop garden or landscaped vegetative roof is located.

Reason: The purpose of this change is to use terminology consistently throughout the I-Codes. The term “vegetative roof” is often used within the I-Codes and is defined in Chapter 2 of IBC. Other undefined terms are used in the I-Codes such as: “roof garden”, “vegetated roof” and “landscaped roof”.

This change is one of three (the other two address IBC and IECC) and will remove undefined terms in IFC where “vegetative roof” is appropriate.
**Cost Impact:** Will not increase the cost of construction
The proposed change is a clarification and does not change the stringency of existing code requirements so the cost of construction will be unchanged.

Staff Note: F186-16 and G24-16 also addresses the issues of vegetative roofs which will be heard by the IBC Structural Committee.
2015 International Fire Code

Add new text as follows:

105.6.49 Mobile Food Preparation Vehicles A permit is required for mobile food preparation vehicles equipped with appliances that produce smoke or grease laden vapors.

Add new definition as follows:

SECTION 202 DEFINITIONS

MOBILE FOOD PREPARATION VEHICLES. Vehicles that contain cooking equipment that produce smoke or grease laden vapors for the purpose of preparing and serving food to the public. Vehicles intended for private recreation shall not be considered mobile food preparation vehicles.

Add new text as follows:

SECTION 319 MOBILE FOOD PREPARATION VEHICLES

319.1 General. Mobile food preparation vehicles that are equipped with appliances that produce smoke or grease laden vapors shall comply with this section.

319.2 Permit Required Permits shall be required as set forth in Section 105.6.

319.3 Exhaust hood. Cooking equipment that produces grease laden vapors shall be provided with a kitchen exhaust hood in accordance with Section 609.

319.4 Fire protection. Fire protection shall be provided in accordance with Section 319.4.1 through 319.4.2.

319.4.1 Fire protection for cooking equipment. Cooking equipment shall be protected by automatic fire extinguishing systems in accordance with Section 904.12.

319.4.2 Fire extinguisher. Portable fire extinguishers shall be provided in accordance with Section 904.12.5.

319.5 Appliance connection to fuel supply piping. Gas cooking appliances shall be secured in place and connected to fuel supply piping with an appliance connector complying with ANSI Z21.69/CSA 6.16. The connector installation shall be configured in accordance with manufacturer's installation instructions. Movement of appliances shall be limited by restraining devices installed in accordance with the connector and appliance manufacturer's instructions.

319.6 Cooking oil storage containers Cooking oil storage containers within mobile food preparation vehicles shall have a maximum aggregate volume not to exceed 120 gallons (454 L), and shall be stored in such a way as to not be toppled or damaged during transport.

319.7 Cooking oil storage tanks Cooking oil storage tanks within mobile food preparation vehicles shall comply with Section 319.7.1 through 319.7.5.

319.7.1 Metallic storage tanks Metallic cooking oil storage tanks shall be listed in accordance
with UL 142 or UL 80, and shall be installed in accordance with the tank manufacturer's instructions.

319.7.2 Nonmetallic storage tanks. Nonmetallic cooking oil storage tanks shall be installed in accordance with the tank manufacturer's instructions and shall also comply with all of the following:

1. Tanks shall be listed for use with cooking oil, including maximum temperature to which the tank will be exposed during use.
2. Tank capacity shall not exceed 200 gallons (757 L) per tank.

319.7.3 Cooking oil storage system components. Metallic and nonmetallic cooking oil storage system components shall include but are not limited to piping, connections, fittings, valves, tubing, hose, pumps, vents and other related components used for the transfer of cooking oil.

319.7.4 Design criteria. The design, fabrication and assembly of system components shall be suitable for the working pressures, temperatures and structural stresses to be encountered by the components.

319.7.5 Tank venting. Normal and emergency venting shall be provided for cooking oil storage tanks.

319.7.5.1 Normal vents. Normal vents shall be located above the maximum normal liquid line, and shall have a minimum effective area not smaller than the largest filling or withdrawal connection. Normal vents are not required to vent to the exterior.

319.7.5.2 Emergency vents. Emergency relief vents shall be located above the maximum normal liquid line, and shall be in the form of a device or devices that will relieve excessive internal pressure caused by an exposure fire. For nonmetallic tanks, the emergency relief vent shall be allowed to be in the form of construction. Emergency vents are not required to discharge to the exterior.

319.8 LP-gas systems. Where LP-gas systems provide fuel for cooking appliances, such systems shall comply with Chapter 61 and Sections 319.8.1 through 319.8.5.

319.8.1 Maximum aggregate volume. The maximum aggregate capacity of LP-gas containers transported on the vehicle and used to fuel cooking appliances only shall not exceed 200 pounds propane capacity.

319.8.2 Protection of container. LP-gas containers installed on the vehicle shall be securely mounted and restrained to prevent movement.

319.8.3 LP-gas container construction. LP-gas containers shall be manufactured in compliance with the requirements of NFPA 58.

319.8.4 Protection of system piping. LP-gas system piping, including valves and fittings, shall be adequately protected to prevent tampering, impact damage, and damage from vibration.

319.8.5 LP-gas alarms. A listed LP-gas alarm shall be installed within the vehicle in the vicinity of LP-gas system components, in accordance with manufacturer's instructions.

319.9 CNG Systems. Where CNG systems provide fuel for cooking appliances, such systems shall comply with Sections 319.9.1 through 319.9.4.
319.9.1 CNG containers supplying only cooking fuel. CNG containers installed solely to provide fuel for cooking purposes shall be in accordance with sections 319.9.1.1 through 319.9.1.3

319.9.1.1 Maximum Aggregate Volume. The maximum aggregate capacity of CNG containers transported on the vehicle shall not exceed 1,300 pounds water capacity.

319.9.1.2 Protection of container. CNG containers shall be securely mounted and restrained to prevent movement. Containers shall not be installed in locations subject to a direct vehicle impact.

319.9.1.3 CNG container construction. CNG containers shall be a NGV-2 cylinder.

319.9.2 CNG containers supplying transportation and cooking fuel. Where CNG containers and systems are used to supply fuel for cooking purposes in addition to being used for transportation fuel, the installation shall be in accordance with NFPA 52.

319.9.3 Protection of system piping. CNG system piping, including valves and fittings, shall be adequately protected to prevent tampering, impact damage, and damage from vibration.

319.9.4 Methane alarms. A listed methane gas alarm shall be installed within the vehicle in accordance with manufacturer’s instructions.

319.10 Maintenance. Maintenance of systems on mobile food preparation vehicles shall be in accordance with Sections 319.10.1 through 319.10.3.

319.10.1 Exhaust system. The exhaust system, including hood, grease-removal devices, fans, ducts and other appurtenances, shall be inspected and cleaned in accordance with Section 609.3.

319.10.2 Fire protection systems and devices. Fire protection systems and devices shall be maintained in accordance with Section 901.6.

319.10.3 Fuel-gas systems. LP-gas containers installed on the vehicle and fuel-gas piping systems shall be inspected annually by an approved inspection agency or a company that is registered with the U.S. Department of Transportation to requalify LP-gas cylinders, to ensure that system components are free of damage, suitable for the intended service and not subject to leaking. CNG containers shall be inspected every three years in a qualified service facility. CNG containers shall not be used past their expiration date as listed on the manufacturer’s container label. Upon satisfactory inspection, the approved inspection agency shall affix a tag on the fuel-gas system or within the vehicle indicating the name of the inspection agency and the date of satisfactory inspection.

Reason: This proposal addresses commercial mobile food preparation vehicles. Recent fire incidents have shown a need regulate these vehicles. This proposal addresses concerns with the cooking operations and with the fuel systems for cooking appliances. With respect to cooking operations, this proposal relies heavily on existing IFC code sections from Chapter 6 and Chapter 9 in addressing fire suppression, fire extinguisher, appliance connection, and cooking oil storage tanks. Code language is added to address LP-gas and CNG, which are common fuel gas systems utilized on these vehicles. This proposal addresses the maximum volume of fuel gas, fuel gas container construction, fuel gas system piping, and gas alarm sensors. In addition, this proposal sets forth a maintenance requirement for both LP-gas and CNG fuel gas systems, including the required schedule for inspection of fuel gas containers and fuel gas piping systems. Companion code proposals are submitted to add a definition of “Mobile Food Preparation Vehicle” and to add an operational permit requirement for mobile food preparation vehicles. This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire safety and hazardous materials in new and existing buildings and facilities and the protection of life and property in...
wildland urban interface areas. In 2014 and 2015 the Fire-CAC has held 5 open meetings. In addition, there were numerous conference calls, Regional Work Group and Task Group meetings for the current code development cycle, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC

Cost Impact: Will increase the cost of construction
This proposal will increase costs by requiring fire protection systems, standards for construction, permit fees, and maintenance costs, which have not been required in the past.

F23-16 : 319 (NEW)-
O'BRIAN11521
SECTION 319 SWIMMING POOL BARRIERS

319.1 General. Swimming pool barriers shall be maintained in accordance with the International Swimming Pool and Spa Code.

Reason: This new with allow the fire dept to make sure that swimming barriers are maintained and if not have the means to issue work to the owner to have this barrier system repaired,

Cost Impact: Will not increase the cost of construction
This would not have a cost increase since the owner are require to have this barrier system in working order at all times.
SECTION 319 EXCAVATION AND CONFINED SPACES

319.1 Scope. This section shall apply to any man-made cut, cavity, trench or depression in an earth surface formed by earth removal and procedures to protect employees from the hazards of entry into confined spaces.

319.2 Excavations and trenches. Excavations and trenches shall be in accordance with Title 29, Code of Federal Regulations, Part 1926.650 – 1926.652, Subpart P.

319.3 Confined spaces. Confined spaces shall be in accordance with Title 29, Code of Federal Regulations, Part 1910.

319.4 Unsafe conditions. Where, in the opinion of the fire code official, an unsafe condition exists, excavation and confined space operations shall cease and all persons be removed until such time as adequate means have been taken to provide for the safety of persons working in or around the excavation or confined space.

Reference standards type: This reference standard is new to the ICC Code Books

Add new standard(s) as follows:
Title 29, Code of Federal Regulations, Part 1926.650 – 1926.652, Subpart P.

It can be viewed here:
http://www.ecfr.gov/cgi-bin/text-idx?
SID=6041c6cf0fb9e93dc378a37adacc0b69&mc=true&tpl=/ecfrbrowse/Title29/29t

Reason: Fire departments are the first ones to see an unsafe conditions at construction site where excavation or confined space operation are taking place by providing this new code section the fire department will be able to stop the unsafe condition until the State OSHA or Federal OSHA or construction safety officer arrive on scene. The fire department are typically responding to these types of events for rescue or recovery.

Cost Impact: Will not increase the cost of construction

Th excavation and confined space operation should be complying with these rules.

Analysis: A review of the standard(s) proposed for inclusion in the code,


with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1, 2016.

F25-16 : 319 (NEW)
Add new text as follows:

401.2 **Public notification means required** Buildings shall be equipped with an approved means for the public to access the emergency responder public safety answering point (PSAP). The fire code official is authorized to approve cellular telephone connectivity as meeting this requirement where the cellular signals are sufficient to provide connectivity to access the emergency responder public safety answering point.

   **Exception:** Where it is determined by the fire code official that the ability to contact the emergency responder public safety answering point is not needed.

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**Reason:** Section 401.1 currently states in the scope that it deals with the reporting of emergencies. However, there is no requirement for the public to have access to a means for making such a report verbally to the emergency responder public safety answering point to report the emergency. According to the National Emergency Number Association, an estimated 240 million calls are made to 9-1-1 in the U.S. each year. In many areas, 70% or more are from wireless devices.

Additionally, the number of building locations that provide hardline public access telephones or pay telephones has significantly diminished in recent years and the trend by some developers is to not provide hardline connections as occupants are bringing their own devices. A 2010 Consumer Reports National Research Center survey of more than 2,000 subscribers who made at least one 9-1-1 call in the past year reveals that for 71 percent of emergency calls from a cell phone, no other type of phone was available.

Many building occupants believe that if needed, their cellular device will be able to obtain a cellular signal and make the call to 9-1-1. Unfortunately that is often not the case with various construction types and materials, LEED certified buildings, etc. as the signal source is being blocked from entering the building. This proposal is designed to ensure that building occupants have the ability to secure a signal source and make that important telephone call that during an emergency situation, is the first step to activating the public safety emergency response system.

**Bibliography:**
https://www.nena.org/?page=911Statistics

**Cost Impact:** Will increase the cost of construction

This proposal may increase the cost of construction if the building being constructed does not have public access telephones or blocks the cellular telephone signal due to location and/or type of construction materials provided.
2015 International Fire Code

Add new text as follows:

401.3.4 Hazardous materials release. In the unwanted release of hazardous materials into a sewer, storm drain, ditch, drainage canal, creek, stream, river, lake, tidal waterway, or onto ground, sidewalk, street, highway or into the atmosphere, the owner or occupant shall immediately report such condition to the fire department.

Reason: Chapter 4 emergency planning and preparedness does not have the requirement for report hazmat release, it should be notes the section 5003.3 and 5003.3.1 does have some information, By adding the new code section everyone will understand that the fire department is require to be call for hazmat releases.

Cost Impact: Will not increase the cost of construction
The fire dept is already called to respond to these events.
2015 International Fire Code

Add new text as follows:

401.8 Responsible party. The building engineer or designated representative shall be available to the fire department and other agencies during an emergency and shall be readily identified.

Reason: By having the building engineer or other meet and help the fire department or other agencies during an event can only help. This knowledge is required to help the fire department.

Cost Impact: Will not increase the cost of construction
No cost increase, this new section is only asking for someone from the building to assist the fire department.
2015 International Fire Code

Revise as follows:

403.12.3 Crowd managers for gatherings exceeding 1,000 people. Where facilities or events involve a gathering of more than 1,000 people, crowd managers shall be provided in accordance with Sections 403.12.3.1 through 403.12.3.3.

403.12.3.1 Number of crowd managers. The minimum number of trained crowd managers shall be established at a ratio of one crowd manager for every 250 persons.

Exceptions: Where approved by the fire code official, the number of crowd managers shall be permitted to be reduced where the facility is equipped throughout with an approved automatic sprinkler system or based upon the nature of the event.

1. Outdoor events with less than 1,000 persons in attendance
2. Assembly occupancies used exclusively for religious worship with an occupant load not exceeding 1,000.
3. The number of crowd managers shall be permitted to be reduced where, in the opinion of the fire code official, the fire protection provided by the facility and the nature of the event warrant a reduction

Reason: This change does not require a facility to hire any additional personnel; rather, it requires that a requisite number of their staff receive approved training in fire prevention, evacuation methods, and other duties. This training is currently provided at little or no cost across the nation.

The current code has no requirement for crowd managers until the occupant load in a public assembly reaches 1,000, then the code requires five trained crowd managers for an occupant load of 1,001. This is illogical, especially since one of the events that generated this requirement, the Station Nightclub Fire, had an occupant load of less than 500. Smaller venues sometimes place the public at greater risk than large ones for many reasons, including the fact that larger facilities have greater requirements for other fire protection features. NFPA 1 and NFPA 101 require crowd managers in all public assemblies (except churches), so approving this code change will bring the two regulations closer to conformity. This proposal is to change the threshold to an occupant load of 300, which is more reasonable, given this is the threshold for most sprinkler and alarm requirements in assembly occupancies (all except A-2 assemblies require sprinklers at an occupant load of 300; the threshold for A-2 occupancies is 100).

The exception for outdoor events with less than 1,000 is intended to recognize the fact that outdoor events are perceived to be less dangerous because egress isn't restricted in any way; The exception for places of worship with occupant loads up to 1,000 recognizes the fact that people who are in these places of assembly normally have a greater awareness of their surroundings, and are more familiar with egress routes because they attend the church on a more regular basis than those at performances, who tend to be more transient.

The formatting change to place the potential reduction in the number of crowd managers in an exception is editorial.

Finally the term "trained crowd managers" was inadvertently changed during the last cycle to drop the descriptor "trained" in a rewrite of this section for 2015. Reinserting the term "trained" emphasizes the requirement that crowd managers must receive approved training.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC
Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire safety and hazardous materials in new and existing buildings and facilities and the protection of life and property in wildland urban interface areas. In 2014 and 2015 the Fire-CAC has held 5 open meetings. In addition, there were numerous conference calls, Regional Work Group and Task Group meetings for the current code development cycle, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC

**Cost Impact:** Will not increase the cost of construction
This will not increase the cost of construction but may cost more to run some events. At the same time this revision keeps flexibility with the exceptions in Section 403.12.3.1 where such crowd managers are not warranted. As noted the cost of training is minimal. These people are the same people who would likely already be employed for an event.

F29-16 : 403.12.3-O'BRIAN10948
F30-16

IFC: 403.3.4, 405.2.
Proponent: John Williams, CBO, representing Adhoc Healthcare Committee (AHC@iccsafe.org)

2015 International Fire Code

Revise as follows:

403.3.4 Emergency evacuation drills. Emergency evacuation drills shall comply with Section 405. Emergency evacuation drills shall be conducted not less than four times per year.

Exceptions: The movement of patients to safe areas or to the exterior of the building is not required.

**TABLE 405.2**

<table>
<thead>
<tr>
<th>GROUP OR OCCUPANCY</th>
<th>FREQUENCY</th>
<th>PARTICIPATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group A</td>
<td>Quarterly</td>
<td>Employees</td>
</tr>
<tr>
<td>Group B b</td>
<td>Annually</td>
<td>All occupants</td>
</tr>
<tr>
<td>Group B b c (Ambulatory care facilities)</td>
<td>Annually Quarterly on each shift a</td>
<td>Employees</td>
</tr>
<tr>
<td>Group B b d (Clinic, outpatient)</td>
<td>Annually</td>
<td>Employees</td>
</tr>
<tr>
<td>Group E</td>
<td>Monthly a</td>
<td>All occupants</td>
</tr>
<tr>
<td>Group F</td>
<td>Annually</td>
<td>Employees</td>
</tr>
<tr>
<td>Group I-1</td>
<td>Semiannually on each shift a</td>
<td>All occupants</td>
</tr>
<tr>
<td>Group I-2</td>
<td>Quarterly on each shift a</td>
<td>Employees</td>
</tr>
<tr>
<td>Group I-3</td>
<td>Quarterly on each shift a</td>
<td>Employees</td>
</tr>
<tr>
<td>Group I-4</td>
<td>Monthly on each shift a</td>
<td>All occupants</td>
</tr>
<tr>
<td>Group R-1</td>
<td>Quarterly on each shift</td>
<td>Employees</td>
</tr>
<tr>
<td>Group R-2 d</td>
<td>Four annually</td>
<td>All occupants</td>
</tr>
</tbody>
</table>
a. In severe climates, the fire code official shall have the authority to modify the emergency evacuation drill frequency.

b. Emergency evacuation drills are required in Group B buildings having an occupant load of 500 or more persons or more than 100 persons above or below the lowest level of exit discharge.

c. Emergency evacuation drills are required in ambulatory care facilities in accordance with Section 403.3.

d. Emergency evacuation drills in Group R-2 college and university buildings shall be in accordance with Section 403.10.2.1. Other Group R-2 occupancies shall be in accordance with Section 403.10.2.2.

Reason: These are minimum requirements to be applied to fire evacuation and safety plans, staff training, and evacuation drills. The committee believes that annual drills for all occupants will provide a minimum level of safety and training.

Requiring quarterly drills on each shift for ambulatory care facilities, where patients may be rendered incapable of self preservation, is necessary in order to ensure the level of safety awareness and training for the staff. Footnote A ensures that the fire code official has the authority to modify the frequency of the fire evacuation drills based on local conditions and needs.

This proposal is submitted by the ICC Ad Hoc Committee on Healthcare (AHC). The AHC was established by the ICC Board to evaluate and assess contemporary code issues relating to hospitals and ambulatory healthcare facilities. This is a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. In 2014 and 2015 the ICC Ad Hoc Committee has held 4 open meetings and numerous Work Group meetings and conference calls for the current code development cycle which included members of the committees as well as any interested party to discuss and debate the proposed changes. Information on the AHC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the AHC effort can be downloaded from the AHC website at: [AHC](#).

Cost Impact: Will not increase the cost of construction

The modifications made to the frequency will ensure that the proper resources of time and training will be applied to those Ambulatory Facilities based on the client's capabilities for self preservation and cognitive awareness.
Proponent: Michael O'Brien representing the Fire Code Action Committee (FCAC@iccsafe.org)

2015 International Fire Code

Revise as follows:

404.2 Contents. Fire safety, evacuation and evacuation lockdown plan contents shall be in accordance with Sections 404.2.1 and 404.2.2 through 404.2.3.3.

Reason: This proposal is editorial in nature and does not make a change to the code requirements. Section 404 includes Fire Safety Plans, Evacuation Plans and Lockdown Plans. Subsections of 404.2 specify the contents for Evacuation Plans (404.2.1), Fire Safety Plans (404.2.2), and Lockdown Plans (404.2.3). But 404.2.3 is not included in the referenced sections in Section 404.2.

This proposal corrects the references in Section 404.2 and includes the subsection addressing lockdown plans.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire safety and hazardous materials in new and existing buildings and facilities and the protection of life and property in wildland urban interface areas. In 2014 and 2015 the Fire-CAC has held 5 open meetings. In addition, there were numerous conference calls, Regional Work Group and Task Group meetings for the current code development cycle, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC

Cost Impact: Will not increase the cost of construction
This is editorial in nature and correlates the code requirements.
404.2.2, 408 (New), 508.1.6, IBC [F] 911.1.6

Proponent: Jack Murphy, representing FSDA (FMJack1948@gmail.com)

2015 International Fire Code

404.2.2 Fire safety plans. Fire safety plans shall include the following:

1. The procedure for reporting a fire or other emergency.
2. The life safety strategy including the following:
   2.1. Procedures for notifying occupants, including areas with a private mode alarm system.
   2.2. Procedures for occupants under a defend-in-place response.
   2.3. Procedures for evacuating occupants, including those who need evacuation assistance.
3. Site plans indicating the following:
   3.1. The occupancy assembly point.
   3.2. The locations of fire hydrants.
   3.3. The normal routes of fire department vehicle access.
4. Floor plans identifying the locations of the following:
   4.1. Exits.
   4.2. Primary evacuation routes.
   4.3. Secondary evacuation routes.
   4.4. Accessible egress routes.
      4.4.1. Areas of refuge.
      4.4.2. Exterior areas for assisted rescue.
   4.5. Refuge areas associated with smoke barriers and horizontal exits.
   4.7. Portable fire extinguishers.
   4.8. Occupant-use hose stations.
   4.9. Fire alarm annunciators and controls.
5. A list of major fire hazards associated with the normal use and occupancy of the premises, including maintenance and housekeeping procedures.
6. Identification and assignment of personnel responsible for maintenance of systems and equipment installed to prevent or control fires.
7. Identification and assignment of personnel responsible for maintenance, housekeeping and controlling fuel hazard sources.
8. A Building Information Card in accordance with Section 408.

SECTION 408 BUILDING INFORMATION CARD

408.1 General. Where required by Section 404.2.2 and Section 508.1.6, a Building Information Card shall comply with this section. The Building Information Card shall be maintained on premises and made available to first responders in an approved location.

408.1.1 Format. The Building Information Card shall be provided as an actual card or in electronic format where approved by the fire code official.

408.2 Content. An approved Building Information Card shall include, but not limited to, all of the following:
1. General building information that includes: property name, address, the number of floors in the building above and below grade, use and occupancy classification (for mixed uses, identify the different types of occupancies on each floor) and the estimated building population during the day, night and weekend;

2. Building emergency contact information that includes: a list of building's emergency contacts including but not limited to building manager, building engineer and their respective work phone number, cell phone number and e-mail address;

3. Building construction information that includes: the type of building construction including but not limited to floors, walls, columns and roof assembly;

4. Exit access stairway and exit stairway information that includes: number of exit access stairways and exit stairways in building; each exit access stairway and exit stairway designation and floors served; location where each exit access stairway and exit stairway discharges, interior exit stairways that are pressurized; exit stairways provided with emergency lighting; each exit stairway that allows reentry; exit stairways providing roof and below grade access; elevator information that includes: number of elevator banks, elevator bank designation, elevator car numbers and respective floors that they serve; location of elevator machine rooms, control rooms and control spaces; location of sky lobby; and location of freight elevator banks;

5. Building services and system information that includes: location of mechanical rooms, location of building management system, location and capacity of all fuel oil tanks, location of emergency generator, location of natural gas services, location of public utility company main isolation breakers and valves, photovoltaic (PV) solar power systems, energy storage systems and other alternative power sources;

6. Fire protection system information that includes: location of standpipes, locations of fire pump room, location of fire department connections, floors protected by automatic sprinklers and location of different types of automatic sprinkler systems installed including but not limited to dry, wet or pre-action; location of the fire alarm control panel and location of fire extinguishing systems;

7. Hazardous material information that includes: location and quantity of hazardous materials;

8. Temporary building conditions information that includes: fire protection system impairments that are out-of-service and construction alteration/renovation projects. Temporary conditions shall include the type of condition, emergency contact information.

9. Building Schematic building plans including typical floor plan and detailing the building core, means of egress, fire protection systems, fire-fighter air replenishment systems, fire-fighting equipment, and fire department access, and the location of fire walls, fire barriers, fire partitions, smoke barriers and smoke partitions.

408.3 Maintenance. The contents of the building information card shall be reviewed and updated annually.

Add new text as follows:

508.1.6 (IBC [F] 911.1.6) Required features. The fire command center shall comply with NFPA 72 and shall contain the following features:

1. The emergency voice/alarm communication system control unit.
2. The fire department communications system.
3. Fire detection and alarm system annunciator.
4. Annunciator unit visually indicating the location of the elevators and whether they are operational.
5. Status indicators and controls for air distribution systems.
6. The fire fighter's control panel required by Section 909.16 for smoke control systems installed in the building.
7. Controls for unlocking stairway doors simultaneously.
8. Sprinkler valve and water-flow detector display panels.
9. Emergency and standby power status indicators.
10. A telephone for fire department use with controlled access to the public telephone system.
11. Fire pump status indicators.
12. Schematic building plans indicating the typical floor plan and detailing the building core, means of egress, fire protection systems, fire fighter air replenishment systems, fire-fighting equipment and fire department access, and the location of fire walls, fire barriers, fire partitions, smoke barriers and smoke partitions. Building Information Card in accordance with Section 408.
13. An approved Building Information Card that includes, but is not limited to, all of the following information:
   13.1 General building information that includes: property name, address, the number of floors in the building above and below grade, use and occupancy classification (for mixed uses, identify the different types of occupancies on each floor) and the estimated building population during the day, night and weekend;
   13.2 Building emergency contact information that includes: a list of the building's emergency contacts including but not limited to building manager, building engineer and their respective work phone number, cell phone number and e-mail address;
   13.3 Building construction information that includes: the type of building construction including but not limited to floors, walls, columns and roof assembly;
   13.4 Exit access stairway and exit stairway information that includes: number of exit access stairways and exit stairways in building; each exit access stairway and exit stairway designation and floors served; location where each exit access stairway and exit stairway discharges; interior/exit stairways that are pressurized; exit stairways provided with emergency lighting; each exit stairway that allows reentry; exit stairways providing roof access; elevator information that includes: number of elevator banks, elevator bank designation, elevator car numbers and respective floors that they serve; location of elevator machine rooms, control rooms and control spaces; location of sky lobby; and location of freight elevator banks;
   13.5 Building services and system information that includes: location of mechanical rooms, location of building management system, location and capacity of all fuel oil tanks, location of emergency generator and location of natural gas service;
   13.6 Fire protection system information that includes: location of standpipes, location of fire pump room, location of fire department connections, floors protected by automatic sprinklers and location of different types of automatic sprinkler systems installed including but not limited to dry, wet and pre-action;
   13.7 Hazardous material information that includes: location and quantity of hazardous material.
15. Generator supervision devices, manual start and transfer features.
16. Public address system, where specifically required by other sections of this code.
17. Elevator fire recall switch in accordance with ASME A17.1/CSA B4.
18. Elevator emergency or standby power selector switch(es), where emergency or standby power is provided.

**Reason:** The building information card is more than just a FC508 and BC911 sections as a high-rise fire command center requirement. The present BC/FC sections limit the potential value of a building information card for First Responders as expressed in:

1. **NFPA1620 Standard for Pre-Incident Planning (2015 Edition).** The purpose of the standard shall be to develop pre-incident plans to assist responding personnel in effectively managing emergencies for the protection of occupants, responding personnel, property and the environment.
   - The pre-incident plan shall be coordinated with an incident management system.
   - The pre-incident plan shall be available to the incident commander or communications center at the time of an incident.

2. **Insurance Services Office (ISO) (2013 Edition)** which provides insurance ratings for a community, incorporated into the Fire Suppression Rating System that building familiarization for pre-planning would be a component of the fire department assessment. This major revision reflects current trends in fire prevention and protection. A Building Familiarization Pre-Planning Program has been included into the municipality insurance cost rating system. This Fire Suppression Schedule Rating System helps provide the insurance industry with information on community’s ability to suppress and limit fire losses. Section 580 Training, (H). Building Familiarization for Pre-Planning.

3. **OSHA Fire Service Features of Buildings and Fire Protection Systems (2015 Edition).** Chapter-7 Hazards for Firefighter Emergency Responders must determine the appropriate tactical considerations... Fire codes list information to be provided on a Building Information Card... More detail information can be placed in a locked cabinet or in the fire command center. Fire codes can list information to be provided on a Building Information Card. This can be an actual card or in an electronic format. The later make information very easy to access and read.

The Building Information Card has more occupancy related emergency preparedness planning applications that will further assist the fire service and other first responders with building information for emergency response for appropriate tactical considerations.

**Bibliography:** Jaci J. Murphy - Fire Marshal (Ret.)/Fmr. Deputy Chief and Deputy Fire Coordinator NJ Div. of Fire Safety (Bergen Region).

Currently serves on the:

- ICC Northeast Fire Code Group representing the IAFC
- NFPA 1602 Pre-Incident Planning Committee
- NFPA High-Rise Building Safety Advisory Committee
- Fire Safety Directors Association (NYC/High-Rise Bldg.)

Has served on the NYC/ICC Model Building & Fire Codes Committees for the 2008 & 2012 Editions

**Cost Impact:** Will not increase the cost of construction

The code change will not increase the cost of construction. The content text is being relocated from an existing Section 508.1.6 to a new Section 408 with some new building components being identified (e.g. stairs to below grade, alternative power sources, temporary building condition). A cost may arise if the local AHJ elects to implement an electronic building information card under the EXCEPTION Section 408.1.1.
2015 International Fire Code

Delete and substitute as follows:

404.2.3 Lockdown plans. Where facilities develop a lockdown plan, it shall be in accordance with Sections 404.2.3.1 through 404.2.3.3.

Lockdown plans shall only be permitted where such plans are approved by the fire code official and are in compliance with Sections 404.2.3.1 and 404.2.3.2.

404.2.3.1 Lockdown plan contents. Lockdown plans shall be approved by the fire code official and shall include the following:

1. Initiation. The plan shall include instructions for reporting an emergency that requires a lockdown.
2. Accountability. The plan shall include accountability procedures for staff to report the presence or absence of occupants.
3. Recall. The plan shall include a prearranged signal for returning to normal activity.
4. Communication and coordination. The plan shall include an approved means of two-way communication between a central location and each secured area.

Lockdown plans shall include the following:

- Identify the individuals authorized to issue a lockdown order.
- Security measures used during normal operations, when the building is occupied, that could adversely affect egress or fire department operations.
- A description of identified emergency and security threats addressed by the plan, including specific lockdown procedures to be implemented for each threat condition.
- Means and methods of initiating a lockdown plan for each threat, including:
  1. The means of notifying occupants of a lockdown event, which shall be distinct from the fire alarm signal.
  2. Identification of each door or other access point that will be secured.
  3. A description of the means or methods used to secure doors and other access points.
  4. A description of how locking means and methods are in compliance with the requirements of this code for egress and accessibility.
- Procedures for reporting to the fire department any lockdown condition affecting egress or fire department operations.
- Procedures for determining and reporting the presence or absence of occupants to emergency response agencies during a lockdown.
- Means for providing two-way communication between a central location and each area subject to being secured during a lockdown.
- Identification of the prearranged signal for terminating the lockdown.
9. Identification of individuals authorized to issue a lockdown termination order.
10. Procedures for unlocking doors and verifying that the means of egress has been returned to normal operations upon termination of the lockdown.
11. Training procedures and frequency of lockdown plan drills.

404.2.3.2 Training frequency. Drills The training frequency shall be included in the lockdown plan. The lockdown drills shall not substitute for any of the fire and evacuation drills required in Section 405.2.
Lockdown plan drills shall be conducted in accordance with the approved plan. Such drills shall not be substituted for fire and evacuation drills required by Section 405.2.

Delete without substitution:

404.2.3.3 Lockdown notification. The method of notifying building occupants of a lockdown shall be included in the plan. The method of notification shall be separate and distinct from the fire alarm signal.

Reason: This proposal is intended to address the various security means and methods that have become prevalent due to various incidents throughout the country. Several such means and methods, while solving the security concerns, have unintended consequences in their effect on emergency egress and fire and life safety systems. While the code discusses the contents of a lockdown plan, there is a concern that the current code does not provide sufficient guidance to applicants that are seeking to institute a lockdown plan, to ensure that the plan covers the topics pertinent to the fire code official thoroughly.

This proposal adds some specific topics that need to be addressed in a lockdown plan. One issue that is being addressed is a need to identify the organizational structure in charge of making decisions during a lockdown. Wording is added to Item 1 and Item 3 to address the need to identify the authority that will both initiate and lift a lockdown order.

This proposal also includes requirements for including the lockdown procedures in the plan. In viewing these procedures, it was apparent that different lockdown plans may be necessary for different threats. What might be a correct procedure during a chemical release incident may be different from the correct procedure during an active shooter incident. What might be correct procedure for an active shooter in the vicinity of a facility, may be different than the procedure for an active shooter on the site of the facility. It was recognized that a description of the normal status of security, a description of the various threats scenarios addressed by the lockdown plan, and the lockdown procedure for each such scenario, would be important information to include for review.

This proposal also includes an item to describe the means and methods of locking. There is concern about the proliferation of unlisted locking mechanisms, and their potential detrimental impact on the means of egress. This proposed item requires that all means and methods of locking for all access points be described, and that compliance with Chapter 10 requirements be demonstrated.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire safety and hazardous materials in new and existing buildings and facilities and the protection of life and property in wildland urban interface areas. In 2014 and 2015 the Fire-CAC has held 5 open meetings. In addition, there were numerous conference calls, Regional Work Group and Task Group meetings for the current code development cycle, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC

Cost Impact: Will increase the cost of construction
The cost of construction may be increased in terms of more man-hours to develop the lockdown plan to address the topics added by this proposal.
SECTION 202  DEFINITIONS

MATERIAL-SAFETY DATA SHEET (MSDS SDS). Information concerning a hazardous material which is prepared in accordance with the provisions of DOL 29 CFR Part 1910.1200 or in accordance with the provisions of a federally approved state OSHA plan.

Revise as follows:

407.2 Material-Safety Data Sheets. Material Safety Data Sheets (MSDS SDS) for all hazardous materials shall be either readily available on the premises as a paper copy, or where approved, shall be permitted to be readily retrievable by electronic access.

5001.2.1 Mixtures. Mixtures shall be classified in accordance with hazards of the mixture as a whole. Mixtures of hazardous materials shall be classified in accordance with nationally recognized reference standards; by an approved qualified organization, individual, or Material-Safety Data Sheet (MSDS SDS); or by other approved methods.

5002.1 Definitions. The following terms are defined in Chapter 2:

- BOILING POINT.
- CEILING LIMIT.
- CHEMICAL.
- CHEMICAL NAME.
- CLOSED CONTAINER.
- CONTAINER.
- CONTROL AREA.
- CYLINDER.
- DAY BOX.
- DEFLAGRATION.
- DESIGN PRESSURE.
- DETACHED BUILDING.
- DISPENSING.
- EXCESS FLOW CONTROL.
- EXHAUSTED ENCLOSURE.
- EXPLOSION.
- FLAMMABLE VAPORS OR FUMES.
- GAS CABINET.
- GAS ROOM.
- HANDLING.
- HAZARDOUS MATERIALS.
- HEALTH HAZARD.
- IMMEDIATELY DANGEROUS TO LIFE AND HEALTH (IDLH).
- INCOMPATIBLE MATERIALS.
- LIQUID.
- LOWER EXPLOSIVE LIMIT (LEL).
LOWER FLAMMABLE LIMIT (LFL).  
MATERIAL SAFETY DATA SHEET (MSDS SDS).  
MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA.  
NORMAL TEMPERATURE AND PRESSURE (NTP).  
OUTDOOR CONTROL AREA.  
PERMISSIBLE EXPOSURE LIMIT (PEL).  
PESTICIDE.  
PHYSICAL HAZARD.  
PRESSURE VESSEL.  
SAFETY CAN.  
SECONDARY CONTAINMENT.  
SEGREGATED.  
SOLID.  
STORAGE, HAZARDOUS MATERIALS.  
SYSTEM.  
TANK, ATMOSPHERIC.  
TANK, PORTABLE.  
TANK, STATIONARY.  
TANK VEHICLE.  
UNAUTHORIZED DISCHARGE.  
USE (MATERIAL).  
VAPOR PRESSURE.

5003.4 Material Safety Data Sheets. Material Safety Data Sheets (MSDS SDS) shall be readily available on the premises for hazardous materials regulated by this chapter. Where a hazardous substance is developed in a laboratory, available information shall be documented.

Exception: Designated hazardous waste.

5101.3 Material Safety Data Sheets. Material Safety Data Sheet (MSDS SDS) information for aerosol products displayed shall be kept on the premises at an approved location.

E103.2 Evaluation questions. The following are sample evaluation questions:

1. What is the material? Correct identification is important; exact spelling is vital. Check labels, MSDS SDS, ask responsible persons, etc.
2. What are the concentration and strength?
3. What is the physical form of the material? Liquids, gases and finely divided solids have differing requirements for spill and leak control and containment.
4. How much material is present? Consider in relation to permit amounts, maximum allowable quantity per control area (from Group H occupancy requirements), amounts that require detached storage and overall magnitude of the hazard.
5. What other materials (including furniture, equipment and building components) are close enough to interact with the material?
6. What are the likely reactions?
7. What is the activity involving the material?
8. How does the activity impact the hazardous characteristics of the material? Consider vapors released or hazards otherwise exposed.
9. What must the material be protected from? Consider other materials, temperature, shock, pressure, etc.
10. What effects of the material must people and the environment be protected from?
11. How can protection be accomplished? Consider:
   11.1. Proper containers and equipment.
   11.2. Separation by distance or construction.
   11.3. Enclosure in cabinets or rooms.
   11.4. Spill control, drainage and containment.
   11.5. Control systems—ventilation, special electrical, detection and alarm, extinguishment, explosion venting, limit controls, exhaust scrubbers and excess flow control.
   11.6. Administrative (operational) controls—signs, ignition source control, security, personnel training, established procedures, storage plans and emergency plans.

Evaluation of the hazard is a strongly subjective process; therefore, the person charged with this responsibility must gather as much relevant data as possible so that the decision will be objective and within the limits prescribed in laws, policies and standards.

It could be necessary to cause the responsible persons in charge to have tests made by qualified persons or testing laboratories to support contentions that a particular material or process is or is not hazardous. See Section 104.7.2 of the International Fire Code.

**Reason:** The 2015 IFC and the Occupational and Safety Health Administration (OSHA), have historically required "Material Safety Data Sheets" (MSDSs) be readily available on the premises for hazardous materials. As of June 1, 2015, OSHA, through the HazCom 2012, requires chemical manufacturers and distributors to have completed the process of reclassifying hazardous chemicals, to have updated all their information to be in "Safety Data Sheet" (SDSs) and to bear labels in accordance with the formats found in the UNECE Globally Harmonized System of Classification and Labelling of Chemicals (GHS).

This proposal seeks to correlate the requirements in the IFC to those adopted by OSHA by replacing all references in the IFC to "Material Safety Data Sheets" (MSDSs) with references to "Safety Data Sheet" (SDSs).

**Historical Information**

The United Nations Economic Commission for Europe (UNECE), has long recognized that with the extensive global trade in chemicals there was a need to develop national programs to ensure their safe use, transport and disposal. They also recognized that an internationally-harmonized approach to classification and labelling would provide the foundation for such programs. Born out of the 1992 Earth Summit – at the UN Conference on Environment and Development (UNCED) – in Rio de Janeiro, the GHS was expressly called for in the UNCED's 'International Mandate,':

"A globally harmonized classification and compatible labelling system, including material safety data sheets and easily understandable symbols, should be available, if feasible, by the year 2000.

Thus the UNECE created the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) – with the first edition adopted in December 2002 and published in 2003. The new system – commonly referred to as GHS, addresses classification of chemicals by types of hazard and proposes harmonized hazard communication elements, including labels and safety data sheets. It aims at ensuring that information on physical hazards and toxicity from chemicals be available in order to enhance the protection of human health and the environment during the handling, transport and use of these chemicals. The GHS also provides a basis for harmonization of rules and regulations on chemicals at national, regional and worldwide level, an important factor also for trade facilitation.

(Source: [http://www.unece.org/trans/danger/publi/ghs/ghs_welcome_e.html](http://www.unece.org/trans/danger/publi/ghs/ghs_welcome_e.html))

OSHA in the previous regulations, known as HazCom 1994, did not mandate a specific format for MSDSs, therefore a number of different MSDS styles and formats were used in US. The 2 most common formats for an MSDS was the 8 section OSHA format, or the 16 section ANSI format (ANSI Z400.1-1993). In HazCom 2012, the format for an SDS is mandated by GHS to be a 16 section format:

**Section 1:** Identification

**Section 2:** Hazard(s) Identification

**Section 3:** Components / Information on Ingredients

**Section 4:** First-Aid Measures
Section 5: Fire-Fighting Measures
Section 6: Accidental Release Measures
Section 7: Handling and Storage
Section 8: Exposure Controls / Personal Protection
Section 9: Physical and Chemical Properties
Section 10: Stability and Reactivity
Section 11: Toxicological Information
Section 12: Ecological Information
Section 13: Disposal Considerations
Section 14: Transport Information
Section 15: Regulatory Information
Section 16: Other Information

Correlative code changes are also being proposed to IFC Sections 202, 5001.2.1, 5003.4, 5101.3 and E103.2.

Cost Impact: Will not increase the cost of construction
This is simply a correlation in terminology.
F35-16

IFC: 407.2.

**Proponent**: Jay Weightman, Colorado Springs Fire Dept, representing Colorado Springs Fire Department, Division of the Fire Marshal (jweightman@springsgov.com)

2015 International Fire Code

Revise as follows:

407.2 **Material Safety Data Sheets.** Material-Safety Data Sheets (MSDS, SDS) for all hazardous materials shall be either readily available on the premises as for hazardous materials regulated by this code. One or more of the following methods shall be used to provide SDS's on the premises:

1. **Hard copies**
2. **Website**
3. **Phone**
4. **Other approved methods.**

**Hazardous materials developed in a paper copy, or where approved laboratory, shall be permitted to be readily retrievable by electronic access documented.**

**Reason:** By changing from Material Safety Data Sheets to Safety Data Sheets, it brings the IFC up to the new OSHA requirements. It also allows for other options not currently in the IFC such as on-line websites, by phone to an operator that looks up the requested information, or other means as approved by the AHJ. Many big box stores have far too many items to keep an accurate hard copy on site. This also aligns consistent verbiage for both MSDS sections (407.2 and 5003.4).

**Cost Impact:** Will not increase the cost of construction

There is no substantial cost to this change with more options available to the customer.
2015 International Fire Code

503.1 Where required. Fire apparatus access roads shall be provided and maintained in accordance with Sections 503.1.1 through 503.1.3.

Revise as follows:

503.1.1 Buildings and facilities. Approved fire apparatus access roads shall be provided for every facility, building or portion of a building hereafter constructed or moved into or within the jurisdiction. The fire apparatus access road shall comply with the requirements of this section and shall extend to within 150 feet (45 720 mm) of all portions of the facility and all portions of the exterior walls of the first story of the building as measured by an approved route around the exterior of the building or facility.

Exceptions:

1. The fire code official is authorized to increase the dimension of 150 feet (45 720 mm) where any of the following conditions occur:
   1.1. The building is equipped throughout with an approved automatic sprinkler system installed in accordance with Section 903.3.1.1, 903.3.1.2 or 903.3.1.3.
   1.2. Fire apparatus access roads cannot be installed because of location on property, topography, waterways, nonnegotiable grades or other similar conditions, and an approved alternative means of fire protection is provided.
   1.3. There are not more than two Group R-3 or Group U occupancies.
2. Where approved by the fire code official, fire apparatus access roads shall be permitted to be exempted or modified for solar photovoltaic power generation facilities.

Reason: The purpose of this proposal is simple, NFPA 13R and NFPA 13D were not developed for property protection, they are life safety systems that protect living spaces occupants are expected to be located in to provide time to escape a fire. The existence of either of these two systems is not a valid basis to trade off fire apparatus access. A given site with 13R or 13D systems may qualify for a reduction based upon a number of factors and alternative methods is available to obtain a review of those factors, but the reduction should not be automatic. When exposure fires occur at the exterior of buildings protected with 13R or 13D systems or within unprotected spaces the fire can spread rapidly and presently a serious life safety threat to occupants and exposure hazards to neighboring buildings. Fire apparatus access would be needed at that point, it has been needed at numerous such fires that have occurred across the nation.

The development of NFPA 13D and 13R were primarily a cost saving measure to provide for life safety with a reduced level of property protection as compared to an NFPA 13 system, (which was the applicable standard for the protection of multifamily housing construction before NFPA 13R was developed). This is acknowledged in the NFPA "Automatic Sprinkler Systems for Residential Occupancies Handbook, 2013 edition".

"The Technical Committee on Residential Sprinkler Systems intends that NFPA 13R provide an acceptable level of fire protection with respect to life safety and property protection. NFPA 13R provides a high, but not an absolute, level of life safety and a somewhat lesser degree of property protection. As with NFPA 13D systems, NFPA 13R permits the omission of sprinklers in certain areas of the building. A higher degree of life safety and property protection could be achieved by installing sprinklers throughout the premises in accordance with NFPA 13, with residential sprinklers installed in the dwelling units. Where property protection is the primary objective of the owner or system designer, a more robust water supply and more complete
sprinkler coverage above and beyond what is required by NFPA 13R would need to be considered."

Note that the NFPA "Automatic Sprinkler Systems for Residential Occupancies Handbook, 2013 edition" acknowledges that "... an increasing number of fires have spread through unsprinklered 13R attics." And that "Although these fires have not resulted in loss of life, on several occasions they have resulted in a "total" property loss."

The NFPA "Automatic Sprinkler Systems for Residential Occupancies Handbook, 2013 edition" goes on to include:

"Various building codes have adopted NFPA 13R. However, certain restrictions could be imposed on buildings protected by NFPA 13R sprinkler systems, such as height and area limitations, protection of attic spaces, and limitations on acceptable construction materials. Sprinkler coverage elimination in certain areas results in a reduced level of property protection. Property protection is a major function of building codes, so provisions in addition to those of NFPA 13R could be required."

The need for fire apparatus access roads is not limited to simply ensuring people were able to escape a fire; they are for access to suppress a fire including those that start exterior to a building which even NFPA 13 systems are designed for (other than window protection) though NFPA 13 tends to do better than 13R or 13D when dealing with an exposure fire.

When 13D and 13R systems were added to the legacy codes there was recognition that they did not match the capabilities of an NFPA 13 system and as a result all of the various trade-offs were not given to these systems. Unfortunately there has been unwarranted mission creep in the trade-off credit given to NFPA 13R and 13D systems and this proposal is to eliminate this example.

**Cost Impact:** Will not increase the cost of construction

This proposal has the potential to increase the cost of construction for those cases when NFPA 13R or 13D systems were granted unwarranted credit for fire protection of property potential.
F37-16

IFC: 503.1.2, 503.1.2.1 (New), 503.1.2.2 (New).

Proponent: Stephen Skalko, representing Masonry Alliance for Codes and Standards (svskalko@cox.net)

2015 International Fire Code

Revise as follows:

503.1.2 Additional access. The fire code official is authorized to require more than one fire apparatus access road based on the potential for impairment of a single road by vehicle congestion, condition of terrain, climatic conditions or other factors that could limit access in accordance with Sections 503.1.2.1 and 503.1.2.2.

503.1.2.1 Access Impairment. Additional fire department apparatus access as needed based on the potential for impairment of a single road by vehicle congestion, condition of terrain, climatic conditions or other factors that could limit access.

503.1.2.2 Buildings of Type III, IV and V construction. Buildings of Type III, IV and V construction that are four or more stories in height shall be provided with not less than two fire apparatus access roads complying with Section 503. The termination point of the fire apparatus access roads on the building site shall be placed a distance apart not less than one-third of the length of the maximum overall diagonal dimension of the building or area to be served as measured in a straight line.

Reason: As buildings of Type III, IV and V construction are being built to taller heights as allowed in Tables 504.3 and 504.4 of the International Building Code, they are representing a significant challenge for the fire service in responding to and attempting to extinguish or control the burning of the combustible structure, especially at the higher structure heights. In addition, these buildings of combustible material necessitate response by larger numbers of fire fighters and fire apparatus. This is evident by the fires that have occurred in recent years for buildings of combustible framing under construction.

A recent example is a major fire in Los Angeles with five stories of wood framing over a two story concrete podium on December 8, 2014. The apartment building known as the DaVinci required more than 250 firefighters to be dispatched to the scene. Access to parts of the building under fire was limited by the site layout. The size and the effects of the fire forced the closure of northbound Harbor (110) Freeway to the northbound 101 Freeway until 10 a.m.

Other recent large buildings framed with combustible materials that experienced fires and presented significant challenges for the fire service include:

**Project Name / Location:** Lindell Avenue Apartments, St. Louis, MO

Date of Incidents: June 13, 2007 and July 18, 2012

Project Description: 4 story, 197-unit, wood framed apartment building.

Building Status: Completed and occupied.

This same wood framed building was the scene of a 2007 fire that caused $12 million in damage while construction was underway.

**Project Name / Location:** 550 East and 500 South, Salt Lake City, UT

Date of Incident: February 9, 2014

Project Description: 4-story, wood frame apartment complex
Building Status: Under construction
The fire caused $2.5 million in damage.

Project Name / Location: Axis Apartments, Houston, TX
Date of Incident: March 25, 2014
Project Description: 5 story, 396 unit wood-framed apartment building
Building Status: Under construction
The fire incident began as a 3-alarm fire at 12:30 p.m. but was upgraded to a 5-alarm fire in less than an hour. More than 400 Houston Fire Department personnel responded.

Project Name / Location: Apollo Way, Madison, WI
Date of Incident: August 8, 2014
Project Description: 4-story, 105-unit wood-frame apartment complex.
Building Status: Under construction
Authorities initially said the fire caused $3.5 million to $5 million in damage, but later the insurer estimated that damage is “upwards of $10 million.”

Besides the fires listed above, a recent fire in the Belleza condominium complex at Ponte Vedra Beach, Florida on July 13, 2015, is another example of the need for adequate access to these types of buildings. After the fire was under control St. Johns County Fire-Rescue Capt. Jeremy Robshaw was quoted as saying “We had a heavy fire load upon arrival, so we were essentially playing catch up as soon as we got here. The location of the building, while one side gives us good access, the opposite side of the structure, essentially, there's very little access. The other building is very close to it, so it's difficult for us to get back there. That is where the main body of the fire was located. So really one of our primary objectives, initially, was accessing that area and then preventing the adjacent structure from becoming involved.” [http://www.news4jax.com/news/fire-causes-evacuation-at-timberwalk-apartments/34127358].

This proposal will require at least two (2) fire apparatus access roads be provided for fire department use to stage an exterior fire attack on these taller buildings of combustible construction. More than one fire department access road to these types of buildings is essential to assist the fire service in responding to and possibly gaining early control of the fire incident. Also, to insure reasonable remoteness of the location of these access roads on site they are also being required to be placed a distance equal to 1/3 the overall diagonal of the building or area. This concept is similar to criteria for remoteness of exits and exit access in Section BE 1007.1.1.

If a fire should occur two (2) fire department apparatus access roads remotely located give the fire service ample opportunity to respond, adequately stage a fire attack on the structure and reduce the risk of fire spread to other properties to an acceptable level.

Cost Impact: Will increase the cost of construction
This proposal is expected to increase the cost of construction due to the additional fire department apparatus roads required on site. This increased cost however is necessary to reduce the risk of damage to adjacent properties due to fire exposure and provide the fire service with improved access for firefighting response to these taller combustible buildings.
2015 International Fire Code

Add new text as follows:

503.7 Fire apparatus access roads during construction. Fire department access during construction shall comply with this section.

503.7.1 Required access. Fire apparatus access shall be provided within 200 feet (60 960mm) of all points on the ground level exterior of the building. Fire apparatus access roads shall be provided prior to introducing combustible materials on the construction site. Fire apparatus access roads on construction sites shall not be obstructed.

503.7.2 Width. Fire apparatus access roads shall be not less than 20 feet (60 960 mm) in width.

503.7.3 Surface. The surface of fire apparatus access roads shall consist of not less than 6 inches (152 mm) of native soil compacted to 95 percent of standard proctor density in accordance with ASTM D 698, and covered by not less 4 inches (102 mm) of aggregate base compacted to 100 percent of standard proctor density in accordance with ASTM D 698.

Exception: The surface of fire apparatus access roads are not required to comply with this section where it is shown that the surface provided will support an imposed live load of 70,000 pounds (31 751kg) with a maximum axle load of 28,000 pounds (12 712kg). A registered engineer shall prepare and seal the soil compaction report. The report shall be available for review by the fire code official.

503.7.4 Turning radius. Curves in fire apparatus access roads shall have a center line radius of not less than 45-foot (13 716 mm) with a 35-foot (10 668mm) inside radius, and a 55-foot (16 764 mm) outside radius.

503.7.5 Dead ends. Dead-end fire apparatus access roads greater than 200 feet (60 960 mm) in length shall terminate at an approved turnaround.

503.7.6 Drainage. Water drainage shall be directed away from the fire apparatus access road.

Reference standards type: This reference standard is new to the ICC Code Books

Add new standard(s) as follows:

ASTM D698-2012e2 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft3 (600 kN-m/m3))

Reason: By adding this new section the fire department will have access to construction sites. There have been multiple fires where the fire service has seen large losses of property at sites with little to no fire dept access. This new requirement will provide support to the first responder for both Fire and EMS to the construction site.

Cost Impact: Will increase the cost of construction

This will increase cost of construction however, it will provide Fire Department access to construction sites.

Analysis: A review of the standard(s) proposed for inclusion in the code, ASTM D698-2012e2 with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1, 2016.
F39-16

IFC: 507.5.7 (New).

Proponent: Tim Knorr, representing Los Angeles County Fire Department (tim.knorr@fire.lacounty.gov)

2015 International Fire Code

507.5.7 Fire Fighting Water Source Marker Where required by the fire code official, a fire hydrant and other fire fighting water sources shall be identified by installation of a blue raised reflective pavement marker or identified by other approved means.

Reason: Quicker visualization of identifying water sources assist in spotting apparatus and connecting to these available water sources reduce property damage and increase productivity of assigned manpower.

Cost Impact: Will increase the cost of construction
Minimal cost increases for the purchase of raised pavement markers, application glues, and installation labor costs.
2015 International Fire Code
Delete and substitute as follows:

508.1 (IBC [F] 911.1) General. Where required by other sections of this code and in all buildings classified as high rise buildings by the International Building Code, a fire command center for fire department operations shall be provided and shall comply with Sections 508.1.1 through 508.1.6. A fire command center shall be provided in each of the following locations:

1. High-rise buildings.
2. Buildings with an atriums connecting more than two stories.
3. Buildings, other than Group E, provided with a required emergency voice/alarm communications system.
4. Buildings or areas provided with a mass notification system.
5. Buildings with smoke protected assembly seating.
6. Covered mall buildings exceeding 100,000 square feet.

Fire command centers shall comply with Sections 508.1.1 through 508.1.6.

Reason: Currently fire command centers are only required in high rises, this new section will require them in other areas. These new locations will provide a center location for the fire department.

Cost Impact: Will increase the cost of construction
These new location will provide a fire command center location for the fire department use. Hence additional sq ft will be loss. Most the equipment required in the fire command center will be required do to the nature of the building.
2015 International Fire Code

Revise as follows:

508.1 (IBC [F] 911.1) General. Where required by other sections of this code and in all buildings classified as high-rise buildings by the International Building Code and in all buildings with a footprint of over 500,000 square feet, a fire command center for fire department operations shall be provided and shall comply with Sections 508.1.1 through 508.1.6.

Reason: Fire Operations at large, horizontal buildings in excess of 500,000 square feet can be just as challenging for firefighters as operating at high-rise buildings. Adding a fire control room to these types of buildings will allow the incident commander to see at a glance, in one protected location, where the fire is, the building layout, and any active fire protection to provide the best strategy possible to mitigate the problem and protect the lives of firefighters. The items required in the fire control room in Section 508.1.6 would be limited to those already in the building and would not require items otherwise not required by the construction of the building.

Cost Impact: Will increase the cost of construction
This proposal would require that a 200 sq. ft. rated room be added to the building, an estimated .06% increase to the cost of construction, utilizing 500,000 sq. ft. as the model. The applicable items listed in 508.1.6 will already be in the building so the cost to locate them in the fire control room rather than throughout the building will not increase costs.
**F42-16**

**508.1.2, IBC [F] 911.1.2**

**Proponent:** Ali Fattah, City of San Diego Development Services Department (afattah@sandiego.gov)

**2015 International Fire Code**

Revise as follows:

**508.1.2 (IBC [F] 911.1.2) Separation.** The *fire command center* shall be separated from the remainder of the building by not less than a 1-hour *fire barrier* constructed in accordance with Section 707 of the *International Building Code* or *horizontal assembly* constructed in accordance with Section 711 of the *International Building Code*, or both. Where the fire command center is required by Section 403.4.6 of the *International Building Code*, it shall be separated from the remainder of the building by not less than a 2-hour *fire barrier* or *horizontal assembly*, or both.

**Reason:** This code change is mainly editorial in nature and coordinates the IBC/IFC with the requirements in NFPA 72.

The majority of high rise buildings utilize zoned evacuation. NFPA 72 is a referenced standard and it requires that zoned (or partial) evacuation systems meet survivability requirements. This entails that the fire alarm riser and all equipment serving the main backbone of the system (prior to branching off on each floor) being protected as specified in NFPA 72.

Survivability is achieved via a 2-hour rated room or enclosure per 2013 NFPA 72 Section 24.4.2.8.5.6. Since IBC Section 911.1.5 requires that the emergency voice/alarm communications system control unit be in the fire command center, this is equipment that is required to meet the survivability requirements of NFPA 72. Therefore, the room must be separated by at least 2-hour rated fire barriers per NFPA 72.

The intent of this change is to incorporate the referenced standard requirement from NFPA 72 into the IBC so that they are consistent and there is no confusion. The cost of this change is minimal as the fire command center is only 200 square feet in area so the added layer of drywall and an upgrade to a 90-minute rated door should not be cost restrictive.

Additionally, Section 913.2.1 requires that fire pump rooms be separated with two hour assemblies and Section 403.4.8.1 requires that the emergency or standby generator room also be separated with two hour assemblies it stands to reason that the fire command center that controls these systems should be similarly separated.

The proposed code change assumes that Group A code change G76-15 will be approved through public comment # 1 or 2 as a result the text of the proposed code change is reflective of that. In the even that G76-15 is not approved then we request that the code correlating committee revise the fire resistance rating to 2 hour in the first sentence of the unchanged Section and that the additional proposed text be omitted.

**Cost Impact:** Will increase the cost of construction

This requirement is a life safety related issue. The cost increase will not be significant since it involves the incremental cost of increased fire resistance on a very large project.
F43-16
508.1.3; IBC 911.1.3

Proponent: Matthew Davy, Arup (matt.davy@arup.com)

2015 International Fire Code

Revise as follows:

508.1.3 (IBC [F] 911.1.3) Size. The fire command center shall be not less than 96 square feet (8.9 m²) in area with a minimum dimension of 8 feet (2438 mm). In buildings more than 420 feet in building height, the fire command center shall be not less than 200 square feet (19 m²) in area with a minimum dimension of 10 feet (3048 mm).__

Reason: The 96 sqft size was typical for high-rise buildings in legacy editions with sufficient room for a work table; however, it was increased to 200 sqft during the 07/08 code development cycle stating "too small and confining." As noted in OSHA's Fire Service Features of Buildings and Fire Protection Systems, "[an] important consideration is the size of the [fire command center]. Space is needed to accommodate a table and to access all the equipment in the room. The table is intended to help incident commanders consult plans for the building and fire protection systems. If the center is used for other purposes (such as security), additional space should be provided beyond that required or needed for the fire protection features." This 'additional space' more appropriately aligns with self-supporting buildings over 420 feet, which should trigger a larger fire command center for incident management and control of building systems during lengthy or extended operations. It should be noted that the dimensions of the work table are not specified in the code, and the fire command center layout for any high-rise must be approved prior to installation for local fire department operational considerations.


Cost Impact: Will not increase the cost of construction
This proposal should reduce the cost of construction for high-rise buildings less than 420 feet in height.
508.1.3, IBC [F] 911.1.3

**Size.** The fire command center shall be not less than 200 \(0.015\) percent of the total building area of the facility served or 96 square feet \(8.9 \text{ m}^2\) in area, whichever is greater, with a minimum dimension of 10 \(0.7\) times the square root of the room area, or 8 feet \(2438 \text{ mm}\), whichever is greater.

**Reason:** From the 2006 IBC to the 2009 IBC, the Fire Command Center size increased from 96 sf to 200 sf, and the minimum dimension increased from 8 ft to 10 ft.

It is clear that one Fire Command Center size does not address all building scenarios. This issue may be better addressed by a Fire Command Center size that is variable. For smaller buildings, which are expected to have fewer panels for fire alarm, stair pressurization controls, HVAC controls, smoke removal, elevator status, etc., the size of 200 sf from the current code may be more than needed. It is probable that the original size requirement of 96 sf room was sufficient for many of the smaller buildings constructed. However, for larger complexes, having more building area to express on the various system control panels, larger Fire Command Centers may be necessary.

This proposal attempts to size the Fire Command Center in relation to the building size. The proposal returns to the original size of 96 sf as the base, but also can require much larger rooms, depending on the building served. The formula contained in this proposal returns the same Fire Command Center size for a building of 1,333,333 sf; smaller buildings will have smaller size requirements, while larger buildings will have larger size requirements. This table shows a sample of the varying sizes of the Fire Command Centers that would result from this proposal:

<table>
<thead>
<tr>
<th>Size of Building (SF)</th>
<th>Size of Fire Command Center (SF)</th>
<th>Minimum Dimension of Fire Command Center (FT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>250,000</td>
<td>37.5 (would be 96 due to minimum)</td>
<td>4.3 (would be 8 due to minimum)</td>
</tr>
<tr>
<td>500,000</td>
<td>75 (would be 96 due to minimum)</td>
<td>6.06 (would be 8 due to minimum)</td>
</tr>
<tr>
<td>640,000</td>
<td>96</td>
<td>6.9 (would be 8 due to minimum)</td>
</tr>
<tr>
<td>750,000</td>
<td>112.5</td>
<td>7.4 (would be 8 due to minimum)</td>
</tr>
<tr>
<td>1,000,000</td>
<td>150</td>
<td>8.6</td>
</tr>
<tr>
<td>1,333,333</td>
<td>200</td>
<td>9.9</td>
</tr>
<tr>
<td>2,000,000</td>
<td>300</td>
<td>12.1</td>
</tr>
<tr>
<td>5,000,000</td>
<td>750</td>
<td>19.2</td>
</tr>
<tr>
<td>10,000,000</td>
<td>1,500</td>
<td>27.1</td>
</tr>
</tbody>
</table>

**Cost Impact:** Will increase the cost of construction
This amendment will have varying effects on construction (both increase and decrease), as some buildings (those
less than 1,333,333 sf in building area) would be able to use smaller Fire Command Centers than are currently required, while other buildings (those larger than 1,333,333 sf in building area) would be required to have larger Fire Command Centers than are currently required.
2015 International Fire Code

Revise as follows:

508.1.6 (IBC [F] 911.1.6) Required features. The fire command center shall comply with NFPA 72 and shall contain the following features:

1. The emergency voice/alarm communication system control unit.
2. The fire department communications system.
3. Fire detection and alarm system annunciator.
4. Annunciator unit visually indicating the location of the elevators and whether they are operational.
5. Status indicators and controls for air distribution systems.
6. The fire fighter's control panel required by Section 909.16 for smoke control systems installed in the building.
7. Controls for unlocking stairway doors simultaneously.
8. Sprinkler valve and water-flow detector display panels.
9. Emergency and standby power status indicators.
10. A telephone for fire department use with controlled access to the public telephone system.
11. Fire pump status indicators.
12. Schematic building plans indicating the typical floor plan and detailing the building core, means of egress, fire protection systems, fire-fighter air-replenishment systems, fire-fighting equipment and fire department access, and the location of fire walls, fire barriers, fire partitions, smoke barriers and smoke partitions.
13. An approved Building Information Card that includes, but is not limited to, all of the following information:
   13.1. General building information that includes: property name, address, the number of floors in the building above and below grade, use and occupancy classification (for mixed uses, identify the different types of occupancies on each floor) and the estimated building population during the day, night and weekend;
   13.2. Building emergency contact information that includes: a list of the building's emergency contacts including but not limited to building manager, building engineer and their respective work phone number, cell phone number and e-mail address;
   13.3. Building construction information that includes: the type of building construction including but not limited to floors, walls, columns and roof assembly, spray fire-resistive materials and intumescent fire-resistive coatings manufacturer.
   13.4. Exit access stairway and exit stairway information that includes: number of exit access stairways and exit stairways in building; each exit access stairway and exit stairway designation and floors served; location where each exit access stairway and exit stairway discharges, interior/exterior stairways that are pressurized; exit stairways provided with emergency lighting; each exit stairway that allows reentry; exit stairways providing roof...
access; elevator information that includes: number of elevator banks, elevator bank designation, elevator car numbers and respective floors that they serve; location of elevator machine rooms, control rooms and control spaces; location of sky lobby; and location of freight elevator banks;

13.5. Building services and system information that includes: location of mechanical rooms, location of building management system, location and capacity of all fuel oil tanks, location of emergency generator and location of natural gas service;

13.6. Fire protection system information that includes: location of standpipes, location of fire pump room, location of fire department connections, floors protected by automatic sprinklers and location of different types of automatic sprinkler systems installed including but not limited to dry, wet and pre-action;

13.7. Hazardous material information that includes: location and quantity of hazardous material.

15. Generator supervision devices, manual start and transfer features.
16. Public address system, where specifically required by other sections of this code.
17. Elevator fire recall switch in accordance with ASME A17.1/CSA B4.
18. Elevator emergency or standby power selector switch(es), where emergency or standby power is provided.

**Reason:** Spray fire-resistant materials (SFRM) and intumescent fire resistive materials and coatings (IFRM) protect the structural frame. For post fire investigation, it is critical to identify the manufacturer of the fireproofing system installed for protection. Without this information, the fire code official is left to guess what materials were in place for the investigation. Secondly, the primary structural frame is protected with SFRM and IFRMs. Without protection, the primary structural frame may not stay standing long enough to protect first responders fighting fire.

**Cost Impact:** Will increase the cost of construction
This will increase the cost of construction by the amount of a small sign in the fire command center.
F46-16

IFC: 509.1.2 (New), 509.1.2.1 (New), 509.1.2.2 (New), 509.1.2.3 (New), 509.1.2.4 (New).

Proponent: William Freer, New York State Office of Fire Prevention and Control, representing New York State Office of Fire Prevention and Control (william.freer@dhses.ny.gov)

2015 International Fire Code

Add new text as follows:

509.1.2.1 Marking of Solar Photovoltaic panels/modules Marking is required on interior and exterior direct-current (DC) conduit, enclosures, raceways, cable assemblies, junction boxes, combiner boxes and disconnects. The markings shall be in accordance with Section 509.1.2.1 through 509.1.2.4.

509.1.2.1 Materials. The materials used for marking shall be reflective, weather resistant and suitable for the environment. Marking as required by section 509.1.2 shall have all letters capitalized with a minimum height of 3/8 inch (9.5mm) white on red background.

509.1.2.2 Marking Content. The marking shall state: WARNING: PHOTOVOLTAIC POWER SOURCE.

509.1.2.3 Main Service disconnect. The marking shall be placed adjacent to the main service disconnect in a location clearly visible from the location where the disconnect is operated.

509.1.2.4 Location of marking. Marking shall be placed on interior and exterior DC conduit, raceways, enclosures and cable assemblies every 10 feet (3048mm), within 1 foot (305mm) of turns or bends and within 1 foot (305mm) above and below penetrations of roof/ceiling assemblies, walls or barriers.

Reason: Solar panels and the electricity produced by them are a known hazard to Firefighters and firefighting operations. There currently nothing in the code to require a standardized marking system to allow firefighters to know of the danger present.

This proposal is consistent with the current California Code.

Cost Impact: Will increase the cost of construction

The cost of construction would be increased by the cost of the markings and the labor to install them.
F47-16

IFC: 510.1.
Proponent: Alan Perdue, representing Safer Buildings Coalition (alan.perdue@saferbuildings.org)

2015 International Fire Code

Revise as follows:

510.1 Emergency responder radio coverage in new buildings. All new buildings shall have approved radio coverage for emergency responders within the building based upon the existing coverage levels of utilized by the public safety communication systems of the jurisdiction at the exterior of the building. This section shall not require improvement of the existing public safety communication systems.

Exceptions:
1. Where approved by the building official and the fire code official, a wired communication system in accordance with Section 907.2.13.2 shall be permitted to be installed or maintained instead of an approved radio coverage system.
2. Where it is determined by the fire code official that the radio coverage system is not needed.
3. In facilities where emergency responder radio coverage is required and such systems, components or equipment required could have a negative impact on the normal operations of that facility, the fire code official shall have the authority to accept an automatically activated emergency responder radio coverage system.

Reason: There are instances whereby public safety communications systems are utilized by a jurisdiction but are not owned by the jurisdiction such as but not limited to regional radio systems, FirstNet Nationwide Network, etc. This change is more specific and clarifies the intent of the section to include all public safety communications systems utilized by the emergency responders within the jurisdiction.

Cost Impact: Will not increase the cost of construction
This change provides clarification to existing intent.
F48-16

IFC: 510.3, [A] 105.7.5.
Proponent: Alan Perdue (alan.perdue@saferbuildings.org)

THIS CODE CHANGE WILL BE HEARD BY THE ADMIN COMMITTEE. SEE THE HEARING ORDER FOR THIS COMMITTEE

2015 International Fire Code

Revise as follows:

[A] 105.7.5 Emergency responder radio coverage system. A construction or electrical permit is required for installation of or modification to emergency responder radio coverage systems and related equipment. Maintenance performed in accordance with this code is not considered to be a modification and does not require a construction permit.

510.3 Permit required. A construction or electrical permit for the installation of or modification to emergency responder radio coverage systems and related equipment is required as specified in Section 105.7.5. Maintenance performed in accordance with this code is not considered a modification and does not require a permit.

Reason: Systems utilized to provide for emergency responder radio system coverage may be installed after a building is constructed and the AHJ often will require an electrical permit in lieu of a construction permit. This change clarifies the intent of the code to obtain some type of permit in order to make the AHJ aware activity is taking place that will impact the emergency response to the facility.

Cost Impact: Will not increase the cost of construction
This proposed change provides clarification to the intent of the code.
F49-16
IFC: 510.4.
Proponent: Joe McElvaney, representing self (joemcelvaney@gmail.com)

2015 International Fire Code
Revise as follows:

510.4 Technical requirements. Systems, components and equipment required to provide the emergency responder radio coverage system shall comply with Sections 510.4.1 through 510.4.2.5 and NFPA 72.

Reason: The IFC does not provide detailed information on the wiring method as it relates to survivability, NFPA has the required information and additionally it provides information on critical areas where the system needs to work and the monitoring of the systems via a fire alarm panel.

Cost Impact: Will increase the cost of construction
This will be a cost increase however most designers are complying with NFPA 72 at this time.
2015 International Fire Code

Revise as follows:

**510.4.1 Radio and data signal strength.** The building shall be considered to have acceptable emergency responder radio and data coverage when signal strength measurements in 95 percent of all areas on each floor of the building meet the signal strength requirements in Sections 510.4.1.1, 510.4.1.2 and 510.4.1.3.

Add new text as follows:

**510.4.1.3 Data Network Performance** A data signal sufficient to meet the requirements of the applications being utilized by public safety for emergency operations shall be provided throughout the coverage area as specified by the fire code official in Section 510.4.2.2.

**Reason:** Voice and data (ex: LTE) network performance have different quality measures and thus data network performance needs to be addressed in a separate code section. Data network requirements evolve very quickly and thus allowing the fire code official to provide system parameters is warranted. This information, if required would be included in the technical criteria specified in advance by the fire code official in Section 510.4.2.2.

**Cost Impact:** Will not increase the cost of construction
This proposed new section is not requiring additional signals but simply provides for a method to determine the quality of the signal strength.
F51-16

IFC: 510.4.1.1, 510.4.1.2.

Proponent: Alan Perdue, representing Safer Buildings Coalition (alan.perdue@saferbuildings.org)

2015 International Fire Code

Revise as follows:

510.4.1.1 Minimum signal strength into the building. A
The minimum inbound signal strength of -95 dBm shall be sufficient to provide usable voice communications throughout the coverage area, as specified by the fire code official. The inbound signal level shall be receivable within sufficient to provide a minimum of Delivered Audio Quality (DAQ) 3.0 or an equivalent Signal-to-Noise-Plus-Interference Ratio (SINR) applicable to the building technology for either analog or digital signals.

510.4.1.2 Minimum signal strength out of the building. A
The minimum outbound signal strength of -95 dBm shall be sufficient to provide usable voice communications throughout the coverage area, as specified by the fire code official. The outbound signal level shall be received by sufficient to provide a minimum of DAQ 3.0 or an equivalent SINR applicable to the agency’s radio system when transmitted from within the building technology for either analog or digital signals.

Reason: This change aligns national standards with industry practices in delivering communications quality to the users of emergency responder systems. Utilizing a quality measure in dBm only addresses signal strength, not interference of noise, and thus is an incomplete assessment of usable signal. DAQ (Delivered Audio Quality) refers to a range of usable voice parameters and is useful regardless of the modulation or system technology utilized. This would allow a measure of how the signal will sound to the end user which is critical to emergency operations. A new section is being proposed to address data network performance for other emergency responder signals such as LTE which is part of the nationwide public safety responder network commonly known as FirstNet.

Cost Impact: Will not increase the cost of construction
This change does not impact the requirement of an emergency responder radio enhancement system but simply provides a better quality measurement of the signal being provided for use during emergency incidents.
F52-16
IFC: 510.4.2, 510.5.

Proponent: Michael O'Brian representing the Fire Code Action Committee (FCAC@iccsafe.org)

2015 International Fire Code

510.4.2 System design. The emergency responder radio coverage system shall be designed in accordance with NFPA 72 and with Sections 510.4.2.1 through 510.4.2.5.

510.5 Installation requirements. The installation of the public safety radio coverage system shall be in accordance with NFPA 72 and with Sections 510.5.1 through 510.5.4.

Reason: The use of these systems is increasing. NFPA 72 now points to NFPA 1221 Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems as the best source for design and installation. By including NFPA 72 in the above requirements will improve the applications.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire safety and hazardous materials in new and existing buildings and facilities and the protection of life and property in wildland urban interface areas. In 2014 and 2015 the Fire-CAC has held 5 open meetings. In addition, there were numerous conference calls, Regional Work Group and Task Group meetings for the current code development cycle, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC

Cost Impact: Will not increase the cost of construction
This will provide a clearer process for installation and design and is not intended to increase the cost of installation.
F53-16

IFC: 510.4.2, 510.6.1.

Proponent: Adria Reinertson, Riverside County Fire Department, representing California Fire Chiefs Association (adriar@moval.org)

2015 International Fire Code

Revise as follows:

510.4.2 System design. The emergency responder radio coverage system shall be designed in accordance with Sections 510.4.2.1 through 510.4.2.5 and NFPA 1221.

510.6.1 Testing and proof of compliance. The owner of the building or owners authorized agent shall have the emergency responder radio coverage system shall be inspected and tested annually or where structural changes occur including additions or remodels that could materially change the original field performance tests. Testing shall consist of the following:

1. In-building coverage test as described in Section 510.5.3.
2. Signal boosters shall be tested to verify that the gain is the same as it was upon initial installation and acceptance.
3. Backup batteries and power supplies shall be tested under load of a period of 1 hour to verify that they will properly operate during an actual power outage. If within the 1-hour test period the battery exhibits symptoms of failure, the test shall be extended for additional 1-hour periods until the integrity of the battery can be determined.
4. Other active components shall be checked to verify operation within the manufacturer's specifications.
5. At the conclusion of the testing, a report, which shall verify compliance with Section 510.5.3, shall be submitted to the fire code official.

Reference standards type: This reference standard is new to the ICC Code Books

Add new standard(s) as follows:
NFPA 1221 -2016 Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems

Reason: Adding the standard will bring the technical requirements identified in NFPA 1221 into the IFC for code officials to have a point setter to ensure a system that will work. Adding the owner or owner representative to the testing requirements clarifies that the person responsible for the building is responsible for the testing.

Cost Impact: Will not increase the cost of construction

This is only a clarification of required compliance with NFPA 1221.

Analysis: A review of the standard(s) proposed for inclusion in the code, NFPA 1221-2016 with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1, 2016.

F53-16 : 510.4.2-
REINERTSON13177
2015 International Fire Code

Revise as follows:

510.4.2.1 Amplification systems allowed and components. Buildings and structures that cannot support the required level of radio coverage shall be equipped with a radiating cable system, a distributed antenna system with Federal Communications Commission (FCC)-certified signal boosters, or other systems and components to enhance the public safety radio signals and achieve the required level of radio coverage specified in sections 510.4.1 through 510.4.1.4. Public safety communications enhancement systems utilizing RF emitting devices and cabling shall be approved by the fire code official in order. Prior to achieve installation, all RF emitting devices shall have the required adequate certification of the radio coverage licensing authority and be suitable for public safety use.

Reason: This proposal maintains the existing requirements of 510.4.2.1 while lifting the restriction of the type of technology utilized to comply with the performance requirements of the code. As the international codes may be utilized outside the US for model code language, the FCC may not be the only radio licensing authority in the jurisdiction. This proposed change also aligns with other model language utilized by the industry.

Cost impact: Will not increase the cost of construction
This proposal limits the restriction on a specific type of technology to meet the performance standards public safety radio enhancement systems.
2015 International Fire Code

Revise as follows:

510.4.2.2 Technical criteria. The fire code official shall maintain a document providing the specific technical information and requirements for the emergency responder radio communications coverage system. This document shall contain, but not be limited to, the various frequencies required, the location of radio sites, effective radiated power of radio sites, maximum propagation delay, in microseconds, applications being used and other supporting technical information necessary for system design.

Reason: This proposal will provide additional information necessary to design public safety radio enhancement systems and maintain consistency with Section 510.4. The propagation delay data should be available to the fire code official in its as-build documentation for the system which is vital in maintaining system integrity throughout the life of the system.

Cost impact: Will not increase the cost of construction
This proposal is providing documentation of existing information.
F56-16
510.4.2.3, 604.2.3, IBC [F] 2702.2.3

Proponent: Sagiv Weiss-Ishai, SFFD, representing San Francisco Fire Department (sagiv.weiss-ishai@sfgov.org)

2015 International Fire Code

Revise as follows:

510.4.2.3 Standby power. Emergency responder radio coverage systems shall be provided with standby power in accordance with Section 604. The standby power supply shall be capable of operating the emergency responder radio coverage system for a duration of not less than 24 12 hours at 100 percent system operation capacity.

604.2.3 (IBC [F] 2702.2.3) Emergency responder radio coverage systems. Standby power shall be provided for emergency responder radio coverage systems as required in Section 510.4.2.3. The standby power supply shall be capable of operating the emergency responder radio coverage system for a duration of not less than 24 12 hours at 100 percent system operation capacity.

Reason: It is not practical to require that 24 hour standby power be provided for these systems, especially for those located in buildings where stationary engine generators are not available. This proposal correlates the IFC/IBC standby power requirements with those included in NFPA 72, Section 24.5.2.5.5.2.

Cost Impact: Will not increase the cost of construction
It will significantly reduce the cost of the system since the proposed 12-HR UPS power back up system is less costly than the currently required 24-HR UPS system.
510.4.2.3, 604.2.3; IBC [F] 2702.2.3

Proponent: Alan Perdue, representing Safer Buildings Coalition (alan.perdue@saferbuildings.org)

2015 International Fire Code

Revise as follows:

510.4.2.3 Standby power. Emergency responder radio coverage systems shall be provided with dedicated standby batteries or provided with 2 hour standby batteries and connected to the facility generator power system in accordance with Section 604. The standby power supply shall be capable of operating the emergency responder radio coverage system at 100 percent system capacity for a duration of not less than 24 12 hours.

604.2.3 (IBC [F] 2702.2.3) Emergency responder radio coverage systems. Standby power shall be provided for emergency responder radio coverage systems as required in Section 510.4.2.3. The standby power supply shall be capable of operating the emergency responder radio coverage system at 100 percent system operation capacity for a duration of not less than 24 12 hours.

Reason: In the 2009 IFC the standby power requirements were 12 hours. The requirements in the 2012 IFC to the standby power requirements were changed to 24 hours to align with other fire safety systems such as fire alarms with no real experience or technical justification. The capacity necessary for providing 24 hour battery backup for emergency responder radio enhancement systems is far more significant that that of other systems and can require large battery banks on multiple floors of a building. Other national standards and industry practices utilize 12 hours as the standard and this change brings consistancy to backup battery requirements for design professional and the fire code officials.

Cost Impact: Will not increase the cost of construction
This proposal will reduce the cost of construction.
F58-16
IFC: 510.4.2.4.
Proponent: Alan Perdue, representing Safer Buildings Coalition (alan.perdue@saferbuildings.org)

2015 International Fire Code

Revise as follows:

510.4.2.4 Signal booster requirements. If used, signal boosters shall meet the following requirements:

1. All signal booster components shall be contained in a National Electrical Manufacturer's Association (NEMA) 4-type waterproof cabinet.
2. Battery systems used for the emergency power source shall be contained in a NEMA 4-type waterproof-3R or higher rated cabinet.
3. Equipment shall have FCC or other radio licensing authority certification and be suitable for public safety use prior to installation.
4. Where a donor antenna exist, isolation shall be maintained between the donor antenna and all inside antennas to a minimum of 20dB greater than the system gain under all operating conditions.
5. The signal booster system and battery system shall be electrically supervised and monitored by a supervisory service, or when approved by the fire code official, shall sound an audible signal at a constantly attended location.
6. Bi-Directional Amplifiers (BDA's) used in emergency responder radio coverage systems shall have oscillation prevention circuitry.
6. Equipment shall have FCC certification prior to installation.
6. The installation of amplification systems or systems that operate on or provide the means to cause interference on any emergency responder radio coverage networks shall be coordinated and approved by the fire code official.

Reason: This proposal to modify 510.4.2.2 #2 is to eliminate a conflict the industry faces when placing charging batteries within a totally sealed NEMA 4 enclosure. The NEMA 3R cabinet will provide the intended protection for the battery charging systems. The addition of items #4, #5 and #6 are to provide requirements that limit the opportunity for interference and/or noise created by inadequate system components and their location of placement.

Cost Impact: Will not increase the cost of construction
This proposal reduces the requirements for NEMA 4 rated cabinets and provides direction for limiting interference created by system components.
2015 International Fire Code
Add new text as follows:

510.4.2.5 System Monitoring The emergency responder radio enhancement system shall be monitored by a listed fire alarm control unit, or where approved by the fire code official, shall sound an audible signal at a constantly attended on-site location. Automatic supervisory signals shall include the following:

1. Loss of normal AC power supply.
2. System battery charger(s) failure.
3. Malfunction of the donor antenna(s).
4. Failure of active RF emitting device(s).
5. Low-battery capacity at 70 percent reduction of operating capacity.
6. Failure of critical system components.
7. The communications link between the fire alarm system and the emergency responder radio enhancement system.

Revise as follows:

510.4.2.5 510.4.2.6 Additional frequencies and change of frequencies. The emergency responder radio coverage system shall be capable of modification or expansion in the event frequency changes are required by the FCC or radio licensing authority or additional frequencies are made available by the FCC or radio licensing authority.

Reason: System monitoring within 510.4.2.4 is being relocated to a new section to clarify the specific monitoring requirements necessary to maintain integrity of the emergency responder communications enhancement system. This change also brings consistancy to the method of monitoring taking place within the industry. Renumber 510.4.2.5 to 510.4.2.6 and include radio licensing authority in the event the model code language is utilized outside the US.

Cost Impact: Will not increase the cost of construction
Monitoring was already required within Section 510.4.2.4 but was not specific. This proposal clarifies the intent of the code to maintain system integrity.
2015 International Fire Code

Add new text as follows:

510.4.2.6 **Design Documents.** The fire code official shall have the authority to require as built design documents and specifications for emergency responder communications coverage systems. The documents shall be in a format acceptable to the fire code official.

**Reason:** The radio enhancement system documentation exist electronically when systems are designed and installed. Many jurisdictions utilize this type of information within their electronic records management systems and computer aided dispatch systems. This proposal is consistent with other construction document requirements in Chapter 9 of the IFC.

**Cost Impact:** Will not increase the cost of construction

This proposal will not increase construction cost as design documents are already developed for the design and installation of the system.
2015 International Fire Code

Add new text as follows:

510.4.2.6 Radio Communication Antenna Density  Systems shall be engineered to minimize the near-far effect. Radio enhancement system designs shall include sufficient antenna density to address reduced gain conditions.

Exceptions:

1. Class A narrow band signal booster devices with independent AGC/ALC circuits per channel.
2. Systems where all portable devices within the same band use active power control features.

Reason: The near-far effect occurs when too few indoor antennas are used to enhance coverage inside the building creating excessively wide dynamic range of operation. A portable in close proximity to indoor antenna, when keyed, can cause the talk-out amplifier's AGC/ALC circuit to reduce the gain leaving other portables farther away at risk of not hitting the repeater site due to insufficient gain. If the near-far effect occurs, some public safety communications equipment will not function as required by the code and will leave responders at risk.

Cost Impact: Will increase the cost of construction
This proposal may increase cost of construction if additional antenna's are necessary to minimize the near-far effect of the system.
F62-16

IFC: 510.4.2.6 (New).

Proponent: Alan Perdue, representing Safer Buildings Coalition (alan.perdue@saferbuildings.org)

2015 International Fire Code

Add new text as follows:

510.4.2.6 Protection of system cabling and components Cabling and components for emergency responder communications enhancement systems shall be protected from fire and lightning in accordance with NFPA 1221.

Reference standards type: This reference standard is new to the ICC Code Books

Add new standard(s) as follows:
NFPA 1221 - 2016: STANDARD FOR THE INSTALLATION, MAINTENANCE, AND USE OF EMERGENCY SERVICES COMMUNICATIONS SYSTEMS

Reason: The survivability of the emergency responder communications enhancement systems are critical to public safety responders during an emergency. Protecting critical pathways and components from fire and lightning will allow the operational effectiveness of these systems to continue as conditions deteriorate in portions of the building thereby providing much needed communications capability to emergency responders. As a component of the life safety eco system of the building much like the fire alarm and sprinkler systems it is imperative that the emergency responder communications enhancement systems also be protected. This protection is detailed in the 2016 Edition of NFPA 1221.

Cost Impact: Will not increase the cost of construction

The cabling and components identified within this proposal should be installed currently with protections. The addition of this code section is intended to clearly state what is and is not being protected and provide the necessary protection design criteria.

Analysis: A review of the standard(s) proposed for inclusion in the code, NFPA 1221-2016 with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1, 2016.
2015 International Fire Code

Revise as follows:

510.5.2 Minimum qualifications of personnel. The minimum qualifications of the system designer and lead installation personnel shall include both of the following:

1. A valid FCC-issued general radio operators license.
2. Certification of in-building system training issued by a nationally recognized organization, school or a certificate issued by the manufacturer of the equipment being installed.

These qualifications shall not be required where demonstration of adequate skills and experience satisfactory to the fire code official is provided.

Reason: This proposal removes the word “nationally”. This proposed change will provide the opportunity for either a national or regional organization recognized by the fire code official to provide the necessary training.

Cost Impact: Will not increase the cost of construction
The proposed change does not impact system cost.
F64-16
IFC: 510.5.3.
Proponent: Alan Perdue, representing Safer Buildings Coalition (alan.perdue@saferbuildings.org)

2015 International Fire Code
Revise as follows:

510.5.3 Acceptance test procedure. Where an emergency responder radio coverage system is required, and upon completion of installation, the building owner shall have the radio system tested to verify that two-way coverage on each floor of the building is not less than 90% 95 percent. The test procedure shall be conducted as follows:

1. Each floor of the building shall be divided into a grid of 20 approximately equal test areas.
2. The test shall be conducted using a calibrated portable radio of the latest brand and model used by the agency talking through the agency's radio communications system or equipment approved by the fire code official.
3. Failure of not more than two nonadjacent test areas shall not result in failure of the test.
4. In the event that three of the test areas fail the test, in order to be more statistically accurate, the floor shall be permitted to be divided into 40 equal test areas. Failure of not more than four nonadjacent test areas shall not result in failure of the test. If the system fails the 40-area test, the system shall be altered to meet the 90 percent 95-percent coverage requirement.
5. A test location approximately in the center of each test area shall be selected for the test, with the radio enabled to verify two-way communications to and from the outside of the building through the public agency's radio communications system. Once the test location has been selected, that location shall represent the entire test area. Failure in the selected test location shall be considered failure of that test area. Additional test locations shall not be permitted.
6. The gain values of all amplifiers shall be measured and the test measurement results shall be kept on file with the building owner so that the measurements can be verified during annual tests. In the event that the measurement results become lost, the building owner shall be required to rerun the acceptance test to reestablish the gain values.
7. As part of the installation a spectrum analyzer or other suitable test equipment shall be utilized to ensure spurious oscillations are not being generated by the subject signal booster. This test shall be conducted at the time of installation and subsequent annual inspections.
8. Systems incorporating Class B signal booster devices or Class B broadband fiber remote devices shall be tested using two portable radios simultaneously conducting subjective voice quality checks. One portable radio shall be positioned not greater than 10 feet from the indoor antenna. The second portable radio shall be positioned at a distance that represents the farthest distance from any indoor antenna. With both portable radios simultaneously keyed up on different frequencies within the same band, subjective audio testing shall be conducted and comply with DAQ levels as specified in Sections 510.4.1.1 and 510.4.1.2.

Reason: This proposal clarifies inconsistency within the testing criteria for emergency responder communications enhancement system coverage. The pass/fail threshold of 90% is less than the required 95% coverage stated in Section 510. Additionally, inserting other test equipment approved by the AHJ provides for technological
improvements with testing equipment. The testing identified in item #8 will ensure that there is consistent objective data for the fire code official to use to ensure quality and conformance and to maintain consistency with the DAQ (delivered audio quality) requirements in section 510.4.

**Cost Impact:** Will increase the cost of construction
Depending on which percentage number within the existing code the fire code official enforced this change could increase construction cost.
2015 International Fire Code

Revise as follows:

510.5.3 Acceptance test procedure. Where an emergency responder radio coverage system is required, and upon completion of installation, the building owner shall have the radio system tested to verify that two-way coverage on each floor of the building is not less than 95 percent. The test procedure shall be conducted as follows:

1. Each floor of the building shall be divided into a grid of 20 approximately equal test areas.
2. The test shall be conducted using a calibrated portable radio of the latest brand and model used by the agency talking through the agency's radio communications system.
3. Failure of not more than two nonadjacent test areas shall not result in failure of the test.
4. In the event that two of the test areas fail the test, in order to be more statistically accurate, the floor shall be permitted to be divided into 40 equal test areas. Failure of not more than four nonadjacent test areas shall not result in failure of the test. If the system fails the 40-area test, the system shall be altered to meet the 95-percent coverage requirement.
5. A test location approximately in the center of each test area shall be selected for the test, with the radio enabled to verify two-way communications to and from the outside of the building through the public agency's radio communications system. Once the test location has been selected, that location shall represent the entire test area. Failure in the selected test location shall be considered failure of that test area. Additional test locations shall not be permitted.
6. The gain values of all amplifiers shall be measured and the test measurement results shall be kept on file with the building owner so that the measurements can be verified during annual tests. In the event that the measurement results become lost, the building owner shall be required to rerun the acceptance test to reestablish the gain values.
7. As part of the installation a spectrum analyzer or other suitable test equipment shall be utilized to ensure spurious oscillations are not being generated by the subject signal booster. This test shall be conducted at the time of installation and subsequent annual inspections.

Reason: Currently, there is an inconsistency in the testing criteria for emergency responder radio coverage. Section 510.4.1 specifies that the signal strength in 95% of all areas must meet the requirements, while Section 510.5.3 specifies that the pass/fail threshold is 90% and Section 510.5.3 Items 3 and 4 set up testing criteria that allows less than 95% coverage.

Section 510.4.1 reads: "The building shall be considered to have acceptable emergency responder radio coverage when signal strength measurements in 95 percent of all areas on each floor of the building meet the signal strength requirements in Sections 510.4.1.1 and 510.4.1.2."

This proposal is intended to correlate the various code requirements and provide consistency. The threshold of 95% was in the original code requirement. Therefore, Section 510 is revised to consistently require 95%, and Section 510.5.3, Items 3 and 4 are revised to correlate the testing criteria with the 95% coverage requirement.
This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire safety and hazardous materials in new and existing buildings and facilities and the protection of life and property in wildland urban interface areas. In 2014 and 2015 the Fire-CAC has held 5 open meetings. In addition, there were numerous conference calls, Regional Work Group and Task Group meetings for the current code development cycle, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC

Cost Impact: Will increase the cost of construction
This proposal may increase the cost of construction, depending on whether the jurisdiction previously required 90% or 95%.
IFC: 510.6, 510.6.3 (New).
Proponent: Alan Perdue, representing Safer Buildings Coalition (alan.perdue@saferbuildings.org)

2015 International Fire Code

Revise as follows:

510.6 Maintenance. The emergency responder radio coverage system shall be maintained operational at all times in accordance with Sections 510.6.1 through 510.6.3.

Add new text as follows:

510.6.3 Non-public safety system. Other non-public safety amplification system(s) installed within the building that reduce the performance or cause interference with the emergency responder radio coverage system shall be corrected immediately.

Reason: With the public's reliance on cellular devices as a primary method of communications, many buildings are being equipped with cellular enhancement systems that provide improved coverage. If not properly designed, installed and maintained these non-public safety systems may cause interference and performance issues on the public safety radio enhancement system. This proposal provides the necessary tool for the fire code official to address interference of a required public safety system. Requiring immediate correction of the non-public safety system when it is causing interference or performance issues is vital to the public safety responders in the event of an incident.

Cost Impact: Will not increase the cost of construction
This proposal will not increase the cost of construction. It simply provides an avenue for the fire code official to address interference on the required public safety system.
2015 International Fire Code

Revise as follows:

510.6.1 Testing and proof of compliance. The emergency responder radio coverage system shall be inspected and tested annually or where structural changes occur including additions or remodels that could materially change the original field performance tests. Testing shall consist of the following:

1. In-building coverage test as described in Section 510.5.3.
2. Signal boosters shall be tested to verify that the gain is the same as it was upon initial installation and acceptance or set to optimize the performance of the system.
3. Backup batteries and power supplies shall be tested under load of a period of 1 hour to verify that they will properly operate during an actual power outage. If within the 1-hour test period the battery exhibits symptoms of failure, the test shall be extended for additional 1-hour periods until the integrity of the battery can be determined.
4. Other active components shall be checked to verify operation within the manufacturer's specifications.
5. At the conclusion of the testing, a report, which shall verify compliance with Section 510.5.3, shall be submitted to the fire code official.

Reason: Adding "or set to optimize the performance of the system" in item #2 provides an option for optimizing the system in the event some of the original conditions impacting the systems performance have changed. The addition of other nearby non public safety systems within the same property or adjacent properties may impact emergency responder communications enhancement systems and the ability to enhance the systems performance will benefit public safety responders.

Cost Impact: Will not increase the cost of construction
This change allows for optimizing the system and will not increase construction cost.
Add new definition as follows:

SECTION 202 DEFINITIONS

CURRENT TAP. A male and female contact device that, where connected to a permanently installed receptacle outlet, provides multiple receptacle outlet configurations. Current taps are within the scope of UL 498A. Such devices can incorporate other features such as surge protection and over-current protection.

SECTION 202 DEFINITIONS

RELOCATABLE POWER TAP. A relocatable electrical enclosure that provides one or more receptacle outlets and that is provided with an attached power supply cord and attachment plug for connection to a permanently installed receptacle outlet. Relocatable power taps are within the scope of UL 1363. Such devices can incorporate other features such as surge protection and over-current protection.

Add new text as follows:

602.1 Definitions. The following terms are defined in Chapter 2:

- BATTERY SYSTEM, STATIONARY LEAD-ACID.
- BATTERY TYPES.
- COMMERCIAL COOKING APPLIANCES.
- CRITICAL CIRCUIT.
- EMERGENCY POWER SYSTEM.
- HOOD.
- Type I.
- Type II.
- REFRIGERANT.
- REFRIGERATION SYSTEM.
- STANDBY POWER SYSTEM.
- CURRENT TAP.
- RELOCATABLE POWER TAP.

605.4 Multiplug Multi-plug adapters. Multiplug adapters, such as cube adapters, unfused plug strips or any other device not complying with NFPA 70 shall be prohibited.

605.4.1 Power Current tap and relocatable power tap design. Relocatable power taps shall be of the polarized or grounded type, shall be equipped with overcurrent protection, and shall be listed and labeled in accordance with UL 1363. Current taps shall be of the polarized or grounded type and shall be listed and labeled in accordance with UL 498A. Devices incorporating surge protection features shall be listed and labeled in accordance with UL 1449.

605.4.2 Power supply application and use. Relocatable Current taps and relocatable power taps shall be directly connected to a permanently installed receptacle outlet. Current taps and
relocatable power taps shall not be connected in series. Current taps and relocatable power taps shall not be powered by extension cord sets.

**Exception:** Current taps and relocatable power taps shall not be required to connect directly to a permanently installed receptacle outlet where used for 90 days or less for the purpose of testing the performance of such devices.

**605.5.1 Power supply.** Extension cords shall be plugged directly into an approved receptacle, current tap or relocatable power tap or multi-plug adapter and, except for approved multi-plug extension cords, shall serve only one portable appliance.

**Reference standards type:** This reference standard is new to the ICC Code Books

**Add new standard(s) as follows:**

UL 498A Current Taps  
UL 1449 Surge Protective Devices

**Reason:** Currently, there are multiple standards that govern multiplug adapters: NFPA 70, UL 498A and 1363, and the International Fire Code (IFC). These changes are an attempt to harmonize language between the UL product safety standards, NFPA 70, and the IFC.  
The current and previous versions of the IFC, in section 605.4.1, do not recognize that there are two different formats of multiplug adapters that are certified to two different UL product safety standards. The first element of this IFC code change proposal is for 605.4.1 to recognize the "current tap" format of multiplug adapter and require certification of that format to the appropriate UL product safety standard - UL 498A.

The second element of this IFC code change proposal is for 605.4.2. Specifically, we suggest that current taps shall be directly connected to a permanently installed receptacle. This is consistent with existing language for relocatable power taps. Additionally, we request an additional statement to harmonize IFC with UL safety standards and provide clarity to the audience of the IFC. That statement is, "A relocatable power tap (RPT) or current tap is not intended to be series connected (daisy chained) to other RPT, current tap, or extension cord products."

The third and final element of this IFC code change proposal is the creation of new code: 605.4.4 Temporary Installation. Manufacturers of multiplug adapters need the ability to test and experiment with their products in both a laboratory and field environment. These products are frequently used in energy-saving efforts and programs. The sponsors of such programs seek the ability to verify and validate energy savings through the use of external, pass-through, energy monitoring devices. Therefore, we request an allowance in IFC for temporary installations as is the case in NFPA 70. We propose that language in the IFC directly reference NFPA 70, Article 590 for clarity and harmonization.

**Cost Impact:** Will not increase the cost of construction
The requests contained within this IFC code change proposal add clarity by way of harmonizing language in existing standards - specifically UL product safety standards, NFPA 70, and the IFC. Furthermore, the allowance of temporary installations under Article 590 of NFPA 70 will not have any adverse effects on construction costs - to the contrary, it adds safe flexibility for contractors and construction workers.

**Analysis:** A review of the standard(s) proposed for inclusion in the code, **UL 498A Current Taps and UL 1449 Surge Protective Devices** with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1, 2016.
2015 International Fire Code

Add new definition as follows:

SECTION 202 DEFINITIONS

CURRENT TAP. A male and female contact device that, where connected to a permanently installed receptacle outlet, provides multiple receptacle outlet configurations. Current Taps are within the scope of UL 498A. Such devices can incorporate other features such as surge protection and over-current protection.

SECTION 202 DEFINITIONS

RELOCATABLE POWER TAP. A relocatable electrical enclosure that provides one or more receptacle outlets and that is provided with an attached power supply cord and attachment plug for connection to a permanently installed receptacle outlet. Relocatable power taps are within the scope of UL 1363 or UL 1363A. Such devices can incorporate other features such as surge protection and over-current protection.

Add new text as follows:

602.1 Definitions. The following terms are defined in Chapter 2:

- BATTERY SYSTEM, STATIONARY LEAD-ACID.
- BATTERY TYPES.
- COMMERCIAL COOKING APPLIANCES.
- CRITICAL CIRCUIT.
- EMERGENCY POWER SYSTEM.
- HOOD.
- Type I.
- Type II.
- REFRIGERANT.
- REFRIGERATION SYSTEM.
- STANDBY POWER SYSTEM.
- CURRENT TAP.
- RELOCATABLE POWER TAP.

Revise as follows:

605.4 Multiplug adapters Current taps and relocatable power taps. Multiplug adapters

The construction, such as cube adapters design, unfused plug strips or any other device not complying use and application of current taps and relocatable power taps shall be in accordance with NFPA 70 shall be prohibited and Sections 605.4.1 through 605.4.3.

605.4.1 Power Current tap and relocatable power tap design.

Relocatable power taps shall be of the polarized or grounded type, shall be equipped with overcurrent protection, and shall be listed and labeled in accordance with UL 1363 or UL 1363A. Current taps shall be of the polarized or grounded type and shall be listed and labeled in
accordance with UL 498A. Devices incorporating surge protection features shall be listed and labeled in accordance with UL 1449.

605.4.2 Power supply Application and use. Relocatable

Current taps and relocatable power taps shall be directly connected to a permanently installed receptacle outlet. Current taps and relocatable power taps shall not be connected in series. Current taps and relocatable power taps shall not be powered by extension cord sets.

**Exception:** Current taps and relocatable power taps shall not be required to connect directly to a permanently installed receptacle outlet where used for 90 days or less for the purpose of testing the performance of such devices.

605.5.1 Power supply.

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

Reference standards type: This reference standard is new to the ICC Code Books

Add new standard(s) as follows:

UL 1363A Special purpose relocatable power taps
UL 498A - 2013 Current taps and adapters
UL 1449 Surge protective devices

Reason:

This IFC change proposal intends to update and harmonize the content of section 605.4 with language from supporting standards from NFPA and UL.

The first element of this change request is to add two new definitions to section 202 General Definitions. Specifically, we seek to add two new terms and supporting definitions for "Current Taps" and "Relocatable Power Taps." Legacy language in the IFC referenced "multiplug adapters" in section 605.4; however, this term is non-standard in the electrical/construction industry and fails to harmonize with supporting standards from UL. As defined by UL, current taps and relocatable power taps are the devices section 605.4 in the IFC intends to cover. Therefore, we propose definitions for these terms which harmonize with the language UL uses to define these terms in the standards that govern them. Please note that we do not list requirements in the definitions.

The second element of this change request is to add two new terms in section 602.1 Definitions. The two terms we propose to add to this section are "current tap" and "relocatable power tap." Section 602.1 lists terms that appear in Chapter 6 which are defined in Chapter 2 in section 202.

The third element of this change request is to change the title and content of 605.4. As previously mentioned, the term "multiplug adapter" is not a standard term. Therefore, we propose to change the title of this section to, "Current taps and relocatable power taps." We then propose to also retire the term "cube adapters," as this type of product no longer exists in the market. We next seek to optimize the language in 605.4 by way of adding clarity. The new language we propose for 605.4 is simply, "The construction, design, use and application of current taps and relocatable power taps shall be in accordance with NFPA 70 and Sections 605.4.1 through 605.4.3."

The fourth element of this change request is to change the title and content of 605.4.1. Currently "power tap design," we propose to change the title to "Current tap and relocatable power tap design." This title change supports the direction of this proposal initiated in 202 and 605.4. Establishing a connection to the UL safety standard that govern current taps and relocatable power taps is important, as is establishing a connection to the UL safety standard for surge protective devices. The new language proposed is as follows: "Relocatable power taps shall be of the polarized or grounded type, shall be equipped with overcurrent protection, and shall be listed and labeled in accordance with UL 1363. Current taps shall be of the polarized or grounded type and shall be listed and labeled in accordance with UL 498A. Devices incorporating surge protection features shall be listed and labeled in accordance with UL 1449." This language stays with the original intention of the IFC and adds relevance to current product and clarity of supporting safety standards.

The fifth element of this change request is to change the title and content of 605.4.2. Currently "Power supply," we
propose to change the title to "Application and use." This title harmonizes with language from supporting UL safety standards. From there, we propose to identify both current taps and relocatable power taps as the devices covered under this section - specifically requirements to be directly connected to a receptacle outlet and to prohibit series connection of such devices. Finally, we propose to add an exception to this exception which allows temporary, non-standard connection for the purpose of testing and verifying performance of these devices. This exception has precedence with NFPA 70 article 590 "temporary installations." There is a need in the market for this exception from both manufacturers that need to test their products and other stakeholders interested in verifying the performance of these products. This verification is typically plugging the current tap or relocatable power tap into an energy monitoring and logging device, such as the Hobo data logger by Onset. These devices are pass-through devices that do not add receptacle outlets to the circuit.

The last element of this change request is to update the content of 605.5.1 to eliminate reference to multiplug adapter and replace with a reference to current taps and relocatable power taps. The proposed language is as follows: "Extension cords shall be plugged directly into an approved receptacle, current tap or relocatable power tap and, except for approved multi-plug extension cords, shall serve only one portable appliance."

**Cost Impact:** Will not increase the cost of construction

Changes proposed will not increase cost of construction. Specifically, we are replacing legacy terms with updated terms for the products governed by this section. We are adding references to already-existing safety standards, which have existing conformity and enforcement systems. Finally, we propose an exception for testing and performance verification that is already common place in the market today.

**Analysis:** A review of the standard(s) proposed for inclusion in the code, UL 498A Current Taps, UL 1363A Special purpose relocatable power taps and UL 1449 Surge Protective Devices with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1, 2016.
F70-16
ICF: 603.1, 603.3.2.1, 603.3.2.2, 603.3.2.4, 603.3.2.5, 603.3.2.5 (New), 603.3.2.6 (New).

Proponent: Michael O'Brian representing the Fire Code Action Committee (FCAC@iccsafe.org)

2015 International Fire Code

Revise as follows:

603.1 Installation. The installation of nonportable fuel gas- gas-fired appliances and systems shall comply with the International Fuel Gas Code. The installation of nonportable liquid fuel- fired appliances and systems shall comply with this section and the International Fuel Gas Mechanical Code. The installation of all other fuel-fired appliances, other than portable internal combustion engines, oil lamps and other portable devices such as blow torches, melting pots and weed burners, shall comply with this section and the International Mechanical Code.

603.3.2.1 Quantity limits. One or more fuel oil storage tanks containing Class II or III combustible liquid shall be permitted in a building. The aggregate capacity of all such tanks shall not exceed 660 gallons (2498 L).

**Exception:** The aggregate capacity limit shall be permitted to be increased to 3,000 gallons (11,356 L) of Class II or III liquid for storage in protected above-ground tanks complying with Section 5704.2.9.7, where all of the following conditions are met:

1. The entire 3,000-gallon (11,356 L) quantity shall be stored in protected above-ground tanks.
2. The 3,000-gallon (11,356 L) capacity shall be permitted to be stored in a single tank or multiple smaller tanks.
3. The tanks shall be located in a room protected by an automatic sprinkler system complying with Section 903.3.1.1.

the following:

1. 660 gallons (2498 L) in unsprinklered buildings.
2. 1,320 gallons (4996 L) in buildings equipped with an automatic sprinkler system in accordance with Section 903.3.1.1 and the tank meets one of the following:
   2.1. UL 142.
   2.2. UL 80.
   2.3. The tank is an integral component of the oil burning equipment as supplied by the manufacturer.
3. 3,000-gallon (11,356 L) where stored in protected above-ground tanks and the room is protected by an automatic sprinkler system in accordance with Section 903.3.1.1.

603.3.2.2 Restricted use and connection. Tanks installed in accordance with Section 603.3.2 shall be used only to supply fuel oil to fuel-burning equipment, generators or generator equipment fire pumps installed in accordance with Section 603.3.2.4. Connections between tanks and equipment supplied by such tanks shall be made using closed piping systems.

603.3.2.4 Installation. Tanks and piping systems shall be installed and separated from other uses in accordance with Section 915 and Chapter 13, both of the International Mechanical Code, as applicable.
Exception: Protected above-ground tanks complying with Section 5704.2.9.7 shall not be required to be separated from surrounding areas.

Add new text as follows:

603.3.2.5 Separation. Rooms containing fuel oil tanks for internal combustion engines shall be separated from the remainder of the building by fire barriers or horizontal assemblies, or both, with a minimum 1-hour fire-resistance rating with 1-hour fire-protection rated opening protectives constructed in accordance with the International Building Code.

Exception: Rooms containing protected above-ground tanks complying with Section 5704.2.9.7 shall not be required to be separated from surrounding areas.

603.3.2.6 Spill containment. Tanks exceeding 55 gallon (208 L) capacity or an aggregate capacity of 1,000 gallon (3785 L) shall be provided with spill containment sized to contain a release from the largest tank.

Revise as follows:

603.3.2.7 Tanks in basements. No change to text.

Reason: As the need for backup power grows, the needed fuel supplies are also increasing. This proposal is intended to address the following items:

1. Clarify the application of Sections 603.1 and 603.3.2.2.
2. Allow an intermediate level of service between the 660 gallons allowed in a non-sprinklered building to the 3,000 gallon limit when a protected above-ground storage tank is provided.
3. Address separation requirements found in NFPA 37.
4. Specify containment for storage tanks.

1. Application of Sections 603.1 and 603.3.2.2
This section is the charging section for all of Section 603 requirements that follow. The first sentence is revised to make it obvious that nonportable fuel-fired appliances using gas as a fuel are regulated by the IFGC. The second sentence is then added to address liquid-fueled appliances. The third sentence is revised to correlate with items that are regulated elsewhere in the code, such as melting pots in Chapter 59.

Additionally, revisions are made to correct a conflict in the code. Section 603.1 states that the subsequent sections do not apply to internal combustion engines. However, the justification for F46-06/07 which revised Section 603.3.2.1 and added the allowance for up to 3,000 gallons of fuel specifically states it was intended for internal combustion engines such as generators. Additionally, Section 603.3.2.2 specifies that it applies to "fuel-burning or generator equipment". So stationary internal combustion engines are indeed regulated in Section 603.

Section 603.3.2.2 is revised to specifically list fire pumps. Current code requirements would allow a diesel-driven generator to power an electric fire pump, but would not allow a diesel-driven fire pump. This does not make sense. So the term fire pump is included.

2. Intermediate Level of Service
The limitation of 660 gallons has been in the code for decades. Recent changes to the codes have provided increased protection schemes that justify a potential increase in the quantity. Section 603.3.2.1 already allows up to 660 gallons without fire sprinklers being installed. The code typically allows a 100% increase in quantities where the building is sprinklered. Therefore, an increase is proposed from 660 to 1,320 gallons when the entire building is sprinklered.

Currently, to increase the quantity to 3,000 gallons, only the room needs to be sprinklered, not the building. But the quantity increase is more based on the protected above-ground tank.

To allow the quantity up to 1,320 gallons, the tank is required to meet UL 142 or UL 80. This is a reduction from the UL 2085 features for a protected above-ground tank, but the entire building must be sprinklered.

This proposal allows an increase from 660 to 1,320 gallons by adding the installation of fire sprinklers in the building, and at the same time reduces the quantity from 3,000 to 1,320 gallons by reducing the tank requirement which changes some of the built-in protection features in the tank.
3. Separation Requirements
Section 603.3.2.4 addresses tank installation and separation of the tank from the remainder of the building. The revised §603.3.2.4 only addresses tank installation and retains the referral to the IMC. The separation requirements are moved to a new section.

Section 603.3.2.5 is added to address separation of the tank from the remainder of the building. The requirement for 1-hour separation is not a new requirement. It is located in NFPA 37 §4.1.2.1.1 and §6.3.5.2 which require 1-HR construction to separate internal combustion engines, and associated fuel tanks up to 1,320 gallons, from remainder of building when located inside the building. NFPA 37 §4.1.2.1.5 specifies that openings are protected with 1-hour opening protective.

Insertion of this requirement into the IFC eliminates the circuitous route that must be followed to find the requirement. First, IFC §603.3.2.4 which refers to the IMC; then IMC §915.1 refers to NFPA 37; finally NFPA 37 §4.1.2.1.1 and §6.3.5.2 contain the requirement for 1-hour construction. This revision simply places the requirement into the IFC and eliminates the confusion as to whether spill containment is even required.

By placing this requirement into the IFC, it correlates with the 1-hour separation in NFPA 37 for tanks up to 1,320 gallons. Including this in the IFC also clarifies that the existing exception in §603.3.2.4 for protected above-ground tanks applies specifically to the separation requirement. NFPA §6.3.6.1.1 requires a 3-hour separation. The IFC specifies the installation of a protected above-ground tank in a sprinklered room in lieu of the 3-hour separation.

4. Spill Containment
Section 603.3.2 states that the installation must comply with IFC §603 or IFC Chapter 57. The designer has an option to select either design method. However, spill containment is found in Chapter 57, which the designer may or may not comply with. Therefore, §603.3.2.6 is added to specify that spill containment is required when a single tank exceeds 55 gallons, or the aggregate exceeds 1,000 gallons. These thresholds are identical to the thresholds in §5004.2.1 for spill containment of liquids.

The secondary containment is sized to contain the largest spill. Even for tanks located inside a sprinklered building, only the tank contents must be contained. This is consistent with the requirements found in NFPA 37 §6.3.5.3. The requirement for spill containment exists in the 2015 IFC, but you have follow IFC §603.3.2.4 which refers to the IMC, then IMC §915.1 which refers to NFPA 37, to finally get to NFPA 37 §6.3.5.3. This revision simply places the requirement into the IFC and eliminates the confusion as to whether spill containment is even required.

Overall Proposal
The following protection schemes would be applicable based on the proposed revisions:

<table>
<thead>
<tr>
<th>Protection Feature</th>
<th>Capacity of Fuel Tank (gallons)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>≤660</td>
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<tr>
<td>Spill containment</td>
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</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Fire-resistance-rated separation</td>
<td>X</td>
</tr>
<tr>
<td>Fire sprinklers in fuel oil storage room</td>
<td>X</td>
</tr>
<tr>
<td>Fire sprinklers in entire building</td>
<td>X</td>
</tr>
<tr>
<td>Protected above-ground tank</td>
<td>X</td>
</tr>
</tbody>
</table>

This proposal clarifies the requirements and provides a reasonable middle ground for fuel oil storage for generators and fire pumps that are greater than 660 but less than 3,000 gallons.
This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire safety and hazardous materials in new and existing buildings and facilities and the protection of life and property in wildland urban interface areas. In 2014 and 2015 the Fire-CAC has held 5 open meetings. In addition, there were numerous conference calls, Regional Work Group and Task Group meetings for the current code development cycle, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: [FCAC](http://www.icc.org).

**Cost Impact:** Will not increase the cost of construction
This proposal allows an alternative to the installation of a protected above-ground tank.
2015 International Fire Code

603.3.2 Fuel oil storage inside buildings. Fuel oil storage inside buildings shall comply with Sections 603.3.2.1 through 603.3.2.5 or Chapter 57.

Revise as follows:

603.3.2.1 Quantity limits. One or more fuel oil storage tanks containing Class II or III combustible liquid shall be permitted in a building. The aggregate capacity of all such tanks shall not exceed 660 gallons (2498 L).

Exception: The aggregate capacity limit shall be permitted to be increased to 3,000 gallons (11 356 L) of Class II or III liquid for storage in protected above-ground tanks complying with Section 5704.2.9.7, where all of the following conditions are met:

1. The entire 3,000-gallon (11 356 L) quantity shall be stored in protected above-ground tanks.
2. The 3,000-gallon (11 356 L) capacity shall be permitted to be stored in a single tank or multiple smaller tanks.
3. The tanks shall be located in a room protected by an automatic sprinkler system complying with Section 903.3.1.1 or an automatic water mist system installed in accordance with Section 904.11.

Reason: Water mist systems are listed/approved By UL and FM Global for use in Ordinary Hazard occupancies, machinery spaces and spray/pool fires. Additionally, VdS has approved water mist sprinklers for use in flammable liquid storage rooms. The spaces described in this section are consistent with the listings/approvals. Automatic water mists systems provide a water efficient alternative to sprinkler systems. Water mist systems reduce the water supply demand which can be of significance in areas where municipal water supplies may be marginal or inadequate for conventional sprinklers. Reducing the water demand for automatic fire protection systems that are tested in the same manner by recognized laboratories to conventional sprinklers, will encourage the installation of fire protection where water shortages due to drought may be a problem. Furthermore, the reduced discharge from water mist systems, compared to conventional sprinklers, in turn reduces the potential water damage.

Water have been used for years in buildings and on passenger ships specifically as a “sprinkler equivalent system” per Resolution A.800(19), November 1995 (IMO A800). The listings of the systems have been used as design guidance in buildings.

Water mist works to extinguish, suppress or control fires in fully open or enclosed compartments. Water-mist systems tested in environments identical to automatic sprinkler testing and have been found to achieve at least equal performance using less water than conventional sprinklers.

Cost Impact: Will not increase the cost of construction
This provides another suppression option only.
2015 International Fire Code

Revise as follows:

603.4 Portable unvented heaters. Portable unvented fuel-fired heating equipment shall be prohibited in occupancies in Groups A, E, I, R-1, R-2, R-3 and R-4.

Exceptions:
1. Listed and approved unvented Unvented fuel-fired heaters, including portable outdoor gas-fired heating appliances listed in accordance with UL 647 and approved for use in one- and two-family dwellings.
2. Portable outdoor gas-fired heating appliances shall be allowed in accordance with Section 603.4.2.

Reference standards type: This reference standard is new to the ICC Code Books
Add new standard(s) as follows:
UL 647-93, Standard for Unvented Kerosene-Fired Room Heaters and portable Heaters - with revisions through April 2010.

Reason: UL 647, the UL Standard for Safety for Unvented Kerosene-Fired Room Heaters and Portable Heaters, provides requirements for unvented kerosene-fired room heaters, including requirements for automatic primary safety controls or to be inherently constructed to prevent abnormal discharge of fuel at the burner in case of ignition failure or premature flame extinguishment. This change adds the specific UL standard to be used for the certification and listing of Kerosene heaters. The exception for portable gas-fired heating appliances in Exception 1 for one- and two-family dwellings is already covered more completely by Exception 2.

Cost Impact: Will not increase the cost of construction
This simply clarifies the standard used to list these products.

Analysis: A review of the standard(s) proposed for inclusion in the code, UL 647-93, Standard for Unvented Kerosene-Fired Room Heaters and portable Heaters - with revisions through April 2010, with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1, 2016.
F73-16
IFC: 603.4, 605.10, 605.10.1 (New).
Proponent: John Williams, CBO, representing Adhoc Healthcare Committee (AHC@iccsafe.org)

2015 International Fire Code

Revise as follows:

603.4 Portable unvented heaters. Portable unvented fuel-fired heating equipment shall be prohibited in occupancies in Groups A, E, I, R-1, R-2, R-3, R-4 and R-4 ambulatory care facilities.

Exceptions:
1. Listed and approved unvented fuel-fired heaters, including portable outdoor gas-fired heating appliances, in one- and two-family dwellings.
2. Portable outdoor gas-fired heating appliances shall be allowed in accordance with Section 603.4.2.

605.10 Portable, electric space heaters. Where not prohibited by other sections of this code, portable electric space heaters shall be permitted to be used in all occupancies other than Group I-2 and in accordance with Sections 605.10.1 through 605.10.5.

Exception: The use of portable, electric space heaters in which the heating element cannot exceed a temperature of 212°F (100°C) shall be permitted in nonsleeping staff and employee areas in Group I-2 occupancies.

Add new text as follows:

605.10.1 Group I-2 occupancies and ambulatory care facilities. In Group I-2 and ambulatory care facilities, the use of portable, electric space heaters in which the heating element cannot exceed a temperature of 212°F (100°C) shall be permitted in nonsleeping staff and employee areas.

Reason: In the last code cycle, the requirements for the limitations for electric space heaters was provided for and passed for Group I-2 facilities and provided for consistency in the requirements for hospitals with other federal regulatory requirements. The requirement for Ambulatory Healthcare Facilities has the same requirements; however, it was not addressed during the last code cycle due to time and limitations on the Adhoc Healthcare Committee. We are proposing this reorganization to IFC Section 605.10 to provide additional clarification for the specific requirements for Ambulatory Healthcare Facilities. This proposal is submitted by the ICC Ad Hoc Committee on Healthcare (AHC). The AHC was established by the ICC Board to evaluate and assess contemporary code issues relating to hospitals and ambulatory healthcare facilities. This is a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. In 2014 and 2015 the ICC Ad Hoc Committee has held 4 open meetings and numerous Work Group meetings and conference calls for the current code development cycle which included members of the committees as well as any interested party to discuss and debate the proposed changes. Information on the AHC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the AHC effort can be downloaded from the AHC website at: AHC.

Cost Impact: Will not increase the cost of construction. Practically this has been a long standing federal rule that is already being enforced at the state and federal level. Medicare certified facilities are used to this requirement. We expect that the use of fireplaces and portable space heater in non-medicare accredited ambulatory care is very minimal.
F74-16
IFC: 604.1, 604.7 (New), 604.7.1 (New), 604.7.2 (New), 604.7.2.1 (New), 604.7.2.2 (New), 604.7.2.3 (New).
Proponent: Marcelo Hirschler, representing GBH International (gbhint@aol.com)

2015 International Fire Code
Revise as follows:

604.1 General. Emergency power systems and standby power systems required by this code or the International Building Code shall comply with Sections 604.1.1 through 604.1.8. The installation of stationary generators not required by code shall comply with section 604.7.

Add new text as follows:

604.7 Installation of stationary generators not required by code
Stationary generators not required by code shall be installed in accordance with Sections 604.7.1 and 604.7.2.

604.7.1 NFPA 37 Stationary generators shall be installed in accordance with NFPA 37.

604.7.2 Separation distance outdoor installations. Outdoor installations of stationary generators shall be separated from structures in accordance with Section 604.7.2.1, 604.7.2.2 or 604.7.2.3

604.7.2.1 Default installation distance Generators installed outdoors shall be located not less than 5 ft (1.5 m) from structures having combustible walls and not less than 5 ft (1.5 m) from openings in walls.

604.7.2.2 Fire resistance rating If all walls of the structure that are closer than 5 ft (1.5 m) from the generator enclosure have a fire resistance rating of at least 1 hour, no minimum separation distance shall be required.

604.7.2.3 Full scale fire test The separation distance is not required to be in accordance with Sections 604.7.2.1 or 604.7.2.2 where is it is demonstrated through full scale testing that a lesser distance is acceptable. The full scale test shall involve the generator and a combustible wall, shall demonstrate that the complete consumption of the combustibles in the tested generator will not cause ignition of the nearby wall and shall be acceptable to the fire code official. The generator shall be at a distance that is not less than that used in the fire test. The combustible wall that the stationary generator is being separated from shall be of similar materials to those that were used in the full scale testing.

Reference standards type: This is an update to reference standard(s) already in the ICC Code Books
Add new standard(s) as follows:
NFPA 37, Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines (2015) - Already referenced in IMC and IFGC.

Reason: The IFC lacks the information an authority having jurisdiction needs to either provide for the location of generators not required by code or to assess the validity of any reports provided by a generator manufacturer seeking to place engines close to combustible walls. The IMC and the IFGC contain references to NFPA 37 (section 915. of the IMC and section 616 of the IFGC) but the IFC does not. NFPA 37 requires that generators installed outdoors not be placed closer than 5 ft from combustible walls. It does not, however, provide good guidance on exceptions, which are essential because most generators placed outdoors tend to be placed much closer than 5 ft from the walls. In particular, there are no criteria for how to demonstrate that an engine fire will not ignite a
combustible wall or for how close to the wall the engine can be placed. The proposed language provides that information without being a detailed test protocol and without ruling out the use of alternative means and methods as a tool.

1. In view of the close proximity between buildings which could install engines or generators to ensure uninterrupted electrical supply, clear criteria for engine placement are essential to permit adequate enforcement. Neither the IFC nor the IRC contain enforceable criteria.

2. This proposal ensures that it does not specify details of the full scale fire test procedure to be used for determining acceptable separation distances. This is reflected in the proposed wording.

3. This proposal does not include wording that would require specific test protocols but simply proposes wording that ensures a minimal level of safety, after full scale fire tests have been conducted.

4. Research conducted by the proponent has demonstrated that, if a generator burns it can cause the ignition of nearby combustible walls. Whether ignition of combustible walls occurs will depend primarily on three factors: (a) the amount and fire performance of the combustible materials in the generator and the engineering design of the generator and its enclosure, (b) the materials contained in the combustible walls present and (c) the distance between the generator and the combustible walls.

5. Fire tests have demonstrated that fire tests with some generators can be more severe when the generator is not operating because the associated cooling fan in the generator can result in the extinguishment of the fire when the generator is operating but not when the generator is idle. This has been shown for at least two generator designs. (a) Jason Huczek (Southwest Research Institute) ["Custom Fire Testing of Power Generators for NFPA 37 Compliance", at the NFPA 2010 Annual Meeting, Session T68, June 9, 2010] and (b) Marcelo Hirschler ["Testing of Residential Electrical Generators", Fire and Materials Conf., San Francisco, CA, Jan. 31-Feb. 2, 2011, pp. 71-81, Interscience Communications, London, UK]. Both publications are attached: one deals with full scale tests (like the ones recommended in this proposal) and one deals with small scale tests. The results demonstrate that it is important that full scale tests be conducted.

6. There can be no assurance that every generator will be provided with an adequate fan. Therefore, full scale fire tests or calculations should ideally be conducted with both the generator operating and the generator idle. However, that requirement is not included here, to allow maximum flexibility for the fire test.

7. The full scale fire tests or calculations leading to the determination of the safe location distance need to be conducted in such a way that there is complete consumption of the combustible materials in the generator to ensure that the full scale fire tests actually address the fire hazard.

8. If the full scale fire tests or calculations do not result in complete consumption of the combustible materials in the generator there can be no assurance that the results are fully representative of the actual fire hazard.

9. There are different types of combustible wall materials that are in common use and the full scale fire tests need to be conducted using either the wall materials to be used in the actual installation or the combustible wall materials with the poorest fire performance. Fire tests have demonstrated that polypropylene siding is a more combustible wall material than either wood siding or vinyl (PVC) siding. Peak heat release rate data for polypropylene, wood and PVC siding materials are shown below.  

10. The distance between the generator and the combustible walls should provide a reasonable margin of safety so that if the tests are conducted at a distance of, for example 1 ft., the generator should not be permitted to be placed closer than 1.5 ft. (i.e. a 50% margin of safety). Such added fire safety requirement is not included here.

11. This proposal does not discuss the composition of the generators because the key issue is ensuring that a fire that destroys all combustible materials does not cause wall ignition, irrespective of the materials used to construct the generator.

Heat release rate of siding materials (calorimeter testing)

Vinyl (PVC): 187 kW/m²
Wood (Cedar): 309 kW/m²
Polypropylene: 546 kW/m²

Cost Impact: Will increase the cost of construction

Adding requirements for location of generators, as proposed here, will improve fire safety. No such requirements exist at present.
Gas detection systems. A construction permit is required for installation of or modification to gas detection systems. Maintenance performed in accordance with this code is not considered a modification and shall not require a permit.

Delete without substitution:

SECTION 202 DEFINITIONS

CONTINUOUS GAS DETECTION SYSTEM. A gas detection system where the analytical instrument is maintained in continuous operation and sampling is performed without interruption. Analysis is allowed to be performed on a cyclical basis at intervals not to exceed 30 minutes.

Add new definition as follows:

GAS DETECTION SYSTEM. A system or portion of a combination system that utilizes one or more stationary sensors to detect the presence of a specified gas at a specified concentration and initiate one or more responses required by this code, such as notifying a responsible person, activating an alarm signal, or activating or deactivating equipment. A self-contained gas detection and alarm device is not classified as a gas detection system.

Delete without substitution:

GAS DETECTION SYSTEM, CONTINUOUS. See "Continuous gas detection system."

Add new definition as follows:

HPM. See "Hazardous Production Material."

Add new text as follows:
604.2.6 (IBC [F] 2702.2.6) Gas detection systems. Emergency power shall be provided for gas detection systems where required by Sections 604.2.8 and 604.2.14. Standby power shall be provided for gas detection systems where required by Section 916.5.

Revise as follows:

606.8 Refrigerant detector detection. Machinery rooms shall contain be provided with a refrigerant detector with an audible and visible alarm. The detector, or a sampling tube that draws air to the detector, shall be located in an area where refrigerant from a leak will concentrate. The alarm shall be actuated at a value not greater than the corresponding TLV-TWA values shown in the International Mechanical Code for Where ammonia is used as the refrigerant classification. Detectors and alarms, refrigerant detection shall be placed in approved locations comply with IIAR 2. The detector For refrigerants other than ammonia, refrigerant detection shall transmit a signal to an approved location comply with Section 606.8.1.

Add new text as follows:

606.8.1 Refrigerants other than ammonia. A detector, or a sampling tube that draws air to a detector shall be provided at an approved location where refrigerant from a leak is expected to accumulate. The system shall be designed to initiate audible and visible alarms inside of and outside each entrance to the refrigerating machinery room and transmit a signal to an approved location where the concentration of refrigerant detected exceeds the lesser of the following:

1. The corresponding TLV-TWA values shown in the International Mechanical Code for the refrigerant classification.
2. 25 percent of the lower flammable limit (LFL).

Detection of a refrigerant concentration exceeding 25 percent of the lower flammable limit (LFL) shall stop refrigerant equipment in the machinery room in accordance with Section 606.9.1.

Revise as follows:

901.5 Installation acceptance testing. Fire detection and alarm systems, emergency alarm systems, gas detection systems, fire-extinguishing systems, fire hydrant systems, fire standpipe systems, fire pump systems, private fire service mains and all other fire protection systems and appurtenances thereto shall be subject to acceptance tests as contained in the installation standards and as approved by the fire code official. The fire code official shall be notified before any required acceptance testing.

901.6 Inspection, testing and maintenance. Fire detection and alarm systems, emergency alarm systems, and gas detection systems, fire extinguishing systems, mechanical smoke exhaust systems, and smoke and heat vents shall be maintained in an operative condition at all times, and shall be replaced or repaired where defective. Nonrequired fire protection systems and equipment shall be inspected, tested and maintained or removed.

902.1 Definitions. The following terms are defined in Chapter 2:

ALARM NOTIFICATION APPLIANCE.
ALARM SIGNAL.
ALARM VERIFICATION FEATURE.
ANNUNCIATOR.
AUDIBLE ALARM NOTIFICATION APPLIANCE.
AUTOMATIC.
AUTOMATIC FIRE-EXTINGUISHING SYSTEM.
AUTOMATIC SMOKE DETECTION SYSTEM.
AUTOMATIC SPRINKLER SYSTEM.
AUTOMATIC WATER MIST SYSTEM.
AVERAGE AMBIENT SOUND LEVEL.
CARBON DIOXIDE EXTINGUISHING SYSTEM.
CLEAN AGENT.
COMMERCIAL MOTOR VEHICLE.
CONSTANTLY ATTENDED LOCATION.
DELUGE SYSTEM.
DETECTOR, HEAT.
DRY-CHEMICAL EXTINGUISHING AGENT.
ELEVATOR GROUP.
EMERGENCY ALARM SYSTEM.
EMERGENCY VOICE/ALARM COMMUNICATIONS.
FIRE ALARM BOX, MANUAL.
FIRE ALARM CONTROL UNIT.
FIRE ALARM SIGNAL.
FIRE ALARM SYSTEM.
FIRE AREA.
FIRE DETECTOR, AUTOMATIC.
FIRE PROTECTION SYSTEM.
FIRE SAFETY FUNCTIONS.
FIXED BASE OPERATOR (FBO).
FOAM-EXTINGUISHING SYSTEM.
GAS DETECTION SYSTEM
HALOGENATED EXTINGUISHING SYSTEM.
IMPAIRMENT COORDINATOR.
INITIATING DEVICE.
MANUAL FIRE ALARM BOX.
MULTIPLE-STATION ALARM DEVICE.
MULTIPLE-STATION SMOKE ALARM.
NOTIFICATION ZONE.
NUISANCE ALARM.
PRIVATE GARAGE.
RECORD DRAWINGS.
SINGLE-STATION SMOKE ALARM.
SLEEPING UNIT.
SMOKE ALARM.
SMOKE DETECTOR.
STANDPIPE SYSTEM, CLASSES OF.
Class I system.
Class II system.
Class III system.
STANDPIPE, TYPES OF.
Automatic dry.
Automatic wet.
Manual dry.
Manual wet.
Semiautomatic dry.
SUPERVISING STATION.
SUPERVISORY SERVICE.
SUPERVISORY SIGNAL.
SUPERVISORY SIGNAL-INITIATING DEVICE.
TIRES, BULK STORAGE OF.
TRANSIENT AIRCRAFT.
TROUBLE SIGNAL.
VISIBLE ALARM NOTIFICATION APPLIANCE.
WET-CHEMICAL EXTINGUISHING AGENT.
WIRELESS PROTECTION SYSTEM.
ZONE.
ZONE, NOTIFICATION.

908.1 Group H occupancies. Emergency alarms for the detection and notification of an emergency condition in Group H occupancies shall be provided as required in Chapter 50.

908.2 Group H-5 occupancy. Emergency alarms for notification of an emergency condition in an HPM facility shall be provided as required in Section 2703.12. A continuous gas detection system shall be provided for HPM gases in accordance with Section 2703.13.

Delete without substitution:

908.3 Highly toxic and toxic materials. Where required by Section 6004.2.2.10, a gas detection system shall be provided for indoor storage and use of highly toxic and toxic compressed gases.

908.4 Ozone gas generator rooms. A gas detection system shall be provided in ozone gas-generator rooms in accordance with Section 6005.3.2.

908.5 Repair garages. A flammable gas detection system shall be provided in repair garages for vehicles fueled by nonodorized gases in accordance with Section 2311.7.2.

908.6 Refrigeration systems. Refrigeration system machinery rooms shall be provided with a refrigerant detector in accordance with Section 606.8.

908.7 Carbon dioxide (CO₂) systems. Emergency alarm systems in accordance with Section 5307.5.2 shall be provided where required for compliance with Section 5307.5.

Add new text as follows:

SECTION 916 GAS DETECTION SYSTEMS

916.1 Gas detection systems. Gas detection systems required by this code shall comply with Sections 916.2 through 916.11.

916.2 Permits. Permits shall be required as set forth in Sections 105.7.9.

916.2.1 Construction documents. Documentation of the gas detection system design and equipment to be used that is adequate to demonstrate compliance with the requirements of this code shall be provided with the application for permit.

916.3 Equipment. Gas detection system equipment shall be designed for use with the gases being detected and shall be installed in accordance with manufacturers’ instructions.

916.4 Power connections. Gas detection systems shall be permanently connected to the building electrical power supply or shall be permitted to be cord connected to an unswitched receptacle using an approved restraining means that secures the plug to the receptacle.
916.5 **Emergency and standby power.** Where standby or emergency power is not required elsewhere by this code, standby or emergency power shall be provided or the gas detection system shall initiate a trouble signal at an approved location if the power supply is interrupted.

916.6 **Sensor locations.** Where a specific location for sensors is not specified elsewhere by this code, sensors shall be installed in approved locations where leaking gases are expected to accumulate.

916.7 **Gas sampling.** Gas sampling shall be performed continuously. Sample analysis shall be processed immediately after sampling, except as follows:

1. For HPM gases, sample analysis shall be performed at intervals not exceeding 30 minutes.
2. For toxic gases, sample analysis shall be performed at intervals not exceeding 5 minutes in accordance with Section 6004.2.2.7.
3. Where a less frequent or delayed sampling interval is approved.

916.8 **System activation.** A gas detection alarm shall be initiated where any sensor detects a concentration of gas exceeding the following thresholds:

1. For flammable gases, a gas concentration exceeding 25 percent of the lower flammable limit (LFL).
2. For non-flammable gases, a gas concentration exceeding the threshold specified by the section of this code requiring a gas detection system.

Upon activation of a gas detection alarm, alarm signals or other required responses shall be as specified by the section of this code requiring a gas detection system. Audible and visible alarm signals associated with a gas detection alarm shall be distinctive from fire alarm and carbon monoxide alarm signals.

916.9 **Signage.** Signs shall be provided adjacent to gas detection system alarm signaling devices that advise occupants of the nature of the signals and actions to take in response to the signal.

916.10 **Fire alarm system connections.** Gas sensors and gas detection systems shall not be connected to fire alarm systems unless approved and connected in accordance with the fire alarm equipment manufacturer's instructions.

916.11 **Maintenance, testing and sensor calibration.** Inspection and testing of gas detection systems shall be conducted not less than annually. Sensor calibration shall be confirmed at the time of sensor installation and calibration shall be performed at the frequency specified by the sensor manufacturer.

Revise as follows:

2308.2.2 **Listed equipment.** Hoses, hose connections, dispensers, gas detection systems and electrical equipment used for CNG shall be listed. Vehicle-fueling connections shall be listed and labeled.

2309.2.2 **Listed or approved equipment.** Hoses, hose connections, compressors, hydrogen generators, dispensers, detection systems and electrical equipment used for hydrogen shall be listed or approved for use with hydrogen. Hydrogen motor-fueling connections shall be listed and labeled or approved for use with hydrogen.
2311.7.1.1 Design. Indoor

For indoor locations, the ventilation shall be provided by a continuous mechanical ventilation system or by a mechanical ventilation system activated by a continuously monitoring flammable gas detection system, each activating at a gas concentration of not more than 25 percent of the lower flammable limit (LFL). In all cases, the system shall shut down the fueling system in the event of failure.

The ventilation rate shall be not less than 1 cubic foot per minute \(0.03 \text{ m}^3/\text{minute}\) per 12 cubic feet \(0.00139 \times (s \cdot \text{m}^3)\) of room volume.

2311.7.1.2 Operation. The mechanical ventilation system shall operate continuously.

Exceptions:

1. Mechanical ventilation systems that are interlocked with a gas detection system that complies with Sections 2311.7.2 through 2311.7.2.3.

2. Mechanical ventilation systems in repair garages that are used only for repair of vehicles fueled by liquid fuels or odorized gases, such as CNG, where the ventilation system is electrically interlocked with the lighting circuit.

2311.7.2 Gas detection system. Repair garages used for repair of vehicles fueled by nonodorized gases, including but not limited to hydrogen and nonodorized LNG, shall be provided with a flammable gas detection system that complies with Section 916. The gas detection system shall be designed to detect leakage of nonodorized gaseous fuel. Where lubrication or chassis service pits are provided in garages used for repairing nonodorized LNG-fueled vehicles, gas sensors shall be provided in such pits.

2311.7.2.2 2311.7.2.1 Operation System activation. Activation of the gas detection system shall result in all of the following:

1. Initiation of distinct local audible and visual alarm signals in approved locations.
2. Deactivation of all heating systems located in the repair garage.
3. Activation of the mechanical ventilation system, where the ventilation system is interlocked with gas detection.

Delete without substitution:

2311.7.2.1 -System design. The flammable gas detection system shall be listed or approved and shall be calibrated to the types of fuels or gases used by vehicles to be repaired. The gas detection system shall be designed to activate when the level of flammable gas exceeds 25 percent of the lower flammable limit (LFL). Gas detection shall be provided in lubrication or chassis service pits of repair garages used for repairing nonodorized LNG-fueled vehicles.
2311.7.2.1.1 Gas detection system components. Gas detection system control units shall be listed and labeled in accordance with UL 864 or UL 2017. Gas detectors shall be listed and labeled in accordance with UL 2075 for use with the gases and vapors being detected.

Revise as follows:

2311.7.2.3 Failure of the gas detection system. Failure of the gas detection system shall result in the deactivation of the heating system, activation of the mechanical ventilation system where the system is interlocked with the gas detection system, and cause a trouble signal to sound at an approved location.

2702.1 Definitions. The following terms are defined in Chapter 2:
- CONTINUOUS GAS DETECTION SYSTEM.
- EMERGENCY CONTROL STATION.
- FABRICATION AREA.
- GAS DETECTION SYSTEM.
- HAZARDOUS PRODUCTION MATERIAL (HPM).
- HPM.
- HPM ROOM.
- PASS-THROUGH.
- SEMICONDUCTOR FABRICATION FACILITY.
- SERVICE CORRIDOR.
- TOOL.
- WORKSTATION.

2703.1.3 Signals. The emergency control station shall receive signals from emergency equipment and alarm and detection systems. Such emergency equipment and alarm and detection systems shall include, but not be limited to, the following where such equipment or systems are required to be provided either in this chapter or elsewhere in this code:

1. Automatic sprinkler system alarm and monitoring systems.
3. Emergency alarm systems.
4. Continuous gas detection systems.
5. Smoke detection systems.
6. Automatic detection and alarm systems for pyrophoric liquids and Class 3 water-reactive liquids required by Section 2705.2.3.4.
7. Emergency power system.
8. Exhaust ventilation flow alarm devices for pyrophoric liquids and Class 3 water-reactive liquids cabinet exhaust ventilation systems required by Section 2705.2.3.4.
9. Automatic detection and alarm systems for pyrophoric liquids and Class 3 water-reactive liquids required by Section 2705.2.3.4.
10. Exhaust ventilation flow alarm devices for pyrophoric liquids and Class 3 water-reactive liquids cabinet exhaust ventilation systems required by Section 2705.2.3.4.

2703.13 Continuous-gas Gas detection systems. A continuous-gas detection system complying with Section 916 shall be provided for HPM gases where the physiological warning threshold level of the gas is at a higher level than the accepted permissible exposure limit (PEL) for the gas and for flammable gases in accordance with Sections 2703.13.1 through 2703.13.2.2.
2703.13.1 Where required. A continuous gas detection system shall be provided in the areas identified in Sections 2703.13.1.1 through 2703.13.1.4.

2703.13.1.1 Fabrication areas. A continuous gas detection system shall be provided in fabrication areas where HPM gas is used in the fabrication area.

2703.13.1.2 HPM rooms. A continuous gas detection system shall be provided in HPM rooms where HPM gas is used in the room.

2703.13.1.3 Gas cabinets, exhausted enclosures and gas rooms. A continuous gas detection system shall be provided in gas cabinets and exhausted enclosures for HPM gas. A continuous gas detection system shall be provided in gas rooms where HPM gases are not located in gas cabinets or exhausted enclosures.

2703.13.1.4 Corridors. Where HPM gases are transported in piping placed within the space defined by the walls of a corridor and the floor or roof above the corridor, a continuous gas detection system shall be provided where piping is located and in the corridor.

Exception: A continuous gas detection system is not required for occasional transverse crossings of the corridors by supply piping that is enclosed in a ferrous pipe or tube for the width of the corridor.

2703.13.2 Gas detection system operation. The continuous gas detection system shall be capable of monitoring the room, area or equipment in which the HPM gas is located at or below all the following gas concentrations:

1. Immediately dangerous to life and health (IDLH) values where the monitoring point is within an exhausted enclosure, ventilated enclosure or gas cabinet.
2. Permissible exposure limit (PEL) levels where the monitoring point is in an area outside an exhausted enclosure, ventilated enclosure or gas cabinet.
3. For flammable gases, the monitoring detection threshold level shall be vapor concentrations in excess of 25 percent of the lower flammable limit (LFL) where the monitoring is within or outside an exhausted enclosure, ventilated enclosure or gas cabinet.
4. Except as noted in this section, monitoring for highly toxic and toxic gases shall also comply with Chapter 60.

5307.5 Required protection. Where carbon dioxide storage tanks, cylinders, piping and equipment are located indoors, rooms or areas containing carbon dioxide storage tanks, cylinders, piping and fittings and other areas where a leak of carbon dioxide can collect shall be provided with either ventilation in accordance with Section 5307.5.1 or an emergency alarm system a gas detection system in accordance with Section 5307.5.2.

5307.5.2 Emergency alarm Gas detection system. An emergency alarm a gas detection system complying with Section 916 shall be provided to monitor areas where carbon dioxide can accumulate. The system shall comply with all be designed to initiate a local audible and visible alarm in the room or area in which the sensor is installed when the level of the following:

1. Continuous gas detection shall be provided to monitor areas where carbon dioxide can accumulate.
2. The threshold for activation of an alarm shall not exceed 5,000 parts per million (9,000 mg/m$^3$).
3. Activation of the emergency alarm system shall initiate a local alarm within the room or area in which the system is installed.

carbon dioxide exceeds 5,000 parts per million (9,000 mg/m³).

5808.5 Gas detection system. Hydrogen fuel gas rooms shall be provided with an approved flammable gas detection system in accordance with Sections 916, and Sections 5808.5.1 through 5808.5.4 and 5808.5.2.

5808.5.3 5808.5.1 Operation System activation. Activation of the gas detection system shall result in both of the following:

1. Initiation of distinct audible and visible alarm signals both inside and outside of the hydrogen fuel gas room.
2. Automatic activation of the mechanical exhaust ventilation system.

Delete without substitution:

5808.5.1 System design. The flammable gas detection system shall be listed for use with hydrogen and any other flammable gases used in the hydrogen fuel gas room. The gas detection system shall be designed to activate when the level of flammable gas exceeds 25 percent of the lower flammable limit (LFL) for the gas or mixtures present at their anticipated temperature and pressure.

5808.5.2 Gas detection system components. Gas detection system control units shall be listed and labeled in accordance with UL 864 or UL 2017. Gas detectors shall be listed and labeled in accordance with UL 2075 for use with the gases and vapors being detected.

Revise as follows:

5808.5.4 5808.5.2 Failure of the gas detection system. Failure of the gas detection system shall result in automatic activation of the mechanical exhaust ventilation system, cessation of hydrogen generation, and the sounding of a trouble signal at an approved location.

6004.2.2.7 Treatment systems. The exhaust ventilation from gas cabinets, exhausted enclosures and gas rooms, and local exhaust systems required in Sections 6004.2.2.4 and 6004.2.2.5 shall be directed to a treatment system. The treatment system shall be utilized to handle the accidental release of gas and to process exhaust ventilation. The treatment system shall be designed in accordance with Sections 6004.2.2.7.1 through 6004.2.2.7.5 and Section 510 of the International Mechanical Code.

Exceptions:

1. Highly toxic and toxic gases—storage. A treatment system is not required for cylinders, containers and tanks in storage where all of the following controls are provided:
   1.1. Valve outlets are equipped with gas-tight outlet plugs or caps.
   1.2. Handwheel-operated valves have handles secured to prevent movement.
   1.3. Approved containment vessels or containment systems are provided in accordance with Section 6004.2.2.3.
   1.4. Toxic gases—use. Treatment systems are not required for toxic...
gases supplied by cylinders or portable tanks not exceeding 1,700 pounds (772 kg) water capacity where the following are provided:

5.1. A listed or approved gas detection system with a sensing interval not exceeding 5 minutes.

5.2. A listed or approved automatic-closing fail-safe valve located immediately adjacent to cylinder valves. The fail-safe valve shall close when gas is detected at the permissible exposure limit (PEL) by a gas detection system monitoring the exhaust system at the point of discharge from the gas cabinet, exhausted enclosure, ventilated enclosure or gas room. The gas detection system shall comply with Section 6004.2.2.10.

2. Toxic gases—use. Treatment systems are not required for toxic gases supplied by cylinders or portable tanks not exceeding 1,700 pounds (772 kg) water capacity where a gas detection system complying with Section 6004.2.2.10 and listed or approved automatic-closing fail-safe valves are provided. The gas detection system shall have a sensing interval not exceeding 5 minutes. Automatic-closing fail-safe valves shall be located immediately adjacent to cylinder valves and shall close when gas is detected at the permissible exposure limit (PEL) by a gas sensor monitoring the exhaust system at the point of discharge from the gas cabinet, exhausted enclosure, ventilated enclosure or gas room.

6004.2.10 Gas detection system. A gas detection system complying with Section 916 shall be provided to detect the presence of gas at or below the PEL or ceiling limit of the gas for which detection is provided. The system shall be capable of monitoring the discharge from the treatment system at or below one-half the IDLH limit and shall initiate a response in accordance with Sections 6004.2.2.10.1 through 6004.2.2.10.3 if the gas detection alarm is activated.

Exception: A gas detection system is not required for toxic gases when the physiological warning threshold level for the gas is at a level below the accepted PEL for the gas.

Delete without substitution:

6004.2.2.10.1 Gas detection system components. Gas detection system control units shall be listed and labeled in accordance with UL 864 or UL 2017, or approved. Gas detectors shall be listed and labeled in accordance with UL 2075 for use with the gases and vapors being detected, or approved.

Revise as follows:

6004.2.2.10.2 Alarms. The gas detection system gas detection system shall initiate a local alarm and transmit a signal to a constantly attended control station when a short-term hazard condition is detected. The alarm shall be both visual audible and audible visible and shall provide warning both inside and outside the area where gas is detected. The audible alarm shall be distinct from all other alarms.

Exception: Signal transmission to a constantly attended control station is not required where not more than one cylinder of highly toxic or toxic gas is stored.

6004.2.2.10.3 Shut off of gas supply. The gas detection system...
system shall automatically close the shutoff valve at the source on gas supply piping and tubing related to the system being monitored for whichever gas is detected.

**Exception:** Automatic shutdown is not required for reactors utilized for the production of highly toxic or toxic compressed gases where such reactors are:

1. Operated at pressures less than 15 pounds per square inch gauge (psig) (103.4 kPa).
2. Constantly attended.
3. Provided with readily accessible emergency shutoff valves.

6004.2.2.10.4 6004.2.2.10.3 Valve closure. Automatic closure of shutoff valves shall be in accordance with the following:

1. Where the gas-detection sampling point initiating the gas detection system alarm is within a gas cabinet or exhausted enclosure, the shutoff valve in the gas cabinet or exhausted enclosure for the specific gas detected shall automatically close.

2. Where the gas-detection sampling point initiating the gas detection system alarm is within a gas room and compressed gas containers are not in gas cabinets or exhausted enclosures, the shutoff valves on all gas lines for the specific gas detected shall automatically close.

3. Where the gas-detection sampling point initiating the gas detection system alarm is within a piping distribution manifold enclosure, the shutoff valve for the compressed container of specific gas detected supplying the manifold shall automatically close.

**Exception:** Where the gas-detection sampling point initiating the gas detection system alarm is at a use location or within a gas valve enclosure of a branch line downstream of a piping distribution manifold, the shutoff valve in the gas valve enclosure for the branch line located in the piping distribution manifold enclosure shall automatically close.

6005.3.2 Ozone gas generator rooms. Ozone gas generator rooms shall be mechanically ventilated in accordance with the International Mechanical Code with not less than six air changes per hour. Ozone gas generator rooms shall be equipped with a continuous gas detection system complying with Section 916 that will shut off the generator and sound a local alarm when concentrations above the permissible exposure limit (PEL) occur.

Ozone gas generator rooms shall not be normally occupied, and such rooms shall be kept free of combustible and hazardous material storage. Room access doors shall display an approved sign stating: OZONE GAS GENERATOR—HIGHLY TOXIC—OXIDIZER.

6005.5 Automatic shutdown. Ozone gas generators shall be designed to shut down automatically under the following conditions:

1. When the dissolved ozone concentration in the water being treated is above saturation when measured at the point where the water is exposed to the atmosphere.
2. When the process using generated ozone is shut down.
3. When the gas detection system detects ozone.
4. Failure of the ventilation system for the cabinet or ozone-generator room.
5. Failure of the gas detection system.
Failure of the *gas detection system* in an ozone-gas generator room.

**6204.1.11 Standby power.** Standby power shall be provided in accordance with Section 604 for the following systems used to protect Class I and unclassified detonable organic peroxide:

1. Exhaust ventilation system.
2. Treatment system.
3. Gas detection system.
4. Smoke detection system.
5. Temperature control system.
6. Fire alarm system.
7. Smoke detection system.
8. Temperature control system.
10. Fire alarm system.
11. Emergency alarm system.

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**2015 International Building Code**

CHAPTER 2 DEFINITIONS

Delete without substitution:

SECTION 202 DEFINITIONS

202 *[F] CONTINUOUS GAS DETECTION SYSTEM.* A gas detection system where the analytical instrument is maintained in continuous operation and sampling is performed without interruption. Analysis is allowed to be performed on a cyclical basis at intervals not to exceed 30 minutes.

Add new definition as follows:

*[F] GAS DETECTION SYSTEM.* A system or portion of a combination system that utilizes one or more stationary sensors to detect the presence of a specified gas at a specified concentration and initiate one or more responses required by this code, such as notifying a responsible person, activating an alarm signal, or activating or deactivating equipment. A self-contained gas detection and alarm device is not classified as a gas detection system.

Revise as follows:

*[F] 406.8.5 Gas detection system.* Repair garages used for the repair of vehicles fueled by nonodorized gases such as including but not limited to hydrogen and nonodorized LNG, shall be provided with a flammable gas detection system that complies with Section 916. The gas detection system shall be designed to detect leakage of nonodorized gaseous fuel. Where lubrication or chassis service pits are provided in garages used for repairing nonodorized LNG-fueled vehicles, gas sensors shall be provided in such pits.

*[F] 406.8.5.2 406.8.5.1 Operation System activation.* Activation of the gas detection system alarm shall result in all of the following:

1. Initiation of distinct local audible and visual alarm signals visible alarms in the repair garage approved locations.
2. Deactivation of all heating systems located in the repair garage.
3. Activation of the mechanical ventilation system, where the ventilation
system is interlocked with gas detection.

[F] 406.8.5.3 406.8.5.2 Failure of the gas detection system. Failure of the gas detection system shall result in the deactivation of the heating system, activation of the mechanical ventilation system where the system is interlocked with the gas detection system, and cause a trouble signal to sound at an approved location.

Delete without substitution:

[F] 406.8.5.1 System design. - The flammable gas detection system shall be listed or approved and shall be calibrated to the types of fuels or gases used by vehicles to be repaired. The gas detection system shall be designed to activate when the level of flammable gas exceeds 25 percent of the lower flammable limit (LFL). Gas detection shall be provided in lubrication or chassis service pits of repair garages used for repairing nonodorized LNG-fueled vehicles.

[F] 406.8.5.1.1 Gas detection system components. - Gas detection system control units shall be listed and labeled in accordance with UL 864 or UL 2017. Gas detectors shall be listed and labeled in accordance with UL 2075 for use with the gases and vapors being detected.

Revise as follows:

[F] 415.2 Definitions. The following terms are defined in Chapter 2:

CONTINUOUS GAS DETECTION SYSTEM.
DETACHED BUILDING.
EMERGENCY CONTROL STATION.
EXHAUSTED ENCLOSURE.
FABRICATION AREA.
FLAMMABLE VAPORS OR FUMES.
GAS CABINET.
GAS DETECTION SYSTEM.
GASROOM.
HAZARDOUS PRODUCTION MATERIAL (HPM).
HPM.
HPM FLAMMABLE LIQUID.
HPM ROOM.
IMMEDIATELY DANGEROUS TO LIFE AND HEALTH (IDLH).
LIQUID.
LIQUID STORAGE ROOM.
LIQUID USE, DISPENSING AND MIXING ROOM.
LOWER FLAMMABLE LIMIT (LFL).
NORMAL TEMPERATURE AND PRESSURE (NTP).
PHYSIOLOGICAL WARNING THRESHOLD LEVEL.
SERVICE CORRIDOR.
SOLID.
STORAGE, HAZARDOUS MATERIALS.
USE (MATERIAL).
WORKSTATION.

[F] 415.11.7 Continuous gas detection systems. A continuous gas detection system complying with Section 916 shall be provided for HPM gases where the physiological warning threshold level of the gas is at a higher level than the accepted permissible exposure limit (PEL) for the gas and for flammable gases in accordance with Sections
_415.11.7.1 and Through 415.11.7.2._

[F] **415.11.7.1 Where required.** A *continuous-gas detection system* shall be provided in the areas identified in Sections 415.11.7.1.1 through 415.11.7.1.4.

[F] **415.11.7.1.1 Fabrication areas.** A *continuous-gas detection system* shall be provided in fabrication areas where HPM gas is used in the fabrication area.

[F] **415.11.7.1.2 HPM rooms.** A *continuous-gas detection system* shall be provided in HPM rooms where HPM gas is used in the room.

[F] **415.11.7.1.3 Gas cabins, exhausted enclosures and gas rooms.** A *continuous-gas detection system* shall be provided in gas cabins and exhausted enclosures for HPM gas. A *continuous-gas detection system* shall be provided in gas rooms where HPM gases are not located in gas cabinets or exhausted enclosures.

[F] **415.11.7.1.4 Corridors.** Where HPM gases are transported in piping placed within the space defined by the walls of a corridor and the floor or roof above the corridor, a *continuous-gas detection system* shall be provided where piping is located and in the corridor.

**Exception:** A *continuous-gas detection system* is not required for occasional transverse crossings of the corridor by supply piping that is enclosed in a ferrous pipe or tube for the width of the corridor.

[F] **415.11.7.2 Gas detection system operation.** The *continuous-gas detection system* shall be capable of monitoring the room, area or equipment in which the HPM gas is located at or below all the following gas concentrations:

1. Immediately dangerous to life and health (IDLH) values where the monitoring point is within an exhausted enclosure, ventilated enclosure or gas cabinet.
2. Permissible exposure limit (PEL) levels where the monitoring point is in an area outside an exhausted enclosure, ventilated enclosure or gas cabinet.
3. For flammable gases, the monitoring detection threshold level shall be vapor concentrations in excess of 25 percent of the lower flammable limit (LFL) where the monitoring is within or outside an exhausted enclosure, ventilated enclosure or gas cabinet.
4. Except as noted in this section, monitoring for highly toxic and toxic gases shall also comply with Chapter 60 of the *International Fire Code*.

[F] **415.11.9.3 Signals.** The emergency control station *emergency control station* shall receive signals from emergency equipment and alarm and detection systems. Such emergency equipment and alarm and detection systems shall include, but not be limited to, the following where such equipment or systems are required to be provided either in this chapter or elsewhere in this code:

1. *Automatic sprinkler system* alarm and monitoring systems.
3. Emergency alarm systems.
5. Smoke detection systems.
6. Emergency power system.
7. Automatic detection and alarm systems for pyrophoric liquids and Class 3 water-reactive liquids required in Section 2705.2.3.4 of the *International Fire Code*.
8. Exhaust ventilation flow alarm devices for pyrophoric liquids and Class 3 water-reactive liquids cabinet exhaust ventilation systems required in Section 2705.2.3.4 of the International Fire Code.

[F] 421.6 Gas detection system. Hydrogen fuel gas rooms shall be provided with an approved flammable gas detection system in accordance with a gas detection system that complies with Sections 916, and Sections 421.6.1 through 421.6.4 421.6.2.

[F] 421.6.3 421.6.1 Operation System activation. Activation of the gas detection-system alarm shall result in all both of the following:

1. Initiation of distinct audible and visible visual alarm signals both inside and outside of the hydrogen fuel gas room.
2. Activation Automatic activation of the mechanical exhaust ventilation system.

Delete without substitution:

[F] 421.6.1 System design. The flammable gas detection system shall be listed for use with hydrogen and any other flammable gases used in the hydrogen fuel gas room. The gas detection system shall be designed to activate when the level of flammable gas exceeds 25 percent of the lower flammability limit (LFL) for the gas or mixtures present at their anticipated temperature and pressure.

Revise as follows:

[F] 421.6.4 421.6.2 Failure of the gas detection system. Failure of the gas detection system gas detection system shall result in activation of automatically activate the mechanical exhaust ventilation system, cessation of stop hydrogen generation, and the sounding of cause a trouble signal in to sound at an approved location.

Delete without substitution:

[F] 421.6.2 Gas detection system components. Gas detection system control units shall be listed and labeled in accordance with UL 864 or UL 2017. Gas detectors shall be listed and labeled in accordance with UL 2075 for use with the gases and vapors being detected.

Reason: Gas detection systems are required for many different applications in the code. There is great inconsistency in how these systems are treated, and some requirements cannot be enforced because required listed gas detectors, controls and systems are not commercially available. A working group of the Fire Code Action Committee that included industry and code officials worked on developing this proposal that addresses these concerns. The significant changes accomplished with this proposal are as follows:

- Section 105.7.9 - A construction permit is required for installation of gas detection systems.
- Section 202 – A definition of gas detection system was added that replaces the Continuous Gas Detection System definition. Continuous gas sampling is addressed further in Section 916.6.
- Section 604.2.6 - Gas detection systems are required to be provided with emergency or standby power. By default, Section 604 requires minimum 2 hours’ duration. An option for providing a power loss trouble signal in an approved location in lieu of standby power is included in Section 916.5.
- Section 606.8 requires ammonia refrigerant systems to comply with the llAR 2 standard, which is already referenced in Section 606.
- In Section 908 only items 1 and 2 apply to emergency alarm systems, items 3 through 7 really reference gas detection systems. The unnecessary/incorrect cross references were deleted.
- Section 916 includes basic requirements for all gas detection systems and covers construction documents, equipment, pow er connections, emergency and standby pow er, sensor locations, gas sampling, system activation, signage, fire alarm system connections, maintenance, testing and sensor calibration. These are important safety requirements that are applicable to all gas detection systems, including those installed in a...
small mom and pop operation up to those in large industrial facilities. Gas detection system equipment is commercially available that can comply with these requirements.  

- Most of the revisions in Sections 23 through 64 accomplished the following: (1) deleted references to listed detectors and equipment, (2) provided consistency in how gas detection requirements are treated, (3) included cross references to Section 916 for basic system requirements, and (4) clarified existing requirements.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire safety and hazardous materials in new and existing buildings and facilities and the protection of life and property in wildland urban interface areas. In 2014 and 2015 the Fire-CAC has held 5 open meetings. In addition, there were numerous conference calls, Regional Work Group and Task Group meetings for the current code development cycle, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC

**Cost Impact:** Will increase the cost of construction  
The additional construction requirements in this proposal have the potential to increase construction costs. However, since the features described in Section 916 are currently available with most gas detection equipment on the market today, the additional costs may not be significant.
F76-16
IFC: 604.4, 604.4.1 (New), 604.5, 604.5.1 (New).

Proponent: John Williams, CBO, representing Adhoc Healthcare Committee (AHC@iccsafe.org); Carl Baldassarra, P.E., FSFPE, representing Code Technology Committee (CTC@iccsafe.org)

2015 International Fire Code

604.4 Maintenance. Emergency and standby power systems shall be maintained in accordance with NFPA 110 and NFPA 111 such that the system is capable of supplying service within the time specified for the type and duration required.

Add new text as follows:

604.4.1 Group I-2. In Group I-2 occupancies, emergency and standby power systems shall be maintained in accordance with NFPA 99.

604.5 Operational inspection and testing. Emergency power systems, including all appurtenant components, shall be inspected and tested under load in accordance with NFPA 110 and NFPA 111.

Exception: Where the emergency power system is used for standby power or peak load shaving, such use shall be recorded and shall be allowed to be substituted for scheduled testing of the generator set, provided that appropriate records are maintained.

604.5.1 Group I-2. In Group I-2 occupancies, emergency and standby power systems shall be maintained in accordance with NFPA 99.

Reason: There are special requirements in NFPA 99 for the maintenance and inspection of generators installed at hospitals and nursing homes. In addition to these special requirements, 99 also references NFPA 110. It is important to reference this code as it is the current federal standard and the one facilities are used to complying with. This is a joint proposal submitted by the ICC Ad Hoc Committee on Healthcare (AHC) and the ICC Code Technology Committee (CTC). The AHC was established by the ICC Board to evaluate and assess contemporary code issues relating to hospitals and ambulatory healthcare facilities. This is a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. In 2014 and 2015 the ICC Ad Hoc Committee has held 4 open meetings and numerous Work Group meetings and conference calls for the current code development cycle which included members of the committees as well as any interested party to discuss and debate the proposed changes.

Information on the AHC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the AHC effort can be downloaded from the AHC website at: AHC. The two remaining CTC Areas of Study are Care Facilities and Elevator Lobbies/WTC Elevator issues. This proposal falls under the Care Facilities Area of Study. In 2014 and 2015 ICC CTC Committee has held 4 open meetings and numerous Work Group meetings and conference calls for the current code development cycle which included members of the committees as well as any interested party to discuss and debate the proposed changes.

Information on the CTC, including: the sunset plan; meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the CTC website CTC.

Cost Impact: Will not increase the cost of construction
This is already required under the requirements for federal funding and participation in Medicare.
IFC: 604.6, 604.6.1, 604.6.1.1, 604.6.2, 604.6.2.1.
Proponent: Jeffrey Shapiro, representing National Multifamily Housing Council (jeff.shapiro@intlcodeconsultants.com)

2015 International Fire Code

Revise as follows:

604.6 1031.10 Emergency lighting equipment inspection and testing. Emergency lighting shall be maintained in accordance with Section 107 and shall be inspected and tested in accordance with Sections 604.6.1 through 604.6.2.1 and 1031.10.1 and 1031.10.2.

604.6.1 1031.10.1 Activation test. An activation test of emergency lighting equipment shall be performed monthly for a duration of not less than 30 seconds. The test shall be performed manually or by an automated self-testing and self-diagnostic routine. Where testing is performed by self-testing and self-diagnostics, a visual inspection of the equipment shall be conducted monthly to identify any equipment displaying a trouble indicator or that has become damaged or otherwise impaired. The activation test shall ensure the emergency lighting activates automatically upon normal electrical disconnect and remains sufficiently illuminated for not less than 30 seconds.

604.6.2 1031.10.2 Power test. For battery-powered emergency lighting, a power test of the battery-powered emergency lighting equipment shall be completed annually. The test shall be performed by operating equipment on battery power and shall operate the emergency lighting for not less than 90 minutes and shall remain sufficiently illuminated for the duration of the test.

Delete without substitution:

604.6.1.1 Activation test record. Records of tests shall be maintained. The record shall include the location of the emergency lighting tested, whether the unit passed or failed, the date of the test and the person completing the test.

604.6.2.1 Power test record. Records of tests shall be maintained. The record shall include the location of the emergency lighting tested, whether the unit passed or failed, the date of the test and the person completing the test.

Reason: This proposal addresses several issues with the current provisions for inspection and testing of emergency lighting, which was added to the 2012 edition of the IFC by proposal F35-09/10. In retrospect, it has become clear that the provisions in this section are more appropriately located in Chapter 10, since they relate to maintenance of emergency illumination for means of egress, rather than being uniquely related to standby and emergency power, which is the focus of Section 604. Accordingly, this proposal recommends relocating the provisions to Section 1031, which deals with maintenance of the means of egress, making it clear that the intent is to maintain overall functionality of the emergency lighting system, not just the power supply.

Additional changes are recommended to recognize modern technology employed in many emergency lighting units, which permits these units to conduct self-testing and self-diagnostics in lieu of manually initiated tests. This technology is recognized by NFPA 101, Section 7.9.3, which was cited as a reference source for the original provisions added by proposal F35-09/10, and the revisions suggested herein actually improve correlation with the latest requirements in NFPA 101, Section 7.9.3.

One other issue that is fixed by this proposal, which wasn’t readily evident when these provisions were proposed but has since become an issue, is the recommended elimination of the current text in Section 604.6.1, which suggests that the 30-second test must be initiated by disconnecting normal power. This has become an issue in
some jurisdictions where code officials are requiring that the building power be turned off to conduct the test.
Needless to say, residents quickly become unhappy when they have to reset their clocks or lose their Internet
connections on a monthly basis when management is required to turn off power for 30 seconds for an emergency
lighting test. Conducting the test in this manner isn’t required by NFPA 101, and a reason for the IFC to be more
stringent is not evident.

Finally, by referencing IFC Section 107, the “sufficiency” and “recordkeeping” provisions are no longer needed in this
section. Although Section 107 applies whether it’s referenced here or not, it may be preferred by some to have the
cross-reference included to avoid the appearance that these topics are no longer of concern.

**Cost Impact:** Will not increase the cost of construction
This proposal has nothing to do with construction.
2015 International Fire Code

Revised as follows:

604.2.6 (IBC [F] 2702.2.6) Group I-2 occupancies. Essential electrical systems for Group I-2 occupancies shall be in accordance with Section 1105.10 and with Section 407.10 of the International Building Code.

1105.10 Essential electrical systems. Essential electrical systems in Group I-2 Condition 2 occupancies shall be in accordance with Sections 1105.10.1, 1105.10.2 and 1105.10.6.

2015 International Building Code

Revised as follows:

407.10 Electrical systems. In Group I-2 occupancies, the essential electrical system for electrical components, equipment and systems shall be designed and constructed in accordance with the provisions of Chapter 27 Section 2702 and NFPA 99.

Reason: Essential electrical equipment for Group I-2 are not consistent with the way other emergency and standby power systems are handled. This proposal provides a needed link between existing codes sections and it follows the format used throughout the code for essential electrical, emergency and standby power, and makes no substantive changes.

Cost Impact: Will not increase the cost of construction
Only provides linkage within the code between related existing code sections.
F79-16
IFC: 604.1.2 (IBC [F] 2702.1.2) (New).
Proponent: Vickie Lovell, InterCode Incorporated, representing 3M (vickie@intercodeinc.com)

2015 International Fire Code
Add new text as follows:

604.1.2 (IBC [F] 2702.1.2) Fuel line piping protection. Fuel lines supplying a generator set inside a building shall be separated from areas of the building other than the room the generator is located in by an approved method, or an assembly that has a fire-resistance rating of not less than 2 hours. Where the building is protected throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1, the required fire-resistance rating shall be reduced to 1 hour.

Reason: This proposal is intended to require fuel lines supplying a generator set inside a building to be separated with fire-resistance-rated construction from areas of the building other than in the room in which the generator is located. It mirrors the text that was approved for the 2015 IBC in Section 403.4.8.2 for high-rises and was overwhelmingly supported by the ICC membership.

This proposal extends the requirement to any building that has a generator that is separated from the rest of the building. It is common for diesel-fueled generators to supply the generators with a day tank and resupply the day tank via remote fuel oil tanks. The fuel line piping from those remote tanks to the generator can be exposed to the same fire incident that the generator has been protected against. Loss of the fuel line due to fire exposure has the same impact as loss of the generator itself.

The wording only refers to “fuel lines” to also provide protection in those cases where a gaseous fuel supply is approved for use.

Cost Impact: Will increase the cost of construction
This requirement for protection of the fuel lines supplying stationary generators already applies to high-rise buildings. This proposal, if approved, would require labor to install generic materials or a proprietary system to protect fuels lines in all buildings with stationary generators
2015 International Fire Code

Add new text as follows:

605.3.1 Labeling. Doors into electrical control panel rooms shall be marked with a plainly visible and legible sign stating ELECTRICAL ROOM or similar approved wording. The disconnecting means for each service, feeder or branch circuit originating on a switchboard or panelboard shall be legibly and durably marked to indicate its purpose unless such purpose is clearly evident. Buildings or structures supplied by more than one power source shall be marked to indicate the presence of all power sources in accordance with NFPA 70.

Reason: The current IFC does not specifically address providing markings to identify multiple power sources. Multiple power sources are becoming a more common hazard to first responders. Understanding that buildings or structures fed from multiple power sources is a hazard to first responders. It is important to know where the building or structure is supplied by alternate energy sources. Without this marking, by just turning off the main disconnect, it may be assumed that the building or structure has been fully deenergized. However there may still be energized systems that pose a serious hazard to first responders.

Cost Impact: Will not increase the cost of construction
There is no increase in cost as this marking is already required by NFPA 70.
605.4.1 Power tap design. Relocatable power taps shall be of the polarized or grounded type, equipped with overcurrent protection, listed and shall be listed labeled in accordance with UL 1363.

Reason: Relocatable power taps are required by UL 1363 to either be a polarized or grounded type. Internal overcurrent protection is required by UL 1363 for relocatable power taps having a 14 AWG flexible supply cord and four to six receptacle outlets, and for relocatable power taps having seven or more receptacle outlets. For other relocatable power taps, internal overcurrent protection is not required because those relocatable power taps are an extension of the branch circuit, and thus are sufficiently protected by the permanently-installed overcurrent protection for the branch circuit. Both the code and the listing requirements limit the use of the relocatable power taps to be directly connected to a permanently installed branch-circuit receptacle outlet (IFC Section 605.4.2). Relocatable power taps are not intended to be series connected (daisy chained) to other relocatable power taps or to extension cords. This standard addresses the requirements for the plug to be polarized or grounded type, and contains requirements for overcurrent protection, and thus is verified by the third-party certification agency as part of the product certification process.

Cost Impact: Will not increase the cost of construction
This code change is simply removing unnecessary language from the text that is already addressed by the listing to the referenced standard, UL 1363. This will make it easier to determine code compliance at the same level of safety. No substantive changes are being made.
Add new text as follows:

605.5 Extension cords. Extension cords and flexible cords shall not be a substitute for permanent wiring and shall be listed and labeled in accordance with UL 817. Extension cords and flexible cords shall not be affixed to structures, extended through walls, ceilings or floors, or under doors or floor coverings, nor shall such cords be subject to environmental damage or physical impact. Extension cords shall be used only with portable appliances. Extension cords marked for indoor use shall not be used outdoors.

Reference standards type: This reference standard is new to the ICC Code Books

Add new standard(s) as follows:
Add new standard. UL 817, Standard for Cord Sets and Power-Supply Cords with revisions through March 2015

Reason: This proposal allows fire code enforcers to require extension cords to be listed and labeled, which demonstrates they have been investigated in accordance with recognized safety standards, and addresses hazards associated with non-listed extension codes that may utilize undersized conductors and substandard construction. The proposal also addresses fire and shock hazards associated with use of indoor use extension cords used in outdoor environments.

Cost Impact: Will not increase the cost of construction
This proposal simply clarifies the safety requirements for extension cords allowed for temporary use.

Analysis: A review of the standard(s) proposed for inclusion in the code, UL 817, Standard for Cord Sets and Power-Supply Cords with revisions through March 2015 with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1, 2016.
2015 International Fire Code

Revise as follows:

605.7 Appliances Equipment and Fixtures. Electrical appliances—equipment and fixtures shall be tested and listed in published reports of inspected electrical equipment by an approved agency and installed and maintained in accordance with all instructions included as part of such listing.

Reason: "Equipment" is a more inclusive term to be used. This term is defined in NFPA 70 as "A general term, including fittings, devices, appliances, luminaires, apparatus, machinery, and the like used as a part of, or in connection with, an electrical installation." The definition of the term "listed" in Chapter 2 already states the listed equipment materials, products or services are included in a list published by the approved agency.

Cost Impact: Will not increase the cost of construction
Editorial clarification using defined terms.
Part I: 
IFC: 605.11.

This is a 2 part code change. Part I will be heard by the Fire Code Committee. Part II will be heard by the IRC-Building Code Committee. See the tentative hearing order for these committees.

Proponent: William Brooks, Brooks Engineering, representing Photovoltaic Industry Code Council (billbrooks7@sbcglobal.net)

Part I

2015 International Fire Code

605.11 Solar photovoltaic power systems. Solar photovoltaic power (PV) systems shall be installed in accordance with Sections 605.11.1 through 605.11.2, and the International Building Code or International Residential Code, and The electrical portion of solar PV systems shall be installed in accordance with NFPA 70.

Part II

2015 International Residential Code

R324.3 Photovoltaic systems. Photovoltaic systems shall be designed and installed in accordance with Sections R324.3.1 through R324.6.1 and . The electrical portion of solar photovoltaic systems shall be installed in accordance with NFPA 70. Inverters shall be listed and labeled in accordance with UL 1741. Systems connected to the utility grid shall use inverters listed for utility interaction.

Reason: The term "power" in "solar photovoltaic power systems" in 605.11 is unnecessary. This phrase has been shortened to agree with NFPA 70 that is referenced in this section. Also, the term "photovoltaic" is rarely used and is shortened to "PV" for ease of reference throughout NFPA 70 and should be done throughout 605.11. Also, while the current list of codes may be correct in the single sentence in 605.11, it would be more clear to show that the electrical provisions of a PV installation are set forth in NFPA 70 (the National Electrical Code). The National Electrical Code (NEC) has enforced the electrical installation requirements for PV systems since 1984. In the 2015 IFC code cycle, all electrical references were removed from the IFC so that only NFPA 70 would have electrical requirements. Also, representation of the fire service was enhanced in the code panels for NFPA 70 so that it would ensure proper dialogue with the fire service on electrical issues related to PV systems.

As chair of the NFPA Firefighter Safety and Photovoltaic Systems Task Group, I have been working closely with many in the fire service and insurance industry to see that the concerns of the these important stakeholders are secured in NFPA 70 for electrical safety issues. The 2017 NEC code cycle includes substantial increases in safety requirements for PV systems on buildings. It would be confusing for the enforcement community to go back on the decisions to remove electrical requirements from the IFC and begin to add new requirements that are not in the NEC. Of greatest concern are issues surrounding Section 690.12, Rapid Shutdown of PV Systems on Buildings, in NFPA 70. There are indications that the fire service may request a similar set of electrical requirements in the 2018 IFC. It is the position of the NFPA Firefighter Safety and Photovoltaic Systems Task Group that adding similar, but not identical requirements in both the 2017 NEC and the 2018 IFC will be counterproductive.

The committee overseeing revisions to the 2018 IFC will have full visibility that the provisions of Section 690.12 in NFPA 70 will make it to publication prior to finalizing the 2018 IFC so that will not be necessary to add the 2017 NEC language into the 2018 IFC for Section 690.12 of NFPA 70. What the NFPA Firefighter Safety and PV Systems Task Group was in agreement on is the need for the signage portion of the NEC requirements related to Rapid Shutdown to be added to the 2018 IFC as it is also being added to NFPA1.
Cost Impact: Will not increase the cost of construction
The language is simply clarifying what is already in the 2015 IFC. Keeping additional electrical provisions out of the 2017 IFC will keep costs of construction down by reducing confusing differences that often occur when similar requirements are in two different enforced codes (the NEC and IFC).
F85-16

Part I:
IFC: 605.11, 605.11.1, 605.11.1.1, 605.11.1.2, 605.11.1.2.1, 605.11.1.2.1 (New), 605.11.1.2.2, 605.11.1.2.2 (New), 605.11.1.2.2.1 (New), 605.11.1.2.3, 605.11.1.2.4, 605.11.1.2.5, 605.11.1.3, 605.11.1.3.1, 605.11.1.3.2, 605.11.1.3.3, 605.11.2.

Part II:
IRC: R324.6, R324.6 (New), R324.6.1, R324.6.1 (New), R324.6.2 (New), R324.6.2.1 (New).

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE FIRE CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-BUILDING CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

Proponent: Joseph Cain, SunEdison, representing Solar Energy Industries Association (SEIA) (joecainpe@aol.com); Kevin Reinertson, Riverside County Fire, representing Riverside County Fire - Office of the Fire Marshal (kevin.reinertson@fire.ca.gov)

Part I

2015 International Fire Code

Revise as follows:

605.11 Solar photovoltaic power systems. Solar photovoltaic power systems shall be installed in accordance with Sections 605.11.1 through 605.11.2, the International Building Code or International Residential Code, and NFPA 70.

605.11.1 Access and pathways. Roof access, pathways, and spacing requirements shall be provided in accordance with Sections 605.11.1.1 through 605.11.1.3.3. Pathways shall be over areas capable of supporting fire fighters accessing the roof. Pathways shall be located in areas with minimal obstructions such as vent pipes, conduit, or mechanical equipment.

Exceptions:

1. Detached, nonhabitable Group U structures including, but not limited to, detached garages serving Group R-3 buildings, parking shade structures, carports, solar trellises and similar structures.
2. Roof access, pathways and spacing requirements need not be provided where the fire chief has determined that rooftop operations will not be employed.

Delete without substitution:

605.11.1.1 Roof access points. Roof access points shall be located in areas that do not require the placement of ground ladders over openings such as windows or doors, and located at strong points of building construction in locations where the access point does not conflict with overhead obstructions such as tree limbs, wires or signs.

Revise as follows:

605.11.1.2 Solar photovoltaic systems for Group R-3 buildings. Solar photovoltaic systems for Group R-3 buildings shall comply with Sections 605.11.1.2.1 through 605.11.1.2.5.
Exception: These requirements shall not apply to structures designed and constructed in accordance with the International Residential Code.

Exceptions:
1. These requirements shall not apply to structures designed and constructed in accordance with the International Residential Code.
2. These requirements shall not apply to roofs with slopes of 2 units vertical in 12 units horizontal (2:12) or less.

Delete without substitution:

605.11.1.2.1 Size of solar photovoltaic array. Each photovoltaic array shall be limited to 150 feet (45 720 mm) by 150 feet (45 720 mm). Multiple arrays shall be separated by a 3-foot-wide (914 mm) clear access pathway.

605.11.1.2.2 Hip roof layouts. Panels and modules installed on Group R-3 buildings with hip roof layouts shall be located in a manner that provides a 3-foot-wide (914 mm) clear access pathway from the eave to the ridge on each roof slope where panels and modules are located. The access pathway shall be at a location on the building capable of supporting the fire fighters accessing the roof.

Exception: These requirements shall not apply to roofs with slopes of two units vertical in 12 units horizontal (2:12) or less.

605.11.1.2.3 Single-ridge roofs. Panels and modules installed on Group R-3 buildings with a single-ridge shall be located in a manner that provides two, 3-foot-wide (914 mm) access pathways from the eave to the ridge on each roof slope where panels and modules are located.

Exception: This requirement shall not apply to roofs with slopes of two units vertical in 12 units horizontal (2:12) or less.

605.11.1.2.4 Roofs with hips and valleys. Panels and modules installed on Group R-3 buildings with roof hips and valleys shall not be located closer than 18 inches (457 mm) to a hip or a valley where panels/modules are to be placed on both sides of a hip or valley. Where panels are to be located on only one side of a hip or valley that is of equal length, the panels shall be permitted to be placed directly adjacent to the hip or valley.

Exception: These requirements shall not apply to roofs with slopes of two units vertical in 12 units horizontal (2:12) or less.

605.11.1.2.5 Allowance for smoke ventilation operations. Panels and modules installed on Group R-3 buildings shall be located not less than 3 feet (914 mm) from the ridge in order to allow for fire department smoke ventilation operations.

Add new text as follows:

605.11.1.2.1 Pathways to ridge. A minimum of two 36 in. (914 mm) wide pathways on separate roof planes, from lowest roof edge to ridge, shall be provided on all buildings. At least one pathway shall be provided on the street or driveway side of the roof. For each roof plane with a
photovoltaic array, at least one 36 in. (914 mm) wide pathway from lowest roof edge to ridge shall be provided on the same roof plane as the photovoltaic array, or on an adjacent roof plane, or straddling the same and adjacent roof planes.

605.11.1.2.2 Setbacks at ridge. For photovoltaic arrays occupying 33 percent or less of the plan view total roof area, a minimum 18 in. (457 mm) wide setback is required on both sides of a horizontal ridge. For photovoltaic arrays occupying more than 33 percent of the plan view total roof area, a minimum 36 in. (457 mm) wide setback is required on both sides of a horizontal ridge.

605.11.1.2.2.1 Alternative setbacks at ridge. Where an automatic sprinkler system is installed within the dwelling in accordance with NFPA 13D, setbacks at ridge shall conform with one of the following:
1. For photovoltaic arrays occupying 66 percent or less of the plan view total roof area, a minimum 18 in. (457 mm) wide setback is required on both sides of a horizontal ridge.
2. For photovoltaic arrays occupying more than 66 percent of the plan view total roof area, a minimum 36 in. (914 mm) wide setback is required on both sides of a horizontal ridge.

Revise as follows:

605.11.3 Other than Group R-3 buildings. Access to systems for buildings, other than those containing Group R-3 occupancies, shall be provided in accordance with Sections 605.11.1.3.1 through 605.11.1.3.3.

Exception: Where it is determined by the fire code official that the roof configuration is similar to that of a Group R-3 occupancy, the fire code official shall be permitted to allow the residential access and ventilation requirements in Sections 605.11.1.2.1 through 605.11.1.2.5 to be used.

605.11.3.1 Access Perimeter pathways. There shall be a minimum 6-foot-wide (1829 mm) clear perimeter around the edges of the roof.

Exception: Where either axis of the building is 250 feet (76 200 mm) or less, the clear perimeter around the edges of the roof shall be permitted to be reduced to a minimum 4 foot wide (1290 mm).

Delete and substitute as follows:

605.11.3.2 Pathways Interior pathways. The solar installation shall be designed to provide designated pathways. The pathways shall meet the following requirements:

1. The pathway shall be over areas capable of supporting fire fighters accessing the roof.
2. The centerline axis pathways shall be provided in both axes of the roof. Centerline axis pathways shall run where the roof structure is capable of supporting fire fighters accessing the roof.
3. Pathways shall be a straight line not less than 4 feet (1290 mm) clear to roof standpipes or ventilation hatches.
4. Pathways shall provide not less than 4 feet (1290 mm) clear around roof access hatch with not less than one singular pathway not less than 4 feet (1290 mm) clear to a parapet or roof edge.

Interior pathways shall be provided between array sections to meet the following requirements:
1. Pathways shall be provided at intervals no greater than 150 ft (45.7 m) throughout the length and width of the roof.
2. A minimum 4 ft (1290 mm) wide pathway in a straight line to roof standpipes or ventilation hatches.
3. A minimum 4 ft (1290 mm) wide pathway around roof access hatches with not less than at least one minimum 4 ft (1290 mm) wide pathway to a parapet or roof edge.

Revise as follows:

**605.11.3.3 Smoke ventilation.** The solar installation shall be designed to meet the following requirements:

1. Arrays Where nongravity-operated smoke and heat vents occur, a minimum 4 ft (1219 mm) wide pathway shall be not greater than 150 feet (45 720 mm) by 150 feet (45 720 mm) in distance in either axis in order to create opportunities for fire department smoke ventilation operations provided bordering all sides.
2. Smoke ventilation options between array sections shall be one of the following:
   2.1. A pathway minimum 8 feet (2438 mm) or greater in width.
   2.2. A 4-foot (1290 mm) or greater in width pathway and bordering roof skylights or Where gravity-operated dropout smoke and heat vents occur, a minimum 4 ft (1290 mm) wide pathway on not less than one side.
   2.3. A 4-foot (1290 mm) or greater in width pathway and bordering all sides of nongravity operated dropout smoke and heat vents.
   2.3. A 4-foot minimum 4 ft (1290 mm) or greater in width pathway and bordering 4-foot by 8-foot (1290 mm by 2438 mm) "venting cutouts" every 20 feet (6096 mm) on alternating sides of the pathway.

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**605.11.2 Ground-mounted photovoltaic arrays panel systems.** Ground-mounted photovoltaic arrays panel systems shall comply with Section 605.11 and this section. Setback requirements shall not apply to ground-mounted, free-standing photovoltaic arrays. A clear, brush-free area of 10 feet (3048 mm) shall be required for ground-mounted photovoltaic arrays.

**Part II**

**2015 International Residential Code**

Add new text as follows:

**R324.6 Roof access and pathways.** Roof access, pathways, and setback requirements shall be provided in accordance with Sections R324.6.1 through R324.6.2.1. Access and minimum spacing shall be required to provide emergency access to the roof, to provide pathways to specific areas of the roof, provide for smoke ventilation opportunity areas, and to provide emergency egress from the roof.

**Exceptions:**

1. Detached, nonhabitable structures, including but not limited to, detached garages, parking shade structures, carports, solar trellises, and similar structures shall not be required to provide roof access.
2. Roof access, pathways, and setbacks need not be provided where the code official has determined that rooftop operations will not be employed.
3. These requirements shall not apply to roofs with slopes of 2 units vertical in 12 units horizontal.
R324.6.1 Pathways. Not less than two minimum 36 in. (914 mm) wide pathways on separate roof planes, from lowest roof edge to ridge, shall be provided on all buildings. At least one pathway shall be provided on the street or driveway side of the roof. For each roof plane with a photovoltaic array, a minimum 36 in. (914 mm) wide pathway from the lowest roof edge to ridge shall be provided on the same roof plane as the photovoltaic array, on an adjacent roof plane, or straddling the same and adjacent roof planes. Pathways shall be over areas capable of supporting fire fighters accessing the roof. Pathways shall be located in areas with minimal obstructions such as vent pipes, conduit, or mechanical equipment.

R324.6.2 Setback at ridge. For photovoltaic arrays occupying not more than 33 percent of the plan view total roof area, not less than an 18-inch (457 mm) clear setback is required on both sides of a horizontal ridge. For photovoltaic arrays occupying more than 33 percent of the plan view total roof area, not less than a 36-inch (914 mm) clear setback is required on both sides of a horizontal ridge.

R324.6.2.1 Alternative setback at ridge. Where an automatic sprinkler system is installed within the dwelling in accordance with NFPA 13D or Section P2904, setbacks at ridges shall conform with one of the following:
1. For photovoltaic arrays occupying not more than 66 percent of the plan view total roof area, not less than an 18-inch (457 mm) clear setback is required on both sides of a horizontal ridge.
2. For photovoltaic arrays occupying more than 66 percent of the plan view total roof area, not less than a 36-inch (914 mm) clear setback is required on both sides of a horizontal ridge.

Revise as follows:

R324.6 R324.7 Ground-mounted photovoltaic systems. No change to text.

R324.6.1 R324.7.1 Fire separation distances. No change to text.

Reason:

Part I: This proposal is intended to remove redundant text and provide additional clarity for the design and enforcement of the access and setback provisions relating to roof top photovoltaic arrays. This proposal does not remove the intended provisions for firefighter safety for roof ventilation operations. Additionally, this proposal allows the increase of the solar array area and reducing the width of the roof access paths for Group R-3 occupancies provided with a residential fire sprinkler system. The data show that approximately 87 percent of all fires in residential housing are controlled by the fire sprinkler activation NFPA’s “U.S. Experience with Sprinklers” http://www.nfpa.org/-/media/files/research/nfpa-reports/fire-protection-systems/ossprinklers.pdf?la=en. The need for fire service to use the roof for firefighting activity is greatly reduced and eliminated in most incidences. Individual sections of 605.11 are revised as follows:

1. Section 605.11.1 includes language formerly found in Section 605.11.1.3.2, Item 1, and includes language that pathways should be free of obstructions. Exception 2 of 605.11.1 is revised from “fire chief” to the defined term “fire code official” to be consistent with other sections of IFC and to recognize other individuals authorized by the fire chief to make such decisions.

2. Section 605.11.1.1 Roof access points is deleted at the request of a representative of the International Association of Fire Fighters (IAFF). This section is deleted because the photovoltaic system designer should not be burdened with decisions regarding placement of ladders by fire fighters, and to eliminate possible conflicts.

3. The first exception to Section 605.11.1.2 is unchanged. Exception 2 is proposed to eliminate the redundancy where the same language is used three times in existing Section 605.11.

4. Sections 605.11.1.2.1 is deleted, as Group R-3 will not exceed 150 feet, and because it is better addressed in Section 605.11.3.2 (formerly Section 605.11.1.3.2). The 150 foot constraint that was formerly found in old Section 605.11.1.2.2 is moved to new Section 605.11.3.2 Interior pathways.
5. Sections 605.11.1.2.2 through 605.11.1.2.5 are replaced with new Sections 605.11.1.2.1 through 605.11.1.2.2.1. This rewrite is consistent with simplified technical requirements approved by the NFPA 1 technical committee for the First Revision of the NFPA 1 Fire Code. A separate discussion is provided after this list.

6. Section 605.11.3 is revised at the request of co-proponent Kevin Reinertson to clarify that the fire code official has the authority to allow the use of the Group R-3 provisions for buildings similar to Group R-3, but is not forced to do so.

7. Section 605.11.3.1 and 605.11.3.2 are re-titled to clarify they are applicable to perimeter pathways and interior pathways. Requirements for perimeter pathways are unchanged.

8. In Section 605.11.3.2, Item 1 is relocated to the general Section 605.11.1. Item 2 is deleted at the request of a representative of IAFF. The former requirement for centerline pathways is replaced with new Item 1 that clarifies access pathways shall be no greater than 150 feet apart. This section is simplified by rewriting Items 3 and 4 as new items 2 and 3, and editing for consistency with other sections. The technical provisions are not changed.

9. In Section 605.11.3.3 Smoke ventilation, new Item 1 is relocated at the request of IAFF from the former 4-item option list to its own status as a requirement rather than an option. This will require access bordering all sides to all nongravity-operated smoke and heat vents found on a building, without exception. It is not apparent in the cdpACCESS version that former Item 1 was replaced, and should have remained visible in strike-out. Former Item 1 was the source of the language "Arrays shall be not greater than 150 feet (45 720 mm) by 150 feet (45 720 mm) in distance in either axis in order to create opportunities for fire department smoke ventilation operations." This language is now moved to 605.11.3.2 Interior pathways.

10. The remainder of Section 605.11.3.3 Smoke ventilation is now Item 2, to clarify that there are requirements with three options, in addition to mandatory Item 1. This is renumbered as Items 2.1 through 2.3. These items have editorial changes but no changes to technical requirements.

11. Section 605.11.4 Ground mounted systems is revised by title and text to the defined term photovoltaic panel systems. There are no changes to technical requirements.

The following notes are modified from the corresponding residential proposal for the International Residential Code (IRC).

The residential rooftop access and setback provisions in this proposals are improved over those found in the 2015 International Fire Code. The language has been simplified, and redundant language has been removed. In a collaborative effort with representatives from the International Association of Fire Fighters (IAFF), the requirements have been simplified. Requirements that were deemed unnecessary are removed, and access provisions are intended to be more effective for the fire service. The concepts for ridge setbacks varying with coverage of the PV system originated with the City of Boulder fire service.

The residential portion of the IFC proposal is for Group R-3 Occupancies. There is a parallel proposal for the IRC. This proposal uses the residential portions of the IFC proposal to serve one- and two-family dwellings and townhouses constructed in conformance with the IRC. There is also a parallel effort in the NFPA 1 Fire Code development process. Proposals with very similar technical provisions were approved by the NFPA 1 technical committee into the First Revision of 2018 NFPA 1 Fire Code. These efforts to update the IFC will play a role in the public comment process for NFPA 1. At the time of this submittal, NFPA 1 is not yet in the public comment period.

Part II: We propose to introduce the applicable rooftop access concepts of International Fire Code Section 605.11 into the International Residential Code to provide for uniform design and enforcement. Many jurisdictions currently provide enforcement of the solar photovoltaic power systems guidelines in IFC Section 605.11, or other locally adopted provisions through the building department/official which typically do not enforce the International Fire Code. Furthermore, the intent to have these provisions reproduced into the IRC is to afford local communities the ability to provide adequate enforcement without the reference to a different code or standard. (IFC 605.11.3.3 through 605.11.3.3.3 are not reproduced; such provisions are not applicable to one- and two-family dwellings or townhouses.

In the Group B development process in 2013, parallel proposals were submitted in the IFC and IRC to clarify issues of scope and to ensure complete coverage of homes whether the are designed and built under the International Building Code or International Residential Code. 2015 IFC 605.11.1.2 covers photovoltaic systems installed on Group R-3 buildings. The exception to 605.11.1.2 states: "These requirements shall not apply to structured designed and constructed in accordance with the international Residential Code." Proposal RM95-13 sought to include applicable
provisions in the IRC for complete coverage. At the final hearings, RM95-13 was Disapproved, leaving a gap in coverage for one- and two-family dwellings and townhouses. This proposal seeks to fill that gap in coverage.

The residential rooftop access and setback provisions in this proposals are improved over those found in the 2015 International Fire Code. The language has been simplified, and redundant language has been removed. In a collaborative effort with representatives from the International Association of Fire Fighters (IAFF), the requirements have been simplified. Requirements that were deemed unnecessary are removed, and access provisions are intended to be more effective for the fire service. The concepts for ridge setbacks varying with coverage of the PV system originated with the City of Boulder fire service.

There is a parallel proposal for the IFC. The residential portion of the IFC proposal is for Group R-3 Occupancies. This proposal uses the residential portions of the IFC proposal to serve one- and two-family dwellings and townhouses constructed in conformance with the IRC. There is also a parallel effort in the NFPA 1 Fire Code development process. Proposals with very similar technical provisions were approved by the NFPA 1 technical committee into the First Revision of 2018 NFPA 1 Fire Code. These efforts to update the IFC will play a role in the public comment process for NFPA 1. At the time of this submittal, NFPA 1 is not yet in the public comment period.

Bibliography:

Part I: NFPA's "U.S. Experience with Sprinklers" [link]

Cost Impact:

Part I: Will not increase the cost of construction
This proposal will not increase the cost of construction because it simplifies the roof setback and access provisions and allows exceptions under certain conditions.

Part II: Will not increase the cost of construction
This proposal seeks to codify certain constraints on photovoltaic system placement, and therefore in some cases constraints on system size based on fit. These requirements are often found in other codes or policies. While system economics can be impacted, the cost of construction will not increase.
Part I

2015 International Fire Code

605.11.2 Solar photovoltaic PV systems for Group R-3 buildings. Solar photovoltaic PV systems for Group R-3 buildings shall comply with Sections 605.11.1.2.1 through 605.11.1.2.5.

   Exception: These requirements shall not apply to structures designed and constructed in accordance with the International Residential Code.

605.11.1.2.1 Size of solar photovoltaic PV array. Each photovoltaic PV array shall be limited to 150 feet (45 720 mm) by 150 feet (45 720 mm). Multiple arrays shall be separated by a 3-foot-wide (914 mm) clear access pathway.

605.11.2 Ground-mounted photovoltaic PV arrays. Ground-mounted photovoltaic PV arrays shall comply with Section 605.11 and this section. Setback requirements shall not apply to ground-mounted, free-standing photovoltaic PV arrays. A clear, brush-free area of 10 feet (3048 mm) shall be required for ground-mounted photovoltaic PV arrays.

605.11 Solar photovoltaic power systems. Solar photovoltaic (PV) power systems shall be installed in accordance with Sections 605.11.1 through 605.11.2, the International Building Code or International Residential Code, and NFPA 70.

605.11.1.3.1 Access. There shall be a minimum 6-foot-wide (1829 mm) clear perimeter around the edges of the roof.

   Exception: Where either axis of the building is 250 feet (76 200 mm) or less, the clear perimeter around the edges of the roof shall be permitted to be reduced to a minimum 4 foot wide (1290 mm).

Part II

2015 International Residential Code

R324.3 Photovoltaic systems. Photovoltaic (PV) systems shall be designed and installed in accordance with Sections R324.3.1 through R324.6.1 and NFPA 70. Inverters shall be listed and labeled in accordance with UL 1741. Systems connected to the utility grid shall use inverters listed for utility interaction.
R324.3.1 Equipment listings. Photovoltaic PV panels and modules shall be listed and labeled in accordance with UL 1703.

R324.4 Rooftop-mounted photovoltaic systems. Rooftop-mounted photovoltaic PV panel systems installed on or above the roof covering shall be designed and installed in accordance with Section R907.

R324.4.1 Roof live load. Roof structures that provide support for photovoltaic PV panel systems shall be designed for applicable roof live load. The design of roof structures need not include roof live load in the areas covered by photovoltaic panel systems. Portions of roof structures not covered by photovoltaic PV panels shall be designed for roof live load. Roof structures that provide support for photovoltaic PV panel systems shall be designed for live load, LR, for the load case where the photovoltaic PV panel system is not present.

R324.5 Building-integrated photovoltaic systems. Building-integrated photovoltaic PV systems that serve as roof coverings shall be designed and installed in accordance with Section R905.

R324.5.1 Photovoltaic PV shingles. Photovoltaic PV shingles shall comply with Section R905.16.

R324.6 Ground-mounted photovoltaic PV systems. Ground-mounted photovoltaic PV systems shall be designed and installed in accordance with Section R301.

R324.6.1 Fire separation distances. Ground-mounted photovoltaic PV systems shall be subject to the fire separation distance requirements determined by the local jurisdiction.

Reason: The term "photovoltaic" is rarely used and is shortened to "PV" for ease of reference throughout NFPA 70 and should be done throughout 605.11. The same change was set forth in another proposal related to 605.11 to establish the first use of the term and acronym in that section.

Cost Impact: Will not increase the cost of construction

This is an editorial change.
F87-16

Part I:
IFC: 605.11.1.2.6 (New).

Part II:
IRC: R324.7.2.6 (New).

1. THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE IFC CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-BUILDING CODE COMMITTEE.

**Proponent:** Daniel Nichols, New York State Division of Building Standards and Codes, representing New York State Division of Building Standards and Codes (dnichols@dos.state.ny.us)

**Part I**

2015 International Fire Code

Add new text as follows:

**605.11.1.2.6 Egress openings** Panels and modules installed on Group R-3 buildings shall not be placed on the portion of a roof that is below a window or door used for egress.

**Part II**

2015 International Residential Code

Add new text as follows:

**R324.7.2.6 Egress Openings.** Panels and modules installed on dwellings shall not be placed on the portion of a roof that is below a window or door used for egress.

**Reason:** The current language does not address when egress openings are above another roof, such as the case with dormer-style windows and covered porch roofs. The installation of PV panels below these openings inhibits safe exiting by occupants and impedes firefighters from safely reaching these openings.

Since PV equipment can be installed on existing dwellings, the language uses the term egress opening to address both emergency escape and rescue openings required by this code, as well as egress requirements of older codes. Installation of these panels below egress windows could be considered an obstruction by IFC 1031.3.

**Cost Impact:** Will not increase the cost of construction

The installation of PV panels is optional and is not required by the IRC, IBC, IFC, or NFPA 70.
F88-16
Part I:
IFC: 605.11.2 (New), 605.11.2.1 (New), 605.11.2.2 (New), 605.11.2.2.1 (New), 605.11.2.2.2 (New), 605.11.2.3 (New), 605.11.2.3.1 (New), 605.11.2.3.2 (New), 605.11.2.4 (New).

Part II:
IRC: R324.7 (New), R324.7.1 (New), R324.7.2 (New), R324.7.2.1 (New), R324.7.2.2 (New), R324.7.3 (New), R324.7.3.1 (New), R324.7.3.2 (New), R324.7.4 (New).

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE FIRE CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-BUILDING CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

Proponent: Sean DeCrane, City of Cleveland Division of Fire, representing International Association of Fire Fighters (rovloc93@aol.com)

Part I
2015 International Fire Code

605.11.2 Rapid Shutdown of PV Systems on Buildings  PV system circuits installed on or in buildings shall include a rapid shutdown function to reduce shock hazard for emergency responders in accordance with Sections 605.11.2.1 through 605.11.2.4

   Exception: Ground mounted PV system circuits that enter buildings, of which the sole purpose is to house PV system equipment.

   -

605.11.2.3.1 Multiple PV systems. Where multiple PV systems are installed with rapid shutdown functions on a single electric service, the initiation device(s) shall consist of not more than six switches or six sets of circuit breakers, or a combination of not more than six switches and sets of circuit breakers, mounted in a single enclosure, or in a group of separate enclosures. The initiation device(s) shall initiate the rapid shutdown of all PV systems with rapid shutdown functions on that electric service. Where auxiliary initiation devices are installed, the auxiliary devices shall control all PV systems with rapid shutdown functions on that electric service.

605.11.2.3.2 Group R-3 and R-4 installations. For Group R-3 and R-4 buildings, an initiation device(s) shall be located at a readily accessible location outside the building.

605.11.2.4 Equipment. Equipment that performs the rapid shutdown functions shall be listed and labeled for providing rapid shutdown protection.

   Exception: Listed initiation devices such as disconnect switches, circuit breakers, or control switches.

605.11.2.3 Initiation device. The initiation device(s) shall initiate the rapid shutdown function of the PV system. The device "off" position shall indicate that the rapid shutdown function has been initiated for all PV systems connected to that device. The rapid shutdown initiation device(s) shall
consist of at least one of the following:

1. Service disconnecting means.
2. PV system disconnecting means.
3. A readily-accessible switch that clearly indicates whether it is in the "off" or "on" position.

605.11.2.2 Inside the array boundary. The PV system components within the array boundary shall comply with one of the following:

1. The PV array shall be listed and labeled as a rapid shutdown PV array and shall be installed and operated in accordance with the manufacturer's instructions and the listing.
2. Controlled conductors located inside the array boundary or not more than 3 ft. (1 m) from the point of penetration of the surface of the building shall be limited to not more than 80 volts within 30 seconds of rapid shutdown initiation. Voltage shall be measured between any two conductors and between any conductor and ground.
3. PV arrays shall be installed with no exposed wiring methods, no exposed conductive parts, and more than 8 ft. (2.5 m) from exposed grounded conductive parts or ground.

605.11.2.1 Controlled conductors. Requirements for controlled conductors shall apply to PV circuits supplied to the PV system.

605.11.2.2 Controlled limits. The array boundary shall include all array components within 1 ft. (305 mm) of the array in all directions. Controlled conductors outside the array boundary shall comply with Section 605.11.2.2.1 and inside the array boundary shall comply with Section 605.11.2.2.

605.11.2.2.1 Outside the array boundary. Controlled conductors located outside the array boundary or greater than 3 ft. (1 m) from the point of entry inside a building shall be limited to not more than 30 volts within 30 seconds of rapid shutdown initiation. Voltage shall be measured between any two conductors and between any conductor and ground.

Part II

2015 International Residential Code

R324.7 Rapid shutdown of PV systems on buildings. PV system circuits installed on or in buildings shall include a rapid shutdown function to reduce shock hazard for emergency responders in accordance with Sections R324.7.1 through R324.7.4.

Exception: Ground mounted PV system circuits that enter buildings, of which the sole purpose is to house PV system equipment.
**R324.7.1 Controlled conductors.** Requirements for controlled conductors shall apply to PV circuits supplied to the PV system.

**R324.7.2 Controlled limits.** The array boundary, shall include all array components within 1 ft. (305 mm) of the array in all directions. Controlled conductors outside the array boundary shall comply with Section R324.7.2.1 and inside the array boundary shall comply with Section R324.7.2.2.

**R324.7.2.2 Inside the array boundary.** The PV system components within the array boundary shall comply with one of the following:

1. The PV array shall be listed and labeled as a rapid shutdown PV array and shall be installed and operated in accordance with the manufacturer's instructions and the listing.
2. Controlled conductors located inside the array boundary or not more than 3 ft. (1 m) from the point of penetration of the surface of the building shall be limited to not more than 80 volts within 30 seconds of rapid shutdown initiation. Voltage shall be measured between any two conductors and between any conductor and ground.
3. PV arrays shall be installed with no exposed wiring methods, no exposed conductive parts, and more than 8 ft. (2.5 m) from exposed grounded conductive parts or ground.

**R324.7.2.1 Outside the array boundary.** Controlled conductors located outside the array boundary or greater than 3 ft. (1 m) from the point of entry inside a building shall be limited to not more than 30 volts within 30 seconds of rapid shutdown initiation. Voltage shall be measured between any two conductors and between any conductor and ground.

**R324.7.3 Initiation device.** The initiation device(s) shall initiate the rapid shutdown function of the PV system. The device "off" position shall indicate that the rapid shutdown function has been initiated for all PV systems connected to that device. The rapid shutdown initiation device(s) shall consist of at least one of the following:

1. Service disconnecting means.
2. PV system disconnecting means.
3. A readily-accessible switch that clearly indicates whether it is in the "off" or "on" position.

**R324.7.3.1 Multiple PV systems.** Where multiple PV systems are installed with rapid shutdown functions on a single electric service, the initiation device(s) shall consist of not more than six switches or six sets of circuit breakers, or a combination of not more than six switches and sets of circuit breakers, mounted in a single enclosure, or in a group of separate enclosures. The initiation device(s) shall initiate the rapid shutdown of all PV systems with rapid shutdown functions on that electric service. Where auxiliary initiation devices are installed, the auxiliary devices shall control all PV systems with rapid shutdown functions on that electric service.

**R324.7.3.2 Location.** An initiation device(s) shall be located at a readily accessible location outside the building.

**R324.7.4 Equipment.** Equipment that performs the rapid shutdown functions shall be listed and labeled for providing rapid shutdown protection.

**Exception:** Listed initiation devices such as disconnect switches, circuit breakers, or control
This submission reflects the concerns of the fire service when exposed to energized Solar PV circuits on rooftops with no method to safely de-energize these systems. The minimal area remaining to perform vertical ventilation requires personnel to operate within close distances to systems that are operating at up to 1000Vdc. The need to limit areas of hazardous voltage within the array after initiation of Rapid Shutdown has been identified by both the fire service and insurance industry as a key gap and concern. Similar language is being considered for inclusion to the NFPA 70 standard, but has not passed ballot as of this submission deadline.

This results in increased level of danger to first responders when the structure has been damaged.

Historically this has been accepted since there was no practical way to isolate a PV module from the PV source circuit that would operate remotely and on all PV modules in an array simultaneously. Module level control systems were not developed to the point where products were readily available on the market to provide this functionality. Today this is no longer true, many reliable products are available that can be either incorporated into a PV module or added to a PV module in the field to provide PV module isolation by remote control. The product availability concerns from the past are no longer relevant today, and market data estimates that up to 10 million units capable of module level isolation are now in service.

Under normal fault response conditions, the inverter is taken off-line due to the first fault. A risk of re-ignition remains with string and central inverters due to the discontinuation of fault detection, interruption, and annunciation when inverters are off-line due to a fault, or maintenance. Module level electronics provide for continued array monitoring in the event one fault occurs within the system due to the series nature of the devices monitoring each module.

There is no longer any reasonable reason to accept the additional hazard that having energized conductors represents in a structure mounted PV array. Reducing the voltage only in conductors outside the array, leaves very large areas of a structure with hazardous voltages, and should be considered "off-limits" to firefighters. Additionally this leaves no options for first or second responders to safely de-energize in the event of an emergency.

Cost Impact: Will increase the cost of construction
The cost of the shutdown may or may not increase the cost of construction depending on the selected system and/or the distance to the array.
Part I:
IFC: 605.11.3 (New), 605.11.3.1 (New), 605.11.3.1(1) (New), 605.11.3.1(2) (New), 605.11.3.1.1 (New), 605.11.3.1.2 (New), 605.11.3.2 (New), 605.11.3.3 (New).

Part II:
IRC: R324.4 (New), R324.4.1 (New), R324.4.1(1) (New), R324.4.1(2) (New), R324.4.1.1 (New), R324.4.1.2 (New), R324.4.2 (New), R324.4.3 (New).

This is a 2 part code change. Part I will be heard by the Fire Code Committee. Part II will be heard by the IRC-Building Code Committee. See the tentative hearing order for these Committees.

Proponent: William Brooks, Brooks Engineering, representing Photovoltaic Industry Code Council (billbrooks7@sbcglobal.net)

Part I

2015 International Fire Code

Add new text as follows:

**605.11.3 Buildings with Rapid Shutdown** Buildings with solar PV systems, shall have permanent labels in accordance with Sections 605.11.3.1 through 605.11.3.3.

**605.11.3.2 Buildings with more than one rapid shutdown type.** For buildings that have PV systems with both rapid shutdown types or a PV system with 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 different PV system and a dotted line around areas that remain energized after the rapid shutdown switch is operated.

**605.11.3.3 Rapid shutdown switch.** A rapid shutdown switch shall have a label located not greater than 1 meter (3 ft) from the switch that states the following: RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM

**605.11.3.1 Rapid shutdown type.** The type of PV system rapid shutdown shall be labeled with one of the following:

1. For PV systems that shutdown the array and conductors leaving the array a label shall be provided. The first two lines of the label shall be capitalized characters with a minimum height of 9.5 mm (3/8 in.) in black on yellow background and the remaining characters shall be capitalized with a minimum height of 4.8 mm (3/16 in.) in black on white background. The label shall be in accordance with Figure 605.11.3.1(1) and state the following:

   SOLAR PV SYSTEM IS EQUIPPED WITH RAPID SHUTDOWN
   TURN RAPID SHUTDOWN SWITCH TO THE "OFF" POSITION
   TO SHUTDOWN PV SYSTEM AND REDUCE SHOCK HAZARD IN ARRAY.

2. For PV systems that only shutdown conductors leaving the array a label shall be provided. The first two lines of the label shall be capitalized characters with a minimum height of 9.5 mm (3/8 in.) in white on red background and the remaining characters shall be capitalized with a minimum height of 4.8 mm (3/16 in.) in black on white background. The label shall be in accordance with Figure 605.11.3.1(2) and state the following:

   SOLAR PV SYSTEM IS EQUIPPED WITH RAPID SHUTDOWN
TURN RAPID SHUTDOWN SWITCH TO THE "OFF" POSITION
TO SHUTDOWN CONDUCTORS OUTSIDE THE ARRAY. CONDUCTORS IN ARRAY
REMAIN ENERGIZED IN SUNLIGHT.

605.11.3.1.2 Location. The rapid shutdown label in 605.11.3.1 shall be located not greater than
1 meter (3 ft) from the service disconnecting means to which the PV systems are connected, and
shall indicate the location of all identified rapid shutdown switches if not at the same location.

605.11.3.1.1 Diagram. The labels in 605.11.3.1 shall include a simple diagram of a building with
a roof. Diagram sections in red signify sections of the PV system that are not shutdown when the
rapid shutdown switch is turned off.

FIGURE 605.11.3.1(2)
LABEL FOR PV SYSTEMS THAT ONLY SHUTDOWN CONDUCTORS LEAVING THE ARRAY

FIGURE 605.11.3.1(1)
LABEL FOR PV SYSTEMS THAT REDUCE SHOCK HAZARD WITHIN ARRAY AND SHUTDOWN
CONDUCTORS LEAVING ARRAY
Part II
2015 International Residential Code

Add new text as follows:

R324.4 Buildings with Rapid Shutdown. Buildings with solar PV systems shall have permanent labels in accordance with Sections R324.4.1 through R324.4.3.3

R324.4.1 Rapid shutdown type. The type of PV system rapid shutdown shall be labeled with one of the following:

1. For PV systems that shutdown the array and conductors leaving the array a label shall be provided. The first two lines of the label shall be capitalized characters with a minimum height of 9.5 mm (3/8 in.) in black on yellow background and the remaining characters shall be capitalized with a minimum height of 4.8 mm (3/16 in.) in black on white background. The label shall be in accordance with Figure 605.11.3.1(1) and state the following:

   SOLAR PV SYSTEM IS EQUIPPED WITH RAPID SHUTDOWN
   TURN RAPID SHUTDOWN SWITCH TO THE "OFF" POSITION TO SHUTDOWN PV SYSTEM AND REDUCE SHOCK HAZARD IN ARRAY.

2. For PV systems that only shutdown conductors leaving the array a label shall be provided. The first two lines of the label shall be capitalized characters with a minimum height of 9.5 mm (3/8 in.) in white on red background and the remaining characters shall be capitalized with a minimum height of 4.8 mm (3/16 in.) in black on white background. The label shall be in accordance with Figure 605.11.3.1(2) and state the following:

   SOLAR PV SYSTEM IS EQUIPPED WITH RAPID SHUTDOWN
TURN RAPID SHUTDOWN SWITCH TO THE "OFF" POSITION TO SHUTDOWN CONDUCTORS OUTSIDE THE ARRAY. CONDUCTORS IN ARRAY REMAIN ENERGIZED IN SUNLIGHT.

R324.4.1.1 Diagram. The labels in R324.4.1 shall include a simple diagram of a building with a roof. Diagram sections in red signify sections of the PV system that are not shutdown when the rapid shutdown switch is turned off.

R324.4.1.2 Location. The rapid shutdown label in R324.4.1 shall be located not more than 1 meter (3 ft) from the service disconnecting means to which the PV systems are connected, and shall indicate the location of all identified rapid shutdown switches if not at the same location.

R324.4.2 Buildings with more than one rapid shutdown type. For buildings that have PV systems with both rapid shutdown types or a PV system with 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 different PV system and a dotted line around areas that remain energized after the rapid shutdown switch is operated.

R324.4.3 Rapid shutdown switch. A rapid shutdown switch shall have a label located not more than 1 meter (3 ft) from the switch that states the following: RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM

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**FIGURE R324.4.1(1)**

LABEL FOR PV SYSTEMS THAT REDUCE SHOCK HAZARD WITHIN ARRAY AND SHUTDOWN CONDUCTORS LEAVING ARRAY

---

**FIGURE R324.4.1(2)**

SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN

TURN RAPID SHUTDOWN SWITCH TO THE "OFF" POSITION TO SHUTDOWN PV SYSTEM AND REDUCE SHOCK HAZARD IN ARRAY
**Reason:** These new marking requirements for Rapid Shutdown PV systems were initially developed by the NFPA Fire Fighter Safety and PV Systems Task Group that was reorganized in December of 2014. This collaborative Task Group is working on proposals for NFPA1, NFPA70, and other related documents. This Task Group is made up of over 20 participants from Code Making Panel 4 of the NFPA70, the solar industry, the fire service, the insurance industry, test laboratories, and other relevant stakeholders.

The Rapid Shutdown marking requirements proposed in this second revision input includes the language for these signs and greyscale figures of the color signs to print in the Code. Actual examples of these signs will exist in the handbook of the 2017 NEC Handbook for section 690.56(C) and the Annex of NFPA1, 2018 edition. The signs are provided in the attachment so that reviewers can visualize what the signs are intended to look like.

Two different signs are required on buildings depending on what type of rapid shutdown system is on the building. Systems with multiple rapid shutdown types will be required to have a detailed directory since a simple sign will not be sufficient to clarify the levels of hazard on the roof.

Lastly, all switches that are intended to be used as rapid shutdown switches shall be labeled with the words, "RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM."

**Cost Impact:** Will increase the cost of construction

The manufacturing of signs and applying those signs at the appropriate locations does add a small cost to a solar PV system. This cost is appropriate given value of helping emergency responders understand the level of hazard they will encounter with a PV system.
Add new text as follows:

**[M] 606.1 Scope.** Refrigeration systems shall be installed in accordance with the *International Mechanical Code*.

### 606.1.1 Refrigerants other than ammonia
Where a refrigerant other than ammonia is used, refrigeration systems and the buildings in which such systems are installed shall be in accordance with ASHRAE 15.

### 606.1.2 Ammonia refrigerant
Refrigeration systems using ammonia refrigerant and the buildings in which such systems are installed shall comply with IIAR-2 for system design and installation and IIAR-7 for operating procedures.

Delete without substitution:

#### 606.12.1 Standards.
Refrigeration systems and the buildings in which such systems are installed shall be in accordance with ASHRAE 15.

#### 606.12.1.1 Ammonia refrigeration.
Refrigeration systems using ammonia refrigerant and the buildings in which such systems are installed shall comply with IIAR 2 for system design and installation and IIAR-7 for operating procedures.

**Reason:** This proposal clarifies that IIAR 2 is the primary design and safety standard for ammonia refrigeration systems, along with IIAR 7 for ammonia system operating procedures, by putting the references to these standards at the same text level as the reference to ASHRAE 15 versus in a subsection.

IIAR 2-2014 is a comprehensive, ANSI-accredited standard that is designed to regulate ammonia refrigeration systems without reliance on ASHRAE 15. Preparation of IIAR 2-2014 included a gap analysis to ensure that content from ASHRAE 15 associated with ammonia systems was incorporated into the IIAR 2-2014 rewrite, which was conducted over a multi-year period, dealt with over 2,000 proposals and comments, and involved a broad spectrum of stakeholders.

**Cost Impact:** Will increase the cost of construction
Some requirements in IIAR 2 exceed those currently applicable to ammonia refrigeration systems under ASHRAE 15. Nevertheless, as the recognized industry standard, IIAR 2 would generally be considered applicable whether or not the IFC adds this reference. However, the cost of design will be reduced by eliminating the suggestion that designers of ammonia systems must review both IIAR 2 and ASHRAE 15 to develop a design basis for an ammonia system.
2015 International Fire Code

Revise as follows:

606.8 Refrigerant detector. Machinery rooms shall contain a refrigerant detector with an audible and visual alarm. The detector, or a sampling tube that draws air to the detector, shall be located in an area where refrigerant from a leak will concentrate. The alarm shall be actuated at a value not greater than the corresponding TLV-TWA values shown in the International Mechanical Code for the refrigerant classification. Detectors and alarms shall be placed in approved locations in accordance with NFPA 72, and Sections 907.5.2 and 907.5.2.3.

Audible and visible notification devices are required inside machinery rooms and outside doors leading into the machinery rooms. The detector shall transmit a signal to an approved location in accordance with Section 907.6.6.

Reason: This new information adds to this section to make sure that the gas detectors and notification devices are installed per NFPA 72, which will ensure battery backup, minimum cd and db rating for notification devices to name a few.

Cost Impact: Will increase the cost of construction
Currently this section does not provide information or a standard on how gas detector or notification device are to be installed, by requiring these devices to be installed per NFPA 72 will increase the cost but at the same time ensure that they are installed throughout the world that same way.

F91-16 : 606.8- MCELVANEY10442
F92-16

IFC: 606.12.1.1.
Proponent: Jeffrey Shapiro, representing International Institute of Ammonia Refrigeration (jeff.shapiro@intlcodeconsultants.com)

2015 International Fire Code

Revise as follows:

606.12.1.1 Ammonia refrigeration. Refrigeration systems using ammonia refrigerant and the buildings in which such systems are installed shall comply with IIAR-2 for system design and installation and IIAR-7 for operating procedures. Decommissioning of ammonia refrigeration systems shall comply with IIAR 8.

Reference standards type: This reference standard is new to the ICC Code Books

Add new standard(s) as follows:

IIAR-8--2015 Decommissioning of Closed-circuit Ammonia Refrigeration Systems 606.12.1.1

Reason: IIAR 8 is a newly completed ANSI accredited standard governing decommissioning of ammonia refrigeration systems that should be referenced by the IFC as a basis for regulating decommissioning of a system that contains a hazardous material.

Cost Impact: Will not increase the cost of construction

This referenced standard relates to decommissioning/removal of existing equipment and therefore has no impact on the cost of construction.

Analysis: A review of the standard(s) proposed for inclusion in the code, IIAR-8--2015 Decommissioning of Closed-circuit Ammonia Refrigeration Systems with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1, 2016.
2015 International Fire Code

Add new text as follows:

606.13 Discharge location for refrigeration machinery room ventilation. Exhaust from mechanical ventilation systems serving refrigeration machinery rooms containing flammable, toxic or highly toxic refrigerants, other than ammonia, capable of exceeding 25 percent of the LFL or 50 percent of the IDLH shall be equipped with approved treatment systems to reduce the discharge concentrations to those values or lower.

Exception: Refrigeration systems containing Group A2L complying with Section 606.17.

Revise as follows:

606.16 Electrical equipment. Where refrigerants of Groups A2, A3, B2 and B3, as defined in the International Mechanical Code, are used, refrigeration machinery rooms shall conform to the Class I, Division 2 hazardous location classification requirements of NFPA 70.

Exceptions:
1. Ammonia machinery rooms that are provided with ventilation in accordance with Section 1106.3 of the International Mechanical Code.
2. Machinery rooms for systems containing Group A2L refrigerants that are provided with ventilation in accordance with Section 606.17.

Add new text as follows:

606.17 Group A2L Refrigerants Mechanical refrigeration systems using Group A2L refrigerants shall also comply with Sections 606.17.1 and 606.17.4.

606.17.1 Machinery rooms. Machinery rooms with systems containing Group A2L refrigerants shall comply with Section 606.17.2 through 606.17.3

Exception: Machinery rooms conforming to the Class 1, Division 2, hazardous location classification requirements of NFPA 70.

606.17.2 Refrigerant detection system. The machinery room shall be provided with a refrigerant detection system. The refrigerant detection system shall be in accordance with Section 606.8 and all of the following:

a. The detectors shall activate at or below a refrigerant concentration of 25% of the LFL.
b. Upon activation, the detection system shall activate the emergency ventilation system in Section 606.17.3
c. The detection, signaling and control circuits shall be supervised.

606.17.3 Emergency Ventilation System An emergency ventilation system shall be provided at the minimum exhaust rate specified in Table 606.17.3. Shut down of the emergency ventilation...
system shall be by manual means.

### TABLE 606.17.3

<table>
<thead>
<tr>
<th>Refrigerant</th>
<th>$Q(m^3/sec)$</th>
<th>$Q(cf m)$</th>
</tr>
</thead>
<tbody>
<tr>
<td>R32</td>
<td>15.4</td>
<td>32,600</td>
</tr>
<tr>
<td>R143a</td>
<td>13.6</td>
<td>28,700</td>
</tr>
<tr>
<td>R444A</td>
<td>6.46</td>
<td>13,700</td>
</tr>
<tr>
<td>R444B</td>
<td>10.6</td>
<td>22,400</td>
</tr>
<tr>
<td>R445A</td>
<td>7.83</td>
<td>16,600</td>
</tr>
<tr>
<td>R446A</td>
<td>23.9</td>
<td>50,700</td>
</tr>
<tr>
<td>R447A</td>
<td>23.8</td>
<td>50,400</td>
</tr>
<tr>
<td>R451A</td>
<td>7.04</td>
<td>15,000</td>
</tr>
<tr>
<td>R451B</td>
<td>7.05</td>
<td>15,000</td>
</tr>
<tr>
<td>R1234yf</td>
<td>7.80</td>
<td>16,600</td>
</tr>
<tr>
<td>R1234ze(E)</td>
<td>5.92</td>
<td>12,600</td>
</tr>
</tbody>
</table>

### TABLE 606.17.3

#### 606.17.4 Emergency Ventilation system discharge.

The point of discharge to the atmosphere shall be located outside of the structure at not less than 15 feet (4572 mm) above the adjoining grade level and not less than 20 feet (6096 mm) from any window, ventilation opening or exit.

**Reason:** This proposal provides necessary changes to permit a new class of refrigerants with very low flammability characteristics in refrigerant machinery rooms. This proposal leaves intact the code requirements for refrigerants elsewhere. This change simply allows Group 2L refrigerants in refrigeration machinery rooms to comply with the current code requirements for Group 1, Division 2 Electrical systems, or install detection and ventilation systems to mitigate the hazard. This is similar to the mitigation scheme for many other hazardous operations, including repair garages (2311.4.3), hazardous materials (dozens of examples), compressed gases, corrosives, etc. This is a common and accepted mitigation scheme within the IFC and other codes. Federal agencies have begun limiting the use of refrigerants that have high global warming potential (GWP) properties. Industry has responded by developing a number of replacement refrigerants. One of the characteristics of most of these products is that they are minimally flammable. Proven protection schemes are available to mitigate the reduced risk posed by these products, and are included in this code change proposal.
The codes (IMC, IFC, ASHRAE) have historically classified the flammability of refrigerants as Group 1 (nonflammable), Group 2 (moderately flammable), and Group 3 (highly flammable). Because the newly developed environmentally preferred refrigerants present a significantly lower hazard than class 2 refrigerants, a new classification was established for them. The new flammability classification is 2L. In addition to flammability, the codes classify refrigerants as either nontoxic (A) or toxic (B). The new refrigerants are primarily classified as A2L - nontoxic, mildly flammable. Table 1103.1 in the IMC recognizes 2L refrigerants as a sub-class of group 2.

The 2L refrigerants have a burning velocity of less than 10 cm/sec. The energy required for ignition is very high, and the pressure rise is much less than refrigerants with a higher flammability, resulting in a far safer product than current Group 2 refrigerants. Historically, ammonia was the only widely used refrigerant with these burning characteristics. The IFC and other codes recognize this, and have made a number of exceptions for ammonia. These exceptions are based upon the fact that its burning characteristics reduce the risk of ignition, and the risk of damage should ignition occur is greatly reduced. These risks are further reduced by code requirements for detection and ventilation. The fire history for ammonia is excellent where these mitigation measures have been in place - the mitigation measures are working to minimize the fire risks associated with the product.

This proposal provides similar mitigation measures for products with similar burning characteristics. The ventilation rates are based upon research that clearly shows that the rates will maintain a safe environment in over 90% of the leaks. This level of protection is more than adequate. Utilizing the same protection scheme for other 2L refrigerants provides the same level of safety as that for ammonia, and adheres to the philosophy of maintaining a level playing field for industry. Below are some graphs and charts showing the properties of various refrigerants under discussion:

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**Severity – Related Properties**

Flammability is evaluated by ‘Chance of Flame occurring’ and ‘Effect of Flame occurring’

- Effect of Flame occurring -> Burning Velocity, Heat of Combustion

---

**HFO-1234yf is classified in Class 2L (Low Burning Velocity)**
Likelihood of Ignition – Related Properties

Flammability is evaluated by ‘Chance of Flame occurring’ and ‘Effect of Flame occurring’
  - Chance of Flame occurring -> Lower Flame Limit, Minimum Ignition Energy

![Graph showing minimum ignition energy vs. lower flame limit for various substances.](image)

- HFO-1234yf
- Ammonia
- R-32
- Iso-Butane
- Methane
- R-152a
- Propane
- Gasoline
- Acetylene

Increasing Flammability

> 5000 times more energy to ignite!

**Difficult to ignite HFO-1234yf due to high Minimum Ignition Energy**
Specifically, the proposal includes:

606.13: adds a new exception for A2L refrigerants; the body of the paragraph already exempts ammonia from this requirement, thus it’s appropriate to exempt other 2L refrigerants, as the fire hazard is the same.

606.16: adds a new exception for A2L refrigerants; an exception already exists for ammonia and the code should treat all 2L’s similarly. The ventiliation requirements are founded in published research.

606.17 contains the mitigation criteria for hazards associated with A2L refrigerants. This section requires that 2L refrigerants used in machinery rooms to either meet Class 1, Division 2 electrical classification or be provided with early detection and ventilation to dilute the refrigerant.

606.17.2 specifies the detection criteria for machinery rooms where A2L refrigerants are used; these requirements include supervision of all circuits.

606.17.3 provides specific criteria for the ventilation requirements. These criteria, including the table, are founded in research conducted by UTC/Carrier. This is widely accepted as the best research on the subject currently available. The ventilation rates in the table are based upon the following formula:

\[ Q \geq \frac{m}{LFL - S} \quad (G-1) \]

\[ m = c_d \cdot \rho \cdot v \cdot A \quad (G-2) \]

Where variables are defined as:
- \( c_d \) - coefficient of discharge
- \( \rho \) - lb/ft^2 (\( c_d = 1.00 \))
- \( \rho \) - kg/m^3
- \( v \) - ft/s (referred to a choked vapor flow conditions, equal to the refrigerant, 0.2)
- \( \nu \) - m/s (acoustic velocity (speed of sound) per 0.2)
- \( A \) - ft^2 (cross-sectional flow area of refrigerant leak assuming 0.50 in [12.7 mm] circular opening)
- \( 12.7 \) - ft (1.001364 ft^2 = 0.001267 m^2)
- \( m \) - lb/s (refrigerant leak mass flow rate)
- \( S \) - kg/s

\( LFL \) - lb/ft^2 (Lower Flammability Limit, or BTFL if no LFL exists, published value
- \( S \) - [g/m^2] per ASHRAE Standard 34^1
- \( S \) - [-]
- \( Q \) - ft^3/s
- \( [m^3/s] \)

required air flow rate, conversion to other units of measure is permitted
**Cost Impact:** Will not increase the cost of construction

Currently, Group 2L refrigerants are treated as Group 2 refrigerants; this proposal provides an additional option for mitigating the risks associated with these products, but does not prohibit the designer or owner from following current code requirements. Because this is optional, it will not increase the cost of construction.
**F94-16**

**IFC: 606.17 (New).**

*Proponent:* Julius Ballanco, JB Engineering and Code Consulting, P.C., representing Daikin US (JBENGINEER@aol.com)

**2015 International Fire Code**

Add new text as follows:

**606.17 Group A2L Refrigerants.** Mechanical refrigeration systems using Group A2L refrigerants shall meet the requirements for Group A2 refrigerants except where used in high probability systems for comfort cooling.

**Reason:** ASHRAE 34 created a subclass identified as A2L to recognize refrigerants that have a lower burning velocity measurement. These refrigerants are considered safer than refrigerants that have a flammability classification of A2. The A2L optional subclass is assigned to a refrigerant when the burning velocity is less than, or equal to, 3.9 inches per second or 10 cm per second when tested at 73.4°F. The current Mechanical Code limits the use of A2 refrigerants to 6.6 pounds for comfort cooling purposes. However, the Mechanical Code does not distinguish between A2 and A2L refrigerants.

This proposed change will allow the use of A2L refrigerants for comfort cooling in high probability systems, which are direct systems. These are the common systems used in residential and commercial applications. A2L refrigerants are currently being used for comfort cooling in many other countries, including Australia, New Zealand, Japan, and Indonesia, to name a few.

While the limitation in use was originally written for A2 and other refrigerants, it is inappropriate for A2L refrigerants. The subclass A2L is a much safer refrigerant than A2 refrigerants. The fire potential is significantly reduced. As such, A2L refrigerants should be permitted for high-probability systems used for human comfort.

In addition to a low burning velocity, A2L refrigerants used in residential systems typically use a quantity of refrigerant that never approaches the lower flammability limit. If the concentration of refrigerant stays below the lower flammability limit, there is no fire hazard at all associated with the refrigerant.

**Cost Impact:** Will not increase the cost of construction

The use of Group A2L refrigerants does not increase the cost of construction. A2L refrigerants are still an option for designers and installers to use.
2015 International Fire Code

Add new text as follows:

**105.6.44 Stationary storage battery systems.** A permit is required for the operation of a stationary storage battery system regulated by Section 608.

*Revise as follows:*

**SECTION 202 DEFINITIONS**

**BATTERY TYPES.**

**Lithium-ion Flow battery.** A type of storage battery that consists which includes chemical components dissolved in two different liquids. Ion exchange, which provides the flow of lithium ions embedded electrical current, occurs through the membrane while both liquids circulate in a carbon-graphite or nickel-metal-oxide substrate. Their own respective space. The electrolyte is a carbonate mixture or a gelled polymer. The lithium ions are the charge carriers of the battery.

**Lithium metal polymer Lead acid battery.** A storage battery that is comprised of nonaqueous lead electrodes immersed in sulphuric acid electrolyte.

**Lithium-ion battery.** A storage battery with lithium ions serving as the charge carriers of the battery. The electrolyte is a polymer mixture of carbonates with an inorganic salt and can be in a liquid or a gelled polymer from. Lithiated metal oxide is typically a cathode and forms of carbon or polymerized electrolytes, which provide ionic conductivity between lithiated positive active material electrically separated from metallic graphite typically form the anode.

**Lithium metal polymer battery.** A storage battery that is similar to the lithium ion battery except that it has a lithium metal anode in the place of the traditional carbon or lithiated negative active material graphite anode.

**Nickel cadmium (Ni-Cd) battery.** An alkaline storage battery in which the positive active material is nickel oxide, the negative contains cadmium and the electrolyte is potassium...
hydroxide.

**Nonrecombinant battery.**

**Pre-engineered stationary storage battery system.** An energy storage system consisting of batteries, a battery management system, components and modules that are produced in a factory, designed to comprise the system when assembled and shipped to the job site for assembly.

**Prepackaged stationary storage battery system.** An energy storage system consisting of batteries, a battery management system, components and modules that is factory assembled and shipped as a complete unit for installation at the job site.

**Sodium-beta storage battery.** A storage battery in also referred to as Na-b beta batteries or NBBs which, under conditions of normal use, hydrogen uses a solid beta-alumina electrolyte membrane that selectively allows sodium ion transport between a positive electrode such as metal halide and oxygen gases created by electrolysis are vented into the air outside of the battery a negative sodium electrode.

**Recombinant battery.** A stationary storage battery in which, under conditions of normal use, hydrogen and oxygen gases created by electrolysis are converted back into water inside the battery instead of venting into the air outside of the battery.

**Stationary storage battery.** A group of electrochemical cells interconnected to supply a nominal voltage of DC power to a suitably connected electrical load, designed for service in a permanent location. The number of cells connected in a series determines the nominal voltage rating of the battery. The size of the cells determines the discharge capacity of the entire battery. After discharge, it may be restored to a fully charged condition by an electric current flowing in a direction opposite to the flow of current when the battery is discharged.

**Valve-regulated lead-acid (VRLA) battery.** A lead-acid battery consisting of sealed cells furnished with a valve that opens to vent the battery whenever the internal pressure of the battery exceeds the ambient pressure by a set amount. In VRLA batteries, the liquid electrolyte in the cells is immobilized in an absorptive glass mat (AGM cells or batteries) or by the addition of a gelling agent (gel cells or gelled batteries).

**Vented (flooded) lead-acid battery.** A lead-acid battery consisting of cells that have electrodes immersed in liquid electrolyte. Flooded lead-acid batteries have a provision for the user to add water to the cell and are equipped with a flame arresting vent which permits the escape of hydrogen and oxygen gas from the cell in a diffused manner such that a spark, or other ignition source, outside the cell will not ignite the gases inside the cell.

Delete without substitution:

**202 -BATTERY SYSTEM, STATIONARY LEAD ACID.** A system which consists of three interconnected subsystems:

1. A lead-acid battery.
2. A battery charger.
3. A collection of rectifiers, inverters, converters and associated electrical equipment as required for a particular application.

Add new definition as follows:

**BATTERY SYSTEM, STATIONARY STORAGE.** A rechargeable energy storage system consisting of electrochemical storage batteries, battery chargers, controls, and associated electrical equipment designed to provide electrical power to a building. The system is typically
used to provide standby or emergency power, an uninterruptable power supply, load shedding, load sharing or similar capabilities.

**ENERGY MANAGEMENT SYSTEM.** An electronic system protects stationary storage batteries from operating outside its safe operating parameters, and generates alarm and trouble for off normal conditions.

- **STATIONARY BATTERY ARRAY** – An arrangement of individual stationary storage batteries in close proximity to each other, mounted on storage racks or in modules, battery cabinets or other enclosures.

Revise as follows:

[A] 105.7.2 Battery systems. A construction permit is required to install stationary storage battery systems having a liquid capacity of more than 50 gallons (189 L) regulated by Section 608.

602.1 Definitions. The following terms are defined in Chapter 2:

- BATTERY SYSTEM, STATIONARY LEAD-ACID STORAGE.
- BATTERY TYPES.
- COMMERCIAL COOKING APPLIANCES.
- CRITICAL CIRCUIT.
- EMERGENCY POWER SYSTEM.
- HOOD.
- Type I.
- Type II.
- REFRIGERANT.
- REFRIGERATION SYSTEM.
- STANDBY POWER SYSTEM.

**SECTION 608 STATIONARY STORAGE BATTERY SYSTEMS**

Note: The existing Sectin 608.1 through 608.9 are to be deleted.

Delete and substitute as follows:

608.1 Scope. Stationary storage battery systems having an electrolyte capacity of more than 50 gallons (189 L) for flooded lead-acid, nickel cadmium (Ni-Cd) and valve-regulated lead-acid (VRLA), or more than 1,000 pounds (454 kg) for lithium ion and lithium metal polymer, used for facility standby power, emergency power or uninterruptible power supplies shall comply with this section and Table 608.1.

Stationary storage battery systems having capacities exceeding the values shown in Table 608.1 shall comply with Section 608.1.2 through 608.6.6, as applicable.

<table>
<thead>
<tr>
<th>TABLE 608.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>BATTERY STORAGE SYSTEM THRESHOLD QUANTITIES.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>BATTERY TECHNOLOGY</th>
<th>CAPACITY¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead acid, all types</td>
<td>70 KWh (252 Megajoules)</td>
</tr>
</tbody>
</table>

¹KWh (kilowatt-hour)
Nickel cadmium (Ni-Cd) | 70 KWh (252 Megajoules)  
---|---
Lithium, all types | 20 KWh (72 Megajoules)  
Sodium, all types | 20 KWh (72 Megajoules)  
Flow batteries | 20 KWh (72 Megajoules)  
Other battery technologies | 10 KWh (36 Megajoules)  

a. For batteries rated in Amp-Hours, KWh shall equal rated voltage times amp-hour rating divided by 1000  
b. Shall include vanadium, zinc-bromine, polysulfide-bromide, and other flowing electrolyte type technologies  
c. 70 KWh (252 Megajoules) for sodium-ion technologies

608.1.1 Permits. Permits shall be obtained for the installation and operation of stationary storage battery systems in accordance with Sections 105.6.44 and 105.7.2.

608.1.2 Construction documents. The following information shall be provided with the permit application:

1. Location and layout diagram of the room in which the stationary storage battery system is to be installed
2. Details on hourly fire-resistant rated assemblies provided
3. Quantities and types of storage batteries and battery systems.
4. Manufacturer's specifications, ratings and listings of storage batteries and battery systems
5. Details on energy management systems
6. Location and content of signage
7. Details on fire suppression, smoke detection and ventilation systems.
8. Rack storage arrangement, including seismic support criteria.

608.1.3 Hazard mitigation analysis. A failure modes and effects analysis (FMEA) or other approved hazard mitigation analysis shall be provided in accordance with Section 104.7.2 under any of the following conditions:

1. Battery technologies not specifically identified in Table 608.1 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. See 608.3.

608.1.3.1 Fault condition. The hazard mitigation analysis shall evaluate the consequences of the following failure modes, and others deemed necessary by the fire code official. Only single failure modes shall be considered.
1. Thermal runaway condition in a single battery storage rack, module or array.
2. Failure of any energy management system.
3. Failure of any 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.
7. Spill neutralization not being provided or failure of the secondary containment system.

608.1.3.2 Analysis approval. The fire code official is authorized to approve the hazardous mitigation analysis provided the consequences of the hazard mitigation analysis demonstrate:

1. Fires or explosions will be contained within unoccupied battery storage rooms for the minimum duration of the fire resistance rated walls identified in IBC table 509.1.
2. Fires and explosions in battery cabinets in occupied work centers will be detected in time to allow occupants within the room to safely evacuate.
3. Toxic and highly toxic gases released during fires and other fault conditions shall not reach concentrations in access of IDLH level in the building or adjacent means of egress routes during the time deemed necessary to evacuate from that area.
4. Flammable gases released from batteries during charging, discharging and normal operation shall not exceed 25% of their lower flammability limit (LFL).
5. Flammable gases released from batteries during fire, overcharging and other abnormal conditions shall not create an explosion hazard that will injure occupants or emergency responders.

608.1.3.3 Additional protection measures. Construction, equipment and systems that are required for the stationary storage battery system to comply with the hazardous mitigation analysis, including but not limited to those specifically described in Section 608.1, shall be installed, maintained and tested in accordance with nationally recognized standards and specified design parameters.

608.1.4 Seismic and structural design. Stationary storage battery systems shall comply with the seismic design requirements in Chapter 16 of the International Building Code, and shall not exceed the floor loading limitation of the building.

608.1.5 Vehicle impact protection. Where stationary storage battery systems are subject to impact by a motor vehicle, including fork lifts, vehicle impact protection shall be provided in accordance with Section 312.

608.1.6 Combustible storage. Combustible materials not related to the stationary storage battery system shall not be stored in battery rooms, cabinets or enclosures. Combustible materials in occupied work centers covered by Section 608.2.5 shall not be stored less than 3 feet (915 mm) from battery cabinets.

608.1.6 Combustible storage. Combustible materials not related to the stationary storage battery system shall not be stored in battery rooms, cabinets or enclosures. Combustible materials in occupied work centers covered by Section 608.2.5 shall not be stored less than 3 feet (915 mm) from battery cabinets.

608.1.7 Testing, maintenance and repairs. Storage batteries and associated equipment and systems shall be tested and maintained in accordance with the manufacturer's instructions. Any
storage batteries or system components used to replace existing units shall be compatible with the battery charger, energy management systems, other storage batteries, and other safety systems. Introducing other types of storage batteries into the stationary storage battery system, or other types of electrolytes into flow battery systems shall be treated as a new installation and require approval by the fire code official before the replacements are introduced into service.

608.2 Location and construction. Rooms and areas containing stationary storage battery systems shall be designed, located and constructed in accordance with this section.

608.2.1 Location. Stationary storage battery systems shall not be located in areas where the floor is located more than 75 feet (22 860 mm) above the lowest level of fire department vehicle access, or where the floor level is more than 30 feet (9144 mm) below the finished floor of the lowest level of exit discharge.

Exception: Installations on noncombustible rooftops of buildings exceeding 75 feet (22 860 mm) in height that do not obstruct fire department rooftop operations shall be permitted where approved by the fire code official.

608.2.2 Separation. Rooms containing stationary storage battery systems shall be separated from other areas of the building in accordance with Section 509.1 of the International Building Code. Battery systems shall be allowed to be in the same room with the equipment they support.

608.2.3 Stationary battery arrays. Storage batteries, prepackaged stationary storage battery systems and pre-engineered stationary storage battery systems shall be segregated into stationary battery arrays not exceeding 50 KWh (180 Mega joules) each. Each stationary battery array shall be spaced a minimum three feet (914 mm) from other stationary battery arrays and from walls in the storage room or area. The storage arrangements shall comply with Chapter 10.

Exceptions:

1. Lead acid storage battery arrays shall not exceed 250 KWh (900 Mega joules) each.
2. Listed pre-engineered stationary storage battery systems and prepackaged stationary storage battery systems shall not exceed 150 KWh (540 Mega joules) each.

608.2.4 Separate rooms. Where stationary batteries are installed in a separate equipment room accessible only to authorized personnel, they shall be permitted to be installed on an open rack for ease of maintenance.

608.2.5 Occupied work centers. Where stationary storage batteries are located in an occupied work center, they shall be housed in a noncombustible cabinet or other enclosure to prevent access by unauthorized personnel.

608.2.5.1 Cabinets. Where stationary batteries are contained in cabinets in occupied work centers, the cabinet enclosures shall be located within 10 feet (3048 mm) of the equipment that they support.

608.2.6 Signage. Approved signs shall be provided on doors or in locations near entrances to stationary storage battery system rooms and shall include the following or equivalent.

1. A minimum 8 in. (200 mm) wide and 6 in. (150 mm) high sign with: CAUTION, WARNING or DANGER
1.1. BATTERY ROOM, 
1.2. AUTHORIZED PERSONNEL ONLY, and 
1.3. The additional markings required in Section 608.6 for the types of storage 
batteries contained within the room.

**Exception:** AUTHORIZED PERSONNEL ONLY markings are not required for entrances to 
occupied work centers complying with Section 608.2.5.

1. Hazard identification markings in accordance with NFPA 704.

608.2.6.1 Electrical disconnects. Where the stationary storage battery system disconnecting 
means is not within sight of the main service disconnecting means, placards or directories shall 
be installed at the location of the main service disconnecting means indicating the location of 
stationary storage battery system disconnecting means in accordance with NFPA 70.

608.2.6.2 Cabinet signage. Battery storage cabinets provided in occupied work centers in 
accordance with Section 608.2.5 shall have exterior labels that indicate CAUTION, BATTERY 
STORAGE CABINET, AUTHORIZED PERSONNEL ONLY, and the additional markings required 
in Section 608.6 for the types of storage batteries contained within the cabinet.

608.2.7 Outdoor installations. Stationary storage battery systems located outdoors shall 
comply with this Section, in addition to all applicable requirements of Section 608. Installations in 
outdoor enclosures or containers which can be occupied for servicing, testing, maintenance and 
other functions shall be treated as battery storage rooms.

**Exception:** Stationary battery arrays in noncombustible containers shall not be required to be 
spaced three feet (914 mm) from the container walls.

608.2.7.1 Separation. Stationary storage battery systems located outdoors shall be separated 
by a minimum five feet (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 

608.2.7.2 Means of egress. Stationary storage battery systems located outdoors shall be 
separated from any means of egress as required by the fire code official to ensure safe egress 
under fire conditions, but in no case less than 10 feet (3048 mm).

608.2.7.3 Security of outdoor areas. Outdoor areas in which stationary storage battery 
systems are located shall be secured against unauthorized entry and safeguarded in an approved 
manner.

608.2.7.4 Walk-in units Where a stationary storage battery system includes an outer
enclosure, the unit shall only be entered for inspection, maintenance and repair of batteries and electronics, and shall not be occupied for other purposes.

608.3 Maximum allowable quantities. Fire areas within buildings containing stationary storage batteries systems exceeding the maximum allowable quantities in Table 608.3 shall comply with all applicable High Hazard Group H occupancy requirements in this code and the International Building Code.

**Exception:** Where approved by the fire code official, areas containing stationary storage batteries that exceed the amounts in Table 608.3 shall be permitted to be treated as incidental use areas and not Group H occupancies based on a hazardous mitigation analysis in accordance with 608.1.3 and large scale fire and fault condition testing conducted or witnessed and reported by an approved testing laboratory.

**TABLE 608.3**
MAXIMUM ALLOWABLE BATTERY QUANTITIES

<table>
<thead>
<tr>
<th>BATTERY TECHNOLOGY</th>
<th>MAXIMUM ALLOWABLE QUANTITIES</th>
<th>GROUP H OCCUPANCY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead acid, all types</td>
<td>600 KWh</td>
<td>Group H-4</td>
</tr>
<tr>
<td>Nickel cadmium (Ni-Cd)</td>
<td>600 KWh</td>
<td>Group H-4</td>
</tr>
<tr>
<td>Lithium, all types</td>
<td>600 KWh</td>
<td>Group H-2</td>
</tr>
<tr>
<td>Sodium, all types</td>
<td>600 KWh</td>
<td>Group H-2</td>
</tr>
<tr>
<td>Flow batteries b</td>
<td>600 KWh</td>
<td>Group H-2</td>
</tr>
<tr>
<td>Other battery technologies</td>
<td>200 KWh</td>
<td>Group H-2 c</td>
</tr>
</tbody>
</table>

a. For batteries rated in Amp-Hours, Watt-hours (Wh) shall equal rated battery voltage times the Amp-hour rating divided by 1000

b. Shall include vanadium, zinc-bromine, polysulfide-bromide, and other flowing electrolyte technologies

c. Shall be a Group H-4 occupancy if the fire code official determines that a fire or thermal runaway involving the battery technology does not represent a significant fire hazard

608.3.1 Mixed battery systems. Where areas within buildings contain different types of storage battery technologies, the total aggregate quantities of batteries shall be determined based on the sum of percentages of each battery type quantity divided by the maximum allowable quantity of each battery type. If the sum of the percentages exceeds 100%, the area shall be treated as a high-hazard Group H occupancy in accordance with Table 608.3.

608.4 Storage batteries and equipment. The design and installation of storage batteries and related equipment shall comply with these sections 608.4.1 through 608.4.8.

608.4.1 Listings. Storage batteries and battery storage systems shall comply with all of the
1. Storage batteries shall be listed in accordance with UL 1973.
2. Prepackaged and pre-engineered stationary storage battery systems shall be listed in accordance with UL 9540.

Exception: Lead-acid batteries are not required to be listed.

608.4.2 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.

608.4.3 Energy management system. An approved energy management system shall be provided 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 such as short circuits, overvoltage (overcharge) or under voltage (over discharge) are detected.

608.4.4 Battery chargers. Battery chargers shall be compatible with the battery chemistry and the manufacturer's electrical ratings and charging specifications. Battery chargers shall be listed and labeled in accordance with the UL 1564 or provided as part of a listed pre-engineered or prepackaged stationary storage battery system.

608.4.5 Inverters. Inverters shall be listed and labeled in accordance with UL 1741. Only inverters 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 to supply power to common loads.

608.4.6 Safety caps. Vented batteries shall be provided with flame-arresting safety caps.

608.4.7 Thermal runaway. Where required by Section 608.6 storage batteries shall be provided with a listed device or other approved method to prevent, detect and control thermal runaway.

608.4.8 Toxic and highly toxic gas. Stationary storage battery systems that have the potential to release toxic and highly toxic materials during charging, discharging and normal use conditions shall comply with Chapter 60.

608.5 Suppression and detection systems. Suppression and detection systems shall be provided in accordance with Sections 608.5.1 through 608.5.5.

608.5.1 Fire suppression systems. Rooms containing stationary storage battery systems shall be equipped with an automatic sprinkler system installed in accordance with Section 903.3.1.1. Commodity classifications for specific technologies of storage batteries shall be in accordance with Chapter 5 of NFPA 13. If the storage battery types are not addressed in Chapter 5 of NFPA 13, the fire code official is authorized to approve the fire suppression system based on full scale fire and fault condition testing conducted or witnessed and reported by an approved laboratory.

608.5.1.1 Alternative suppression systems. Battery systems that utilize water reactive materials shall be protected by an approved alternative automatic fire extinguishing system in accordance with Section 904. The system shall be listed for protecting the type, arrangement and quantities of storage batteries in the room. The fire code official shall be permitted to approve the alternate fire suppression system based on full scale fire and fault condition testing conducted or
witnessed and reported by an approved laboratory.

608.5.2 Smoke detection system. An approved automatic smoke detection system shall be installed in rooms containing stationary storage battery systems in accordance with Section 907.2.

608.5.3 Mechanical ventilation. Where required by Section 608.6 or Section 608.1.4.3, ventilation of rooms containing stationary storage battery systems shall be provided in accordance with the *International Mechanical Code* and the following:

1. The ventilation system shall operate continuously or be designed to operate upon activation of the gas detection system.
2. The system shall provide ventilation at a rate of not less than 1 cubic foot per minute (cfm) per square foot \([0.00508 \text{ m}^3/(\text{s} \cdot \text{m}^2)]\) of floor area, but not less than 150 cfm (4 m3/min).
3. The exhaust system shall be designed to provide air movement across all parts of the floor for gases having a vapor density greater than air and across all parts of the vault ceiling for gases having a vapor density less than air.

608.5.3.1 Cabinet ventilation. Where cabinets located in occupied spaces contain the storage batteries that are required by Section 608.6 or 608.1.4.3 to be provided with ventilation, the cabinet shall be provided with mechanical ventilation in accordance with Section 608.5.3.

608.5.3.2 Supervision. Required mechanical ventilation systems for rooms and cabinets containing storage batteries shall be supervised by an approved central station, proprietary or remote station service or shall initiate an audible and visual signal at an approved constantly attended on-site location.

608.5.4 Gas detection system. Where required by Section 608.6 or 608.1.4.3, rooms containing stationary storage battery systems shall be protected by a continuous gas detection system. The gas detection system shall be designed to activate where the level of flammable gas exceeds 25 percent of the lower flammable limit (LFL), or where the level of toxic or highly toxic gases exceeds the permissible exposure limits (PEL).

608.5.4.1 System activation. Activation of the gas detection system shall result in all the following:

1. Initiation of distinct audible and visible alarms in the battery storage room.
2. Transmission of an alarm to an approved location.
3. De-energizing of the battery charger.
4. Activation of the mechanical ventilation system, where the system is interlocked with the gas detection system.

608.5.5 Spill control and neutralization. Where required by Section 608.6, approved methods and materials shall be provided for the control and neutralization of spills of electrolyte or other hazardous materials in areas containing stationary storage batteries containing free electrolyte as follows:

1. Spill control for battery systems containing more than 55 gallons (208 L) of electrolytes or other hazardous materials shall be provided in accordance with section...
5004.2.1. Neutralization materials or methods shall be provided that are capable of neutralizing a spill of the total capacity from the largest battery array or equipment to a pH between 5.0 and 9.0.

608.6 Specific battery type requirements. This section includes requirements applicable to specific types of storage batteries. Stationary storage battery systems with more than one type of storage battery shall comply with requirements applicable to each battery type.

608.6.1 Lead acid storage batteries. Stationary battery systems utilizing lead acid storage batteries shall comply with the following:

1. Mechanical ventilation shall be provided in accordance with Section 608.5.3.
2. Spill control and neutralization shall be in accordance with Section 608.5.5.
3. Thermal runaway protection shall be provided for VRLA storage batteries in accordance with Section 608.4.7.
4. In addition to the signage required in Section 608.2.6, the text in Figure 608.6.1 shall be provided:

   **FIGURE 608.6.1**

   LEAD ACID STORAGE BATTERY SIGNAGE

   CAUTION – Corrosive Liquids

   This room contains lead acid batteries and energized electrical circuits. Hydrogen gas may be present.

608.6.2 Nickel cadmium (Ni-Cd) storage batteries. Stationary battery systems utilizing nickel cadmium (Ni-Cd) storage batteries shall comply with the following:

1. Mechanical ventilation shall be provided in accordance with Section 608.5.3.
2. Spill control and neutralization shall be in accordance with Section 608.5.5.
3. Thermal runaway protection shall be provided for valve regulated sealed nickel cadmium storage batteries in accordance with Section 608.4.7.
4. In addition to the signage required in Section 608.2.6, the text in Figure 608.6.2 shall be provided.

   **FIGURE 608.6.2**

   LEAD ACID STORAGE BATTERY SIGNAGE
608.6.3 Lithium-ion storage batteries. Stationary battery systems utilizing lithium-ion storage batteries shall provide signage in accordance with Section 608.2, and the text in Figure 608.6.3.

**FIGURE 608.6.3**
**LITHIUM-ION BATTERY SIGNAGE**

![Lithium-ion battery signage](image)

**CAUTION**
This room contains lithium-ion batteries and energized electrical circuits.

608.6.4 Sodium beta storage batteries. Stationary battery systems utilizing sodium beta storage batteries shall comply with the following:

1. Mechanical ventilation shall be provided in accordance with Section 608.5.3.
2. In addition to the signage required in Section 608.2.6, the text in Figure 608.6.4 shall be provided.

**FIGURE 608.6.4**
**SODIUM BETA BATTERY SIGNAGE**

![Sodium beta battery signage](image)
608.6.5 Flow storage batteries. Stationary battery systems utilizing flow storage batteries shall comply with the following:

1. Mechanical ventilation shall be provided in accordance with Section 608.5.3.
2. Spill control and neutralization shall be in accordance with Section 608.5.5.
3. In addition to the signage required in Section 608.2.6, the following text in Figure 608.6.5 shall be provided:

   FIGURE 608.6.5
   FLOW BATTERY SIGNAGE

   CAUTION – Corrosive Liquids
   This room contains flow batteries and energized electrical circuits. Hydrogen gas may be present.

608.6.6 Other battery technologies. Stationary battery systems utilizing battery technologies other than those described in Sections 608.6.1 through 608.6.5 shall comply with the following:

1. Continuous flammable gas detection systems shall be provided in accordance with Section 608.5.4 where the batteries have the potential to produce toxic or highly toxic gases in the storage room or cabinet in excess of the permissible exposure limits (PEL) during charging, discharging and normal system operation.
2. Mechanical ventilation shall be provided in accordance with Section 608.5.3.
3. Spill control and neutralization shall be in accordance with Section 608.5.5.
4. In addition to the signage required in Section 608.2.6, the marking shall identify the
type of batteries present, describe the potential hazards associated with the battery type, and indicate the room contains energized electrical circuits.

Revise as follows:

907.2.23 Battery rooms. An automatic smoke detection system shall be installed in areas containing stationary storage battery systems with a liquid capacity of more than 50 gallons (189 L) as required in Section 608.

2015 International Building Code

Revise as follows:

[F] 307.1.1 Uses other than Group H. An occupancy that stores, uses or handles hazardous materials as described in one or more of the following items shall not be classified as Group H, but shall be classified as the occupancy that it most nearly resembles.

1. Buildings and structures occupied for the application of flammable finishes, provided that such buildings or areas conform to the requirements of Section 416 and the International Fire Code.
2. Wholesale and retail sales and storage of flammable and combustible liquids in mercantile occupancies conforming to the International Fire Code.
3. Closed piping system containing flammable or combustible liquids or gases utilized for the operation of machinery or equipment.
4. Cleaning establishments that utilize combustible liquid solvents having a flash point of 140°F (60°C) or higher in closed systems employing equipment listed by an approved testing agency, provided that this occupancy is separated from all other areas of the building by 1-hour fire barriers constructed in accordance with Section 707 or 1-hour horizontal assemblies constructed in accordance with Section 711, or both.
5. Cleaning establishments that utilize a liquid solvent having a flash point at or above 200°F (93°C).
7. Refrigeration systems.
8. The storage or utilization of materials for agricultural purposes on the premises.
9. Stationary batteries utilized for facility emergency power, uninterruptable power supply or telecommunication facilities, provided that the batteries are provided with safety venting caps and ventilation is provided storage battery systems installed in accordance with the International Mechanical Fire Code.
10. Corrosive personal or household products in their original packaging used in retail display.
11. Commonly used corrosive building materials.
12. Buildings and structures occupied for aerosol storage shall be classified as Group S-1, provided that such buildings conform to the requirements of the International Fire Code.
13. Display and storage of nonflammable solid and nonflammable or noncombustible liquid hazardous materials in quantities not exceeding the maximum allowable quantity per control area in Group M or S occupancies complying with Section 414.2.5.
14. The storage of black powder, smokeless propellant and small arms primers in Groups M and R-3 and special industrial explosive devices in Groups B, F, M and S, provided such storage conforms to the quantity limits and requirements prescribed in the...
<table>
<thead>
<tr>
<th>ROOM OR AREA</th>
<th>SEPARATION AND/OR PROTECTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Furnace room where any piece of equipment is over 400,000 Btu per hour input</td>
<td>1 hour or provide automatic sprinkler system</td>
</tr>
<tr>
<td>Rooms with boilers where the largest piece of equipment is over 15 psi and 10 horsepower</td>
<td>1 hour or provide automatic sprinkler system</td>
</tr>
<tr>
<td>Refrigerant machinery room</td>
<td>1 hour or provide automatic sprinkler system</td>
</tr>
<tr>
<td>Hydrogen fuel gas rooms, not classified as Group H</td>
<td>1 hour in Group B, F, M, S and U occupancies; 2 hours in Group A, E, I and R occupancies.</td>
</tr>
<tr>
<td>Incinerator rooms</td>
<td>2 hours and provide automatic sprinkler system</td>
</tr>
<tr>
<td>Paint shops, not classified as Group H, located in occupancies other than Group F</td>
<td>2 hours; or 1 hour and provide automatic sprinkler system</td>
</tr>
<tr>
<td>In Group E occupancies, laboratories and vocational shops not classified as Group H</td>
<td>1 hour or provide automatic sprinkler system</td>
</tr>
<tr>
<td>In Group I-2 occupancies, laboratories not classified as Group H</td>
<td>1 hour and provide automatic sprinkler system</td>
</tr>
<tr>
<td>In ambulatory care facilities, laboratories not classified as Group H</td>
<td>1 hour and provide automatic sprinkler system</td>
</tr>
<tr>
<td>Laundry rooms over 100 square feet</td>
<td>1 hour or provide automatic sprinkler system</td>
</tr>
<tr>
<td>In Group I-2, laundry rooms over 100 square feet</td>
<td>1 hour</td>
</tr>
<tr>
<td>Group I-3 cells and Group I-2 patient rooms equipped with padded surfaces</td>
<td>1 hour</td>
</tr>
<tr>
<td>In Group I-2, physical plant maintenance shops</td>
<td>1 hour</td>
</tr>
<tr>
<td>In ambulatory care facilities or Group I-2 occupancies, waste and linen collection rooms with containers that have an aggregate volume of 10 cubic feet or greater</td>
<td>1 hour</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>In other than ambulatory care facilities and Group I-2 occupancies, waste and linen collection rooms over 100 square feet</td>
<td>1 hour or provide automatic sprinkler system</td>
</tr>
<tr>
<td>In ambulatory care facilities or Group I-2 occupancies, storage rooms greater than 100 square feet</td>
<td>1 hour</td>
</tr>
<tr>
<td>Stationary storage battery systems having an energy, a liquid electrolyte capacity, greater than the threshold quantity specified in Table 608.1 of the International Fire Code, or more than 50 gallons for flooded lead-acid, nickel cadmium or VRLA, or more than 1,000 pounds for lithium-ion and lithium metal polymer used for facility standby power, emergency power or uninterruptable power supplies.</td>
<td>1 hour in Group B, F, M, S and U occupancies; 2 hours in Group A, E, I and R occupancies.</td>
</tr>
</tbody>
</table>

For SI: 1 square foot = 0.0929 m², 1 pound per square inch (psi) = 6.9 kPa, 1 British thermal unit (Btu) per hour = 0.293 watts, 1 horsepower = 746 watts, 1 gallon = 3.785 L, 1 cubic foot = 0.0283 m³.

Reference standards type: This reference standard is new to the ICC Code Books
Add new standard(s) as follows:

**UL 1564** Standard for Industrial Battery Chargers.

**UL 1973** Standard for Batteries for Use in Light Electric Rail (LER) Applications and Stationary Applications

**UL 9540** Standard for Energy Storage Systems and Equipment

Reason: When Section 608 was developed it primarily addressed hazards associated with stationary lead acid battery systems used for standby and emergency power. Advancements in battery technologies have introduced a new generation of battery technologies, such as lithium-ion and flow batteries, each with advantages and potential hazards. Unfortunately the IFC/IBC have no specific requirements that regulate the use of these new battery technologies in occupancies and buildings, including high-rise and underground buildings. At the same time societal needs for energy solutions such as load shedding and load sharing, while well intentioned, have created a situation where thousands of pounds of storage batteries, and millions as watt-hours of stored energy systems can be installed with little if any building or fire official oversight.

Providing protection for these new technologies and the huge amounts of energy they store is something that needs to be addressed through research, fire and fault condition testing, and the development of effective safety standards. Unfortunately much of this working, such as determining the ability of fire suppression systems to control thermal runaway of a large storage battery installation, still needs to be completed.

This proposal provides a complete rewrite of Section 608 and is an integral part of an energy storage system (ESS).
set of IFC proposals. This proposal was developed with input from a Fire Code Action Committee Energy Storage System working group, which consisted of industry, representatives of government agencies, and the fire service. Comments on selected portions of the proposal:

105.7.2, 608.1.2, 608.1.3 A construction permit was added, along with details on the documentation needed to evaluate the construction.

Section 202 Definitions of two terms used in this Section were added for clarification.

608.1.1, Table 608.1 The scope of this section was revised to (1) add new battery technologies, (2) use kilowatt-hour units which better describe the risk level (and use) compared to gallons of electrolyte or pounds of batteries, (3) establish threshold levels that are commensurate with the potential risks. The 70 KWh should approximate the existing 50 gallon electrolyte trigger for lead-acid batteries.

608.1.4 – 608.1.4.3 A hazardous mitigation analysis is required under certain identified circumstances to address uncertainties associated with new technologies and configurations. This section describes the fault considerations to be evaluated and the acceptance criteria to be achieved, information needed by both the design professional and the fire code official.

608.2.1 These location restrictions address concerns fire departments have with responding to incidents involving stationary storage battery systems, which include upper stories in high rise buildings and in stories identified as underground buildings.

608.2.2 Retains the hourly incidental use fire-resistance separation requirements in IBC Table 509.1.

608.2.3 To address unknowns on whether thermal runaways can proliferate unabated through a very large number of adjacent batteries in a storage room, a maximum 50 KWh limitation was proposed for individual arrays, or groups of adjacent batteries, which are required to be separated by three feet from other battery arrays or walls. To put this in perspective this 50 KWh is equivalent to 104 storage batteries, each rated 12V, 40 A-H. Exceptions for larger size arrays are provided for lead-acid batteries based on their track record over the years, and for listed pre-engineered and prepackaged storage battery systems.

608.2.4, 608.2.5 Sections based on current IFC requirements.

608.2.6 New signage requirements, which provide important information for facility personnel and emergency responders.

608.2.7 New requirements for outdoor installations that recognize installations are being provided in ISO and similar metal and noncombustible containers. An exception for not requiring 3 foot spacing from stationary battery arrays to the noncombustible walls recognizes that the container is not directly adjacent to an occupied portion of the building.

608.3 Scientific research and large scale fire and fault condition testing is not available to justify allowing unlimited quantities of storage batteries to be provided in mixed occupancy buildings using the incidental use provisions of the code. This section establishes a maximum 600 KWh MAQ for each fire area, which is equivalent to 1250 storage batteries, each rated 12V, 40 A-H. Quantities above this amount are only allowed in Group H occupancies.

An exception is provided for allowing larger quantities, when approved, based on large scale testing.

608.4 This section includes requirements that the storage batteries and related equipment must meet. This includes listing of the batteries and battery systems, which will address construction and safety performance requirements. Energy management systems are an important element of a safe system that monitor and takes actions on off normal conditions that could lead to problems.

608.4.8 This section covers battery technologies (many yet to hit the market) that produce toxic gases during charging, discharging and normal use, and triggers Chapter 60 safety requirements. There is no intent to address batteries that produce toxic gases during fires or abnormal conditions.

608.5.1 A significant challenge facing designers and code officials is a lack of large scale fire and fault condition test data that demonstrates that fire suppression systems can control battery fires. Until such protection arrangements are documented in NFPA 13 and other standards, this section allows the code official to approve suppression systems based on test data made available to him.

608.5.2 Existing requirement.

608.5.3 Mechanical ventilation requirements are consistent with existing IFC battery room and battery cabinet requirements. However in lieu of continuous ventilation they are allowed, ventilation is permitted to be provided upon activation of the gas detection system.

608.5.4 Gas detection systems must be provided if so required by the approved hazard mitigation analysis (Section
608.1.4.3) or by Section 608.6. They may also be provided to activate mechanical ventilation systems.

608.5.5 Spill control and neutralization requirements are based on existing stationary battery system requirements, and also applicable requirements for spill control for hazardous material liquids, included in Section 5004.2.1. This recognizes that in new battery technologies that spills of hazardous materials other than lead acid electrolyte might occur and need to be mitigated.

608.6 This section includes requirements for specific battery technologies, and includes criteria that address potential hazards associated with the type of technology involved. The protection requirements are customized for the potential hazards associated with the various battery technologies.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire safety and hazardous materials in new and existing buildings and facilities and the protection of life and property in wildland urban interface areas. In 2014 and 2015 the Fire-CAC has held 5 open meetings. In addition, there were numerous conference calls, Regional Work Group and Task Group meetings for the current code development cycle, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC.

Cost Impact: Will increase the cost of construction
This proposal introduces a number of new requirements that cover stationary storage battery installations that were previously largely unregulated.

Analysis: A review of the standard(s) proposed for inclusion in the code, UL 1564 Standard for Industrial Battery Chargers. UL 1973 Standard for Batteries for Use in Light Electric Rail (LER) Applications and Stationary Applications and UL 9540 Standard for Energy Storage Systems and Equipment with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1, 2016.
2015 International Fire Code

Revise as follows:

608.1 Scope. Stationary storage battery systems having an electrolyte capacity of more than 50 gallons (189 L) for flooded lead-acid, nickel cadmium (Ni-Cd) and valve-regulated lead-acid (VRLA), and nickel metal hydride (NiMH), or more than 1,000 pounds (454 kg) for lithium-ion and lithium metal polymer non-aqueous batteries, used for facility standby power, emergency power or uninterruptible power supplies shall comply with this section and Table 608.1.

<table>
<thead>
<tr>
<th>REQUIREMENT</th>
<th>NON-RECOMBINANT BATTERIES</th>
<th>RECOMBINANT BATTERIES</th>
<th>OTHER BATTERIES NON-AQUEOUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAFETY CAPS</td>
<td>Vented (Flooded) Lead Acid Batteries</td>
<td>Venting caps (608.2.1)</td>
<td>Venting caps (608.2.1)</td>
</tr>
<tr>
<td>Thermal runaway management</td>
<td>Not required</td>
<td>Not required</td>
<td>Required (608.3)</td>
</tr>
<tr>
<td>Spill control</td>
<td>Required (608.5)</td>
<td>Required (608.5)</td>
<td>Not required</td>
</tr>
<tr>
<td>Neutralization</td>
<td>Required (608.5.1)</td>
<td>Required (608.5.1)</td>
<td>Required (608.5.2)</td>
</tr>
</tbody>
</table>
### Table 608.1 informational classifications of Non-recombinant Batteries, Recombinant Batteries, and Other Batteries do not fully differentiate available battery types. Propose the following Table 608.1 headings; Non-recombinant batteries, Recombinant batteries, and changing "Other Batteries" to "Non-Aqueous Batteries".

- When sites deploy newer technology such as NiMH batteries, code officials should be aware that these type of batteries also require ventilation and neutralization.
- When sites deploy newer technologies such as sodium metal halide batteries, code officials should be aware that these technologies do not produce hydrogen and do not require ventilation above that required by the International Mechanical Code.
- The column for Lithium Metal batteries should be removed. Lithium Metal batteries are no longer commercially available and the Lithium Ion type battery is representative of existing and expected Lithium technology.
- Lithium ion batteries should be placed in the Non-aqueous category instead of Recombinant category based on the chemistry.

### Cost Impact
Will not increase the cost of construction
The addition of battery types to Table 608.1 will not add cost of construction since those requiring ventilation or neutralization will utilize safety measures similar to other existing battery technologies.
2015 International Fire Code

Add new text as follows:

608.2 **Listings** Stationary storage batteries shall be listed in accordance with UL 9540 or UL 1973.

**Exception:** The requirement for listing does not apply to lead acid batteries.

**Reference standards type:** This reference standard is new to the ICC Code Books

**Add new standard(s) as follows:**

1. UL 9540-14, Outline of Investigation for Energy Storage Systems and Equipment.

**Reason:** There are potential hazards that are associated with newer battery technologies used in energy storage systems, including lithium-ion batteries. This code change adds two standards which are used to investigate and list stationary storage batteries and stationary storage battery systems and help mitigate potential hazards.

**Cost Impact:** Will increase the cost of construction

There may be a nominal cost increase to provide listed batteries, as compared to nonlisted batteries, but this does not apply to lead-acid batteries, which are not required to be listed.

**Analysis:** A review of the standard(s) proposed for inclusion in the code, UL 9540-14, Outline of Investigation for Energy Storage Systems and Equipment and UL 1973-13, Standard for Batteries for Use in Light Electric Rail (LER) Applications and Stationary Applications. with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1, 2016.
F98-16

IFC: 608.5, 608.5.2.
Proponent: randy.schubert, Ericsson (randy.schubert@ericsson.com)

2015 International Fire Code

608.5 Spill control and neutralization. An approved method and materials for the control and neutralization of a spill of electrolyte shall be provided in areas containing lead-acid, nickel-cadmium or other types of batteries with free-flowing liquid electrolyte. For purposes of this paragraph, a "spill" is defined as any unintentional release of electrolyte.

Exception: VRLA, lithium-ion, lithium metal polymer or other types of sealed batteries with immobilized electrolyte shall not require spill control.

608.5.2 Recombinant battery neutralization. For VRLA or other types of batteries with immobilized electrolyte, the method and material 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.

Exception: Lithium ion and lithium metal polymer Non-aqueous batteries shall not require neutralization.

Reason: Code officials should be aware that some newer types of batteries such as Nickel Metal Hydride require neutralization, whereas non-aqueous batteries such as sodium metal halide do not require neutralization. NiMH are proposed to be added to Table 608.1 and the table specifies they need neutralization per Section 608.5.2.

Cost Impact: Will not increase the cost of construction
The reference information has no impact on the cost of construction and simply provides a clarification as to which batteries would require spill control and neutralization.
F99-16

IFC: 608.6.

Proponent: randy.schubert, Ericsson (randy.schubert@ericsson.com)

2015 International Fire Code

608.6 Ventilation

Where required by Table 608.1, ventilation of stationary storage battery systems shall comply with Sections 608.6.1 and 608.6.2.

Reason: Table 608.1 shows which types of stationary batteries require ventilation beyond that required by the International Mechanical Code. Battery chemistry that does not produce hydrogen such as lithium ion are shown in the Table 608.1 not to require ventilation. An exception statement is included in Section 608.6.1.

Cost Impact: Will not increase the cost of construction

This change is a clarification of when Section 608.6.1 ventilation is required and will not impact cost of construction.
2015 International Fire Code

Revise as follows:

608.6.1 Room ventilation. Ventilation shall be provided in accordance with the International Mechanical Code and the following:

1. For flooded lead-acid, flooded Ni-Cd and VRLA batteries, the ventilation system shall be designed to limit the maximum concentration of hydrogen in accordance with IEEE 1635/ASHRAE 21 or other approved methods to 1.0 percent of the total volume of the room; or
2. Continuous ventilation shall be provided at a rate of not less than 1 cubic foot per minute per square foot (1 ft³/min/ft²) [0.0051 m³/s · m²] of floor area of the room.

Exception: Lithium-ion and lithium metal polymer batteries shall not require additional ventilation beyond that which would normally be required for human occupancy of the space in accordance with the International Mechanical Code.

2015 International Mechanical Code

Revise as follows:

[F] 502.4.1 Hydrogen limit in rooms. For flooded lead-acid, flooded nickel cadmium Ni-Cd and VRLA batteries, the ventilation system shall be designed to limit the maximum concentration of hydrogen in accordance with IEEE 1635/ASHRAE 21 or other approved methods to 1.0 percent of the total volume of the room.

Reference standards type: This reference standard is new to the ICC Code Books

Add new standard(s) as follows:


Reason: As in other sections of the code the addition of this reference IEEE/ASHRAE document provides an approved method to determine hydrogen development and off-gassing. The referenced IEEE document is a comprehensive method to ensure that if necessary, adequate provisions are assessed for safe environmental conditioning or other methods are provided to ensure compliance with the requirements of 608.6.1 (1). This proposal also provides for other methods besides the IEEE document to be used when approved by the Fire Official.

Bibliography:

Cost Impact: Will not increase the cost of construction

The use of an industry accepted accessible document for the uniform determination of potential hydrogen production and off-gassing will provide cost effective designs for potential ventilation options. There can be significant energy expense reductions by attaining minimum ventilation requirements in accordance with the International Mechanical Code and 608.6.1. This savings can be represented by: a) reduced energy expense for the power to operate ventilation devices, b) reduced wear and tear of device components thus a savings on maintenance expenses and c) the reduction of cooling or heating expenses due to possible smaller air exchange requirements for conditioning the space. Proposal does not limit other possible methods to determine the calculations for ventilation and could provide expense benefits savings.
Analysis: A review of the standard(s) proposed for inclusion in the code, IEEE 1635/ASHRAE 21 (2012) - Guide for the Ventilation and Thermal Management of Batteries for Stationary Applications with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1, 2016.
2015 International Fire Code

608.6.1 Room ventilation. Ventilation shall be provided in accordance with the International Mechanical Code and the following:

1. For flooded lead-acid, flooded Ni-Cd, VRLA, and VRLA nickel metal hydride batteries, the ventilation system shall be designed to limit the maximum concentration of hydrogen to 1.0 percent of the total volume of the room; in accordance with IEEE 1635/ASHRAE Guideline 21 or

2. Continuous ventilation shall be provided at a rate of not less than 1 cubic foot per minute per square foot (1 ft³/min/ft²) [0.0051 m³/s · m²] of floor area of the room. Exception: Lithium-ion and lithium sodium metal polymer halide batteries shall not require additional ventilation beyond that which would normally be required for human occupancy of the space in accordance with the International Mechanical Code.

2015 International Mechanical Code

[F] 502.4.1 Hydrogen limit in rooms. For flooded lead-acid, flooded nickel cadmium Ni-Cd, VRLA, and VRLA nickel metal hydride batteries, the ventilation system shall be designed to limit the maximum concentration of hydrogen to 1.0 percent of the room in accordance with IEEE 1635/ASHRAE Guideline 21.

Reference standards type: This reference standard is new to the ICC Code Books
Add new standard(s) as follows:

Reason: Limiting hydrogen concentration to 1.0% of the room volume is a well established safety factor used for battery spaces. Battery manufacturer and end-user experts have developed accurate calculations to determine maximum (worst-case) hydrogen evolution rates and commensurate ventilation rates to ensure room concentrations do not exceed 1.0%. IEEE Std. 1635™ / ASHRAE Guideline 21-2012 is a joint ASHRAE and IEEE Standard that provides guidance on maintaining safe hydrogen concentrations below 1.0% at various conditions including IFC and NFPA designated worst case conditions associated with boost equalization charging. These severe conditions are detailed in Annex A7.7 of the Standard IEEE Std. 1635™ / ASHRAE Guideline 21-2012. This document is widely accessible and accepted by both HVAC system designers and battery experts and is referenced in NFPA standards.

Calculations of battery room ventilation requirements for a variety of worst-case conditions demonstrates that the default ventilation rate of 1 cubic foot per minute per square foot (1 ft³/min/ft²) [0.0051 m³/s · m²] of floor area of the battery room vastly overstates ventilation rates required to maintain hydrogen levels at 1.0 percent. The use of this overly high level of ventilation increases costs due to increased energy usage to operate ventilation systems and requires greater cooling or heating costs to condition make-up air for the battery spaces.

The added option to use IEEE Std. 1635™ / ASHRAE Guideline 21-2012 which includes battery manufacturer criteria for ventilation rates will save energy costs. For operators managing tens of thousands of battery rooms in the telecom, IT, or utility industries the savings impact is substantial in both costs and environmental impacts such as carbon emissions.

Along with lithium ion batteries which do not require ventilation, the additional battery type Sodium Metal Halide batteries will not produce hydrogen and should be included in the existing exception statement.
**Cost Impact:** Will not increase the cost of construction

The option to use IEEE Std. 1635™ / ASHRAE Guideline 21-2012 which includes battery manufacturer criteria for ventilation rates will not impact costs of construction.
Delete and substitute as follows:

608.6.3 Supervision. Mechanical ventilation systems where required by Sections 608.6.1 and 608.6.2 shall be supervised by an approved central, proprietary or remote station service or shall initiate an audible and visual signal at a constantly attended on-site location. Mechanical ventilation systems where required by Sections 608.6.1 and 608.6.2 shall have environments supervised to indicate that ventilation is adequate and to provide response to the location for investigation in accordance with one of the following:

1. Approved constantly attended building management monitoring system.
2. Initiation of an audible and visual signal at a constantly attended on-site location.

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2015 International Mechanical Code

[F] 502.4.3 Supervision. Mechanical ventilation systems required by Section 502.4 shall have environments supervised by an approved central, proprietary or remote station service or shall initiate an audible and visual signal at a constantly attended on-site location to provide response to the location for investigation in accordance with one of the following:

1. Approved constantly attended building management monitoring system.
2. Initiation of an audible and visual signal at a constantly attended on-site location.

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[F] 502.5.3 Supervision. Mechanical ventilation systems required by Section 502.5 shall have environments supervised by an approved central, proprietary or remote station service or shall initiate an audible and visual signal at a constantly attended on-site location to provide response to the location for investigation in accordance with one of the following:

1. Approved constantly attended building management monitoring system.
2. Initiation of an audible and visual signal at a constantly attended on-site location.

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Reason: The proposed modifications provide for two options for cost effective commonly used methods for the monitoring of environmental conditions and could include monitoring of a battery space by other internal monitoring points. These building management monitoring system options will provide an indication of a potential ventilation failure event. These monitoring methods could include exhaust fan operation, temperature levels, and/or other temperature and monitoring points within the equipment or battery space. Monitoring is not required to be at the specific location of the stationary storage battery system. These types of monitoring methods will provide notification as supervision of conditions or alarms will initiate personnel to respond to investigate and take corrective actions if needed. These options are provided in most existing and new battery space installations and therefore little if any additional expense is added to the operational expenses of a site. The current statement “an approved central, proprietary or remote station service” does not clearly state the
requirements for the three listed services. There is no document that incorporates this type of supervision method. This is not referenced in the current National Fire Protection Association's NFPA 72® National Fire Alarm and Signaling Code (2013 and 2016 editions) as this document does not address the monitoring of ventilation systems (exhaust fan operation or environmental conditions). Therefore this is not the intent of NFPA 72® and should not be quasi referenced nor should the IFC expand the NFPA 72®’s scope or intent of services. The removal of methods identified as "an approved central, proprietary or remote station service" is appropriate as recognized common building infra-structure monitoring methods are provided by this proposal.

The removal of the "on-site" requirement expands the monitoring options as long as there is constant attendance at a monitoring location, either at the site or other locations.

Cost Impact: Will not increase the cost of construction
This proposal reduces potential duplicate out sourced supervision methods. The required monitoring can be provided at a reduced expense by an existing building management monitoring system or point alarm monitoring location. Projected savings can be obtained related to outside contractor charges for additional monitoring devices and transmission methods. The owner can still chose to contract these services or conduct in-house activities to provide these services.
F103-16

IFIC: 608.6.3; IMC: [F] 502.4.3, [F] 502.5.3.
Proponent: randy schubert, Ericsson, representing Ericsson (randy.schubert@ericsson.com)

2015 International Fire Code

608.6.3 Supervision. Mechanical ventilation systems where required by Sections 608.6.1 and 608.6.2 shall be supervised by an approved central, proprietary or remote station service, or by a monitored building environmental control system and shall initiate an audible and visual signal at a constantly attended on-site location.

2015 International Mechanical Code

[F] 502.4.3 Supervision. Mechanical ventilation systems required by Section 502.4 shall be supervised by an approved central, proprietary or remote station service or by a monitored building environmental control system and shall initiate an audible and visual signal at a constantly attended on-site location.

[F] 502.5.3 Supervision. Mechanical ventilation systems required by Section 502.5 shall be supervised by an approved central, proprietary or remote station service or by a monitored building environmental control system and shall initiate an audible and visual signal at a constantly attended on-site location.

Reason: Large users of stationary batteries have many options that can be used for reliable and safe supervision of battery room ventilation. For example, the telecommunications industry maintains more than 30,000 stationary battery rooms with an exemplary safety record regarding hydrogen control and fire safety. Many of these sites utilize building environmental control monitoring systems with alarms routed to network operations centers (NOCs) that are continuously staffed. Building monitoring systems provide an indication of ventilation failures by several parameters including battery room environmental alarms, battery temperature alarms, and/or exhaust fan operation alarms. When alarms are received personnel are dispatched to the site and corrective actions can be taken if needed. For sites that utilize these systems adding a secondary remote station service would add expense and complexity without improving safety.

An alarm indicating a problem with the ventilation system for a stationary battery room is not an immediate emergency such as with fire and smoke alarms. It is a condition that may pose risk to increasing hydrogen within the room over time. The build-up of hydrogen levels to a dangerous threshold would likely take days or weeks. In 80 years of maintaining lead acid batteries there have been no hydrogen explosions or hydrogen fires in telecommunications buildings for Verizon, CenturyLink, and AT&T.

NFPA 72 contains the most commonly referenced requirements for central, proprietary, and remote stations. The scope of NFPA 72 only addresses the monitoring of fire alarm systems and no other systems. Consequently, there are no performance criteria that define how ventilation alarms should be processed relative to alarms within the scope of NFPA 72 such as fire alarms, supervisory alarms, and trouble alarms. IFC 608.6.3 seems to expand NFPA 72 beyond its intended scope.

The removal of "on-site" criteria is replaced by mandating alarms are sent to a constantly attended location that monitors the spaces 24x7x365 such as a network operation center (NOC).

Cost Impact: Will not increase the cost of construction
The option to use building management and environmental control monitoring systems that provide alarms to constantly attended locations will not impact cost of construction.
F104-16

IFC: 608.9, 907.2.23.
Proponent: Jeffrey Betz (jbetz@att.com)

2015 International Fire Code

Add new text as follows:

608.9 Smoke detection. An approved automatic smoke detection system shall be installed in accordance with Section 907.2 in rooms containing stationary storage battery systems with quantities exceeding those listed in Section 608.1.

Exception: Stand-alone communications equipment structures classified as Group U are not required to install an approved automatic smoke detection system.

907.2.23 Battery rooms. An automatic smoke detection system shall be installed in areas containing stationary storage battery systems in accordance with a liquid capacity of more than 50 gallons (189 L) Section 608.

Reason: The requirement to provide an approved smoke detection system in stand-alone communication equipment structures of Utility and Miscellaneous Group U buildings is unwarranted. These small stand-alone structures do not pose a serious life safety exposure as the structure is rarely occupied. If occupied, visual awareness is the primary notification of an emergency condition. These structures are often considered non-essential by the owner and can be replaced within a short period of time in the rare event of a fire or other damaging condition. The small footprint of the structure and the exposure of the interior equipment to non-thermal or thermal damage at a very small level is a total loss for the equipment housed within. A fire service response will not prevent the necessity of all equipment being replaced.

The current requirements of the code section encompasses single dedicated stand-alone battery/equipment spaces through high-rise multi-use occupancies with a battery room. The code change proposal also aligns this section with the Scope quantities for Stationary Storage Battery Systems.

The provision of an automatic smoke detection system in a room containing batteries with a multi-use/occupied building is appropriate. This proposal is providing an Exception to this broad use/occupancy and removes the burdens placed upon thousands of stand-alone communications equipment structures of Use Group U to provide an approved automatic smoke detection system. These stand-alone communications structures currently have multi-internal monitoring points that address issues related to the operations of the equipment and potential hazards conditions.

The reasoning for smoke detection for battery rooms in a multi-use/occupied building as stated in the 2015 IFC Commentary 907.2.23 is "...Because standby power and emergency power systems control many important building emergency systems and functions, a supervised automatic smoke-detection system is required for early warning notification of a hazardous condition." The detection of rooms housing emergency support functions of the building fire protection and life safety systems noted in the Commentary are justifiable but do not reflect the completely different conditions of the noted Group U structures.

The code does not require any other stand-alone facilities of this size or nature to provide required approved automatic smoke detection systems (see Section 907.2). This proposal does not prevent or limit the installation of either an automatic smoke detection system or single station smoke alarm by an owner if they choose to install such detection.

Cost Impact: Will not increase the cost of construction
The required design, installation, inspection, testing and maintenance and monitoring for an approved automatic smoke detection system are unnecessary expenses for the owner of a structure of this nature.
F105-16

IFC: 608.10 (New).

Proponent: Matt Paiss, IAFF, representing International Association of Fire Fighters (mpaiss@gmail.com); Sean DeCrane, representing International Association of Fire Fighters (rovloc93@aol.com)

2015 International Fire Code

Add new text as follows:

608.10 Signage. Approved signs shall be provided on doors or in locations adjacent to entrances to stationary storage battery system rooms and shall include the all of the following.

1. A minimum 8 in. (200 mm) wide and 6 in. (150 mm) high sign with all of the following:
   1.1. CAUTION, WARNING or DANGER
   1.2. BATTERY ROOM
   1.3. AUTHORIZED PERSONNEL ONLY
   1.4. The additional markings required in Section 608.6 for the types of storage batteries contained within the room.

2. Hazard identification markings in accordance with NFPA 704.

3. Signage shall be installed adjacent to the main disconnect indicating the name and emergency telephone number of the installer, or company currently servicing the system.

Exception: AUTHORIZED PERSONNEL ONLY markings are not required for entrances to occupied work centers complying with Section 608.2.5.

Reason: The proposed addition of item (3) in this section is intended to supersede the Section 608.2.6 signage requirements in the stationary battery system proposal submitted by the FCAC. Providing contact information on the individual or company responsible for operation and maintenance of the stationary storage battery system provides emergency responders with the information they need to contact qualified responsible parties if they need to respond to an event involving the system.

Cost Impact: Will not increase the cost of construction

The additional marking represents a negligible cost increase.
2015 International Fire Code

Add new text as follows:

608.10 Battery Separation Batteries shall be separated in accordance with Section 608.10.1 for indoor installations and Section 608.10.2 for outdoor installations.

608.10.1 Indoor Installations Storage batteries, prepackaged stationary storage battery systems and pre-engineered stationary storage battery systems shall be segregated into stationary battery arrays not exceeding 50 KWh (180 Mega joules) each. Each stationary battery array shall be spaced a minimum three feet (914 mm) from other stationary battery arrays and from walls in the storage room or area. The storage arrangements shall comply with Chapter 10 of the International Building Code.

Exceptions:

1. Lead acid storage battery arrays shall not exceed 250 KWh (900 Mega joules) each.
2. Listed pre-engineered stationary storage battery systems and prepackaged stationary storage battery systems shall not exceed 150 KWh (540 Mega joules) each.
3. The fire code official is authorized 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 specified in Table 509 of the International Building Code.

608.10.2 Outdoor Installations Outdoor installation of batteries shall be separated in accordance with Section 608.10.2.1 and 608.10.2.2.

608.10.2.1 Outdoor Separation Stationary storage battery systems located outdoors shall be separated by a minimum five feet (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

Exception:

The fire code official is authorized to approve 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.
**608.10.2.2 Means of Egress** Stationary storage battery systems located outdoors shall be separated from any means of egress as required by the fire code official to ensure safe egress under fire conditions, but in no case less than 10 feet (3048 mm).

**Exception:** The fire code official is authorized to approve 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.

**Reason:** These proposed additions are intended to supersede similar requirements in the stationary battery system proposal submitted by the FCAC for Section 608. This proposal adds additional exemptions to the separation requirements proposed by the FCAC submission to allow for industry innovation in battery storage systems over the next five years while addressing concerns regarding a lack of full scale fire testing data. Specifically we anticipate the following innovations:

1. Increased battery capacities: Tesla currently produces a 100 kWh Powerpack tower. However, within the next five years, we expect that battery capacities will increase so that the same volume will encompass a 250 kWh system.
2. Within the next five years, we expect that market demand for energy storage systems will increase. If a fire code official can approve reduced separations based on the results of full scale fire testing, battery designers will be incentivized to develop fire resistant designs to allow denser packaging of systems.
3. Within the next five years, we expect that applicable standards will evolve. If a fire code official can approve reduced separations based on the results of full scale fire testing, battery standards will be incentivized to develop new standards to test and certify systems with smaller separations.

**Cost Impact:** Will not increase the cost of construction

If the FCAC submission for Section 608 is accepted, these proposed requirements have the potential to decrease construction costs compared to the requirements in the FCAC stationary battery system proposal.
F107-16

IFC: [M] 609.2.

Proponent: Jonathan Roberts, representing Underwriters Laboratory (jonathan.roberts@ul.com)

2015 International Fire Code

Add new text as follows:

[M] 609.2 Where required. A Type I hood shall be installed at or above all commercial cooking appliances and domestic cooking appliances used for commercial purposes that produce grease vapors.

Exception: A Type I hood shall not be required for an electric cooking appliance where an approved testing agency provides documentation that the appliance effluent contains 5 mg/m³ or less of grease when tested at an exhaust flow rate of 500 cfm (0.236 m³/s) in accordance with UL 710B.

Exceptions:

1. Factory-built commercial exhaust hoods that are listed and labeled in accordance with UL 710, and installed in accordance with Section 304.1 of the International Mechanical Code, shall not be required to comply with Sections 507.1.5, 507.2.3, 507.2.5, 507.2.8, 507.3.1, 507.3.3, 507.4 and 507.5 of the International Mechanical Code.

2. Factory-built commercial cooking recirculating systems that are listed and labeled in accordance with UL 710B, and installed in accordance with Section 304.1 of the International Mechanical Code, shall not be required to comply with Sections 507.1.5, 507.2.3, 507.2.5, 507.2.8, 507.3.1, 507.3.3, 507.4 and 507.5 of the International Mechanical Code. Spaces in which such systems are located shall be considered to be kitchens and shall be ventilated in accordance with Table 403.3.1.1 of the International Mechanical Code. For the purpose of determining the floor area required to be ventilated, each individual appliance shall be considered as occupying not less than 100 square feet (9.3 m²).

3. Where cooking appliances are equipped with integral down-draft exhaust systems and such appliances and exhaust systems are listed and labeled for the application in accordance with NFPA 96, a hood shall not be required at or above them.

4. A Type I hood shall not be required for an electric cooking appliance where an approved testing agency provides documentation that the appliance effluent contains 5 mg/m³ or less of grease when tested at an exhaust flow rate of 500 cfm (0.236 m³/s) in accordance with UL 710B.

Reason: This proposal will better correlate Sections 507.1 and 507.2 of the International Mechanical Code with the International Fire Code. There are several alternatives to a traditional Type 1 hood for the exhaust of cooking appliances that produce grease vapors. The specific requirements for the installation of these alternative methods are contained in Section 507 of the IMC. Section 609.1 of the IFC requires the installation of the hoods in accordance with the IMC. It should be noted that current IFC Section is not a direct extract of IMC text, but a compilation of the 2015 IMC Sections 507.1 and 507.2.
Cost Impact: Will not increase the cost of construction
Reduces the cost of construction by aligning the IFC requirements with the IMC.
F108-16

IFC: 609.3.1.

Proponent: Jonathan Roberts, representing Underwriters Laboratories (jonathan.roberts@ul.com)

2015 International Fire Code

Revise as follows:

609.3.1 Ventilation system. The ventilation system in connection with hoods shall be operated at the required rate of air movement, and classified grease filters listed and labeled in accordance with UL 1046 shall be in place when equipment under a kitchen grease hood is used.

Reason: Section 507.2.8 of the International Mechanical Code requires grease filters to be listed and labeled in accordance with UL 1046, without any exception. The term "classified" is an undefined term in the code, whereas "listed" and "labeled" are defined.

Cost Impact: Will not increase the cost of construction
Correlates the IFC requirements with the IMC.
Delete without substitution:

609.3.2 Grease extractors. Where grease extractors are installed, they shall be operated when the commercial-type cooking equipment is used.

Reason: The requirements in Section 609.3.1 provides the minimum requirements necessary for a safe cooking operation so this section is no longer necessary. This term grease extractors used to apply to exhaust hoods provided with fire dampers and with cleaning or washing systems. This term is no longer used anywhere else in the family of I codes.

Cost Impact: Will not increase the cost of construction
Aligns the IRC requirements with the IMC requirements. This does not add any new construction requirements.
2015 International Fire Code

610.2 Metallic storage tanks. Metallic cooking oil storage tanks shall be listed in accordance with UL 142 or UL 80, and shall be installed in accordance with the tank manufacturer's instructions.

Revise as follows:

610.3 Nonmetallic storage tanks. Nonmetallic cooking oil storage tanks shall be listed in accordance with UL 2152 and shall be installed in accordance with the tank manufacturer's instructions and Tank capacity shall also comply with all of the following:

1. Tanks shall be listed for use with cooking oil, including maximum temperature to which the tank will be exposed during use.
2. Tank capacity shall not exceed 200 gallons (757 L) per tank.

not exceed 200 gallons (757 L) per tank.

Reference standards type: This reference standard is new to the ICC Code Books

Add new standard(s) as follows:

UL 2152-15    Outline of Investigation for Special Purpose Nonmetallic Containers & Tanks for Specific Combustible or Noncombustible Liquids

Reason: UL 2152 was developed to evaluate the construction and performance of nonmetallic tanks for the storage of new and waste cooking oil, among other applications. Section 610.3 (1) already requires nonmetallic tanks to be listed for use with cooking oil, this proposal merely identifies the standard used to list these systems. The reference to 200 gallons as retained in Section 610.3 (2) since this is the maximum capacity cooking oil tank allowed in UL 2152. That standard also includes requirements evaluating containment of high temperature cooking oil so that reference is no longer needed in Section 610.3 (1).

One company already has a UL 2152 listing for their cooking oil storage tanks.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire safety and hazardous materials in new and existing buildings and facilities and the protection of life and property in wildland urban interface areas. In 2014 and 2015 the Fire-CAC has held 5 open meetings. In addition, there were numerous conference calls, Regional Work Group and Task Group meetings for the current code development cycle, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC

Cost Impact: Will not increase the cost of construction

This proposal does not add additional construction requirements to the code.

Analysis: A review of the standard(s) proposed for inclusion in the code, UL 2152-15 Outline of Investigation for Special Purpose Nonmetallic Containers & Tanks for Specific Combustible or Noncombustible Liquids with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1, 2016.

F110-16 : 610.3-O'BRIAN10725
2015 International Fire Code

Add new text as follows:

105.7.9 Fuel cell power systems. A construction permit is required to install stationary fuel cell power systems.

Add new definition as follows:

SECTION 202 DEFINITIONS

FUEL CELL POWER SYSTEM, STATIONARY. A stationary energy generation system that converts the chemical energy of a fuel and oxidant to electric energy (DC or AC electricity) by an electrochemical process.

Field fabricated fuel cell power system. A stationary fuel cell power system that is assembled at the job site and is not a pre-engineered or prepackaged factory assembled fuel cell power system.

Pre-engineered fuel cell power system. A stationary fuel cell power system consisting of components and modules that are produced in a factory, and shipped to the job site for assembly.

Prepackaged fuel cell power system. A stationary fuel cell power system that is factory assembled as a single, complete unit and shipped as a complete unit for installation at the job site.

Revise as follows:

602.1 Definitions. The following terms are defined in Chapter 2:

- BATTERY SYSTEM, STATIONARY LEAD-ACID.
- BATTERY TYPES.
- COMMERCIAL COOKING APPLIANCES.
- CRITICAL CIRCUIT.
- EMERGENCY POWER SYSTEM.
- FUEL CELL POWER SYSTEM, STATIONARY.
- FIELD FABRICATED FUEL CELL POWER SYSTEM.
- PRE-ENGINEERED FUEL CELL POWER SYSTEM.
- PREPACKAGED FUEL CELL POWER SYSTEM.
- EMERGENCY POWER SYSTEM HOOD.
- HOOD Type I.
- Type I, II.
- Type II REFRIGERANT.
- REFRIGERANT REFRIGERATION SYSTEM.
- REFRIGERATION STANDBY POWER SYSTEM.
- STANDBY POWER SYSTEM.

Add new text as follows:
CHAPTER PART  SECTION 612— STATIONARY FUEL CELL POWER SYSTEMS

612.1 General. Stationary fuel cell power systems in new and existing occupancies shall comply with this section.

612.2 Permits. Permits shall be obtained for stationary fuel cell power systems as set forth in Sections 105.7.9.

612.3 Equipment. Stationary fuel cell power systems shall comply with the following:

1. Prepackaged fuel cell power systems shall be listed and labeled in accordance with CSA FC 1.
2. The modules and components in a pre-engineered fuel cell power system shall be listed and labeled in accordance with CSA FC 1 and interconnected to complete the assembly of the system at the job site in accordance with the manufacturer's instructions and their listings.
3. Field fabricated fuel cell power systems shall be approved based on a review of the technical report provided in accordance with Section 104.7.2. The report shall be prepared by, and bear the stamp of a registered design professional and shall include:
   3.1. A fire risk evaluation.
   3.2. An evaluation demonstrating that modules and components in the fuel cell power system comply with applicable requirements in CSA FC 1.
   3.3. Documentation of the fuel cell power system's compliance with applicable NFPA 2 and NFPA 853 construction requirements.

612.4 Installation. Stationary fuel cell power systems shall be installed and maintained in accordance with NFPA 70 and NFPA 853, the manufacturer's installation instructions, and the listing. Stationary fuel cell power systems fueled by hydrogen shall be installed and maintained in accordance with NFPA 2 and NFPA 70, the manufacturer's installation instructions, and the listing.

612.5 Residential use. Stationary fuel cell power systems shall not be installed in Group R-3 and R-4 buildings, or dwelling units associated with Group R-2 buildings unless they are specifically listed for residential use.

612.6 Indoor installations. Stationary fuel cell power systems installed in indoor locations shall comply with this section. For purposes of this section an indoor location includes a roof and 50 percent or greater enclosing walls.

612.6.1 Listed. The stationary fuel cell power systems installed indoors shall be specifically listed and labeled for indoor use.

612.6.2 Separation. Where stationary fuel cell power systems are installed indoors the indoor area in which the system is located shall be treated as an incidental use area and be separated from Group B, F, M, S and U occupancies by one-hour fire resistive construction, and from Group A, E, I and R occupancies by two-hour fire resistive construction. Separation shall be provided in accordance with Section 509 of the International Building Code. Exception: Stationary fuel cell power systems with an aggregate rating less than 50 Kw shall not be required to be separated from other occupancies provided the systems comply with NFPA 853, Section 9.3 requirements.
612.6.2.1 **Group F, S and U occupancies.** Stationary fuel cell power systems located outside of an incidental use area within Group F, S and U occupancies shall be separated from other F, S and U occupancies and Group B and M occupancies by one-hour fire resistive construction, and from Group A, E, I and R occupancies by two-hour fire resistive construction.

612.6.2.2 **Group A, B, E, I, M or R occupancies.** Stationary fuel cell power systems shall not be located in Group A, B, E, I, M or R occupancies unless treated as an incidental use as required in Section 612.6.2.

612.7 **Vehicle impact protection.** Where stationary fuel cell power systems are subject to impact by a motor vehicle, vehicle impact protection shall be provided in accordance with Section 312.

612.8 **Separation.** Stationary fuel cell power systems located outdoors shall be separated by not less than five feet (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. Any portion of a designated means of egress system
8. Other exposure hazards

612.9 **Fuel supply.** The design, location and installation of the fuel supply for stationary fuel cell power systems shall comply with Chapter 53, Chapter 58 and the International Fuel Gas Code based on the particular fuel being supplied to the system.

612.10 **Manual shutoff.** An accessible manual shutoff valve shall be provided for the fuel piping within 6 feet (1.8m) of any fuel storage tank serving the fuel cell and within 6 feet (1.8 m) of the power system. If the fuel tank and the stationary fuel cell power system are less than 12 feet (3.6 m) apart, a single shutoff valve shall be permitted. If the stationary fuel cell power system is located indoors the shutoff valve shall be located outside of the room in which the system is installed, unless otherwise approved by the code official.

612.11 **Ventilation and exhaust.** Ventilation and exhaust for fuel cell systems shall be provided in accordance with NFPA 853.

612.12 **Fire suppression** Fire suppression for fuel cell power system installations shall be provided in accordance with NFPA 853.

612.13 **Gas detection systems.** Fuel cell power systems shall be provided with a gas detection system. Detection shall be provided in approved locations in the fuel cell power system enclosure, the exhaust system, or the room that encloses the fuel cell power system. The system shall be designed to activate at a flammable gas concentration of not more than 25 percent of the lower flammable limit (LFL).

612.13.1 **System activation.** The activation of the gas detection system shall automatically:

1. Close valves between the gas supply and the fuel cell power system.
2. Shut down the fuel cell power system.
3. Initiate local audible and visible alarms in approved locations.
Reference standards type: This reference standard is new to the ICC Code Books
Add new standard(s) as follows:
CSA AMERICA INC. 8501 East Pleasant Valley Road Cleveland, Ohio 44131
CSA FC 1 – 2012 Stationary Fuel Cell Power Systems

NFPA Standard

853 – 15 Installation of Stationary Fuel Cell Power Systems

Reason: Fuel cell power systems are being used in ever increasing numbers to meet facility energy needs. Stationary fuel cell power systems generate power through an electrochemical process that combines hydrogen and oxygen to produce electricity. The hydrogen comes from a direct hydrogen source or from any hydrocarbon fuel such as natural gas, gasoline, diesel, or methanol if the fuel cell power system includes integral reforming. The oxygen comes from air around the fuel cell. A new section is being proposed in the IFC which provides a comprehensive set of requirements to mitigate potential hazards associated with the installation and use of stationary fuel cell power systems.

Three referenced documents form the basis for these requirements:

ANSI/CSA FC 1 standard is used to investigate and list the stationary fuel cells covered by this section. The construction and performance requirements in that standard address a variety of hazards, including mechanical, electrical, thermal, malfunction, erroneous human intervention and environmental.

NFPA 853, the Standard for the Installation of Stationary Fuel Cell Power Systems includes requirements for the design, construction, and installation of stationary fuel cell power systems.

NFPA 2, the Hydrogen Technologies Code covers the production, storage, transfer, and use of hydrogen in all occupancies and on all premises. Chapter 12 of this code includes requirements for the design, construction, and installation of stationary fuel cell power systems which are extracted from NFPA 853.

Comments on portions of the proposal are as follows:

612.3 - Currently three companies have prepackaged stationary fuel cell power systems listed by UL for nonresidential indoor and outdoor use, so it is appropriate to require these products to be listed since it will be difficult if not impossible for fire code officials to verify that the systems comply with NFPA 853.

The listing and installation requirements proposed in this section for prepackaged, pre-engineered and field fabricated stationary fuel cell power systems are consistent with, but not identical to, NFPA 853 requirements.

The criteria for approving field fabricated fuel cell power systems is based on NFPA 853 and criteria that is difficult for the code official to obtain and evaluate during plan review and initial inspection.

612.5 – Systems are listed for both residential and nonresidential use based on requirements in the two referenced documents noted above.

612.6 – Systems are listed for either indoor or outdoor use. The 50% wall limitation is from NFPA 853, Section 3.3.15.2. Occupancy separations are based on the incidental use occupancy separations established for hydrogen fuel rooms and stationary battery systems (see IBC table 509).

Exception 1 that allows systems in industrial type occupancies is consistent with the requirements in NFPA 853, Section 5.3.

Exception 2 that covers systems < 50 Kw is consistent with NFPA 853, Section 9.3.

612.6.3 is based on IBC Section 905.3.1 and will make sure the indoor stationary fuel cell power systems are in locations that can be effectively responded to by the fire department and emergency responders if needed.

612.8 separation requirements are based on, but not identical to, separation requirements in NFPA 853, Section 5.1.1, and are provided in the IFC as a convenience for the code user.

612.10 – Manual shutoff requirements are based on, but not identical to, requirements in NFPA 853, Section 6.4.

612.11 – Ventilation, exhaust, fire suppression and gas detection are important parts of a safe installation and references to NFPA 853 are provided as a convenience to the code user.

612.3 – Gas detection system requirements include detection locations from UL 853 and activation criteria that are consistent with IFC requirements.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire safety and hazardous materials in new and existing buildings and facilities and the protection of life and property in...
wildland urban interface areas. In 2014 and 2015 the Fire-CAC has held 5 open meetings. In addition, there were numerous conference calls, Regional Work Group and Task Group meetings for the current code development cycle, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC

Cost Impact: Will increase the cost of construction
There are no requirements in the code that specifically regulate these systems. Complying with the proposed requirements will result in increased construction and maintenance expenses.

A review of the standard(s) proposed for inclusion in the code, CSA FC 1 – 2012 Stationary Fuel Cell Power Systems and NFPA Standard 853 – 15 Installation of Stationary Fuel Cell Power Systems with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1, 2016.
**F112-16**

IFC: 105.6.14 (New), 105.7.4 (New), 202 (New), 612 (New), 907.2.24 (New)
[IBC:[F] 907.2.24(New)], IBC; [F] 307.1.1, Table 509

Proponent: Michael O'Brian representing the Fire Code Action Committee (FCAC@iccsafe.org)

2015 International Fire Code

Add new text as follows:

**105.6.14 Capacitor energy storage systems.** An operational permit is required for the operation of capacitor energy storage systems regulated by Section 612.

**105.7.4 Capacitor energy storage systems.** A permit is required to install capacitor energy storage systems regulated by Section 612.

Add new definition as follows:

**SECTION 202 DEFINITIONS**

**CAPACITOR ENERGY STORAGE SYSTEM.** A stationary, rechargeable energy storage system consisting of capacitors, chargers, controls, and associated electrical equipment designed to provide electrical power to a building. The system is typically used to provide standby or emergency power, an uninterruptable power supply, load shedding, load sharing or similar capabilities.

**Pre-engineered capacitor energy storage system.** A capacitor energy storage system consisting of capacitors, an energy management system, components and modules that are produced in a factory, designed to comprise the system when assembled and shipped to the job site for assembly.

**Prepackaged capacitor energy storage system.** A capacitor energy storage system consisting of capacitors, an energy management system, components and modules that is factory assembled and then shipped as a complete unit for installation at the job site.

Add new text as follows:

**SECTION 612 CAPACITOR ENERGY STORAGE SYSTEMS**

**612.1 Scope.** Capacitor energy storage systems having capacities exceeding 70 KWh (252 Mega joules) shall comply with this section.

**612.1.2 Permits.** Permits shall be obtained for the installation and operation of capacitor energy storage systems in accordance with Sections 105.6.14 and 105.7.4.

**612.1.3 Construction documents.** The following information shall be provided with the permit application:

1. Location and layout diagram of the room in which the capacitor energy storage system is to be installed
2. Details on hourly fire-resistant rated assemblies provided
3. Quantities and types of capacitors in the system.
4. Manufacturer's specifications, ratings and listings of capacitors and capacitor energy
storage systems
5. Location and content of signage
6. Details on fire suppression, smoke detection and ventilation systems.
7. Rack storage arrangement, including seismic support criteria.

612.1.4 Hazard mitigation analysis. A hazard mitigation analysis, applicable to the capacitors shall be approved and comply with Section 612.1.4.1 and 612.1.4.2 and this section. A failure modes and effects analysis (FMEA) or other approved hazard mitigation analysis shall be provided in accordance with Section 104.7.2 under any of the following conditions:

1. Capacitor technologies not specifically identified in this code are provided.
2. More than one capacitor energy storage system 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.

612.1.4.1 Fault condition. The hazard mitigation analysis shall evaluate the consequences of the following failure modes, and others deemed necessary by the fire code official. Only single failure modes shall be considered.

1. Thermal runaway condition in a single capacitor rack, module or array.
2. Failure of any energy management system.
3. Failure of any required ventilation system.
4. Voltage surges on the primary electric supply.
5. Short circuits on the load side of the capacitor energy storage system.
6. Failure of the smoke detection, fire suppression, or gas detection system.
7. Spill neutralization not being provided or failure of the secondary containment system.

612.1.4.2 Analysis approval. The fire code official is authorized to approve the hazardous mitigation analysis provided the consequences of the hazard mitigation analysis demonstrate:

1. Fires or explosions will be contained within unoccupied capacitor energy storage rooms for the minimum duration of the fire resistance rated walls identified in IBC table 509.1.
2. Fires and explosions in cabinets in occupied work centers will be detected in time to allow occupants within the room to safely evacuate.
3. Toxic and highly toxic gases released during fires and other fault conditions shall not reach concentrations in access of IDLH level in the building or adjacent means of egress routes during the time deemed necessary to evacuate from that area.
4. Flammable gases released from batteries during charging, discharging and normal operation shall not exceed 25% of their lower flammability limit (LFL).
5. Flammable gases released from batteries during fire, overcharging and other abnormal conditions shall not create an explosion hazard that will injure occupants or emergency responders.

612.1.5 Seismic and structural design. Capacitor energy storage systems shall comply with the seismic design requirements in Chapter 16 of the International Building Code, and shall not exceed the floor loading limitation of the building.

612.1.6 Vehicle impact protection. Where capacitor energy storage systems are subject to
impact by a motor vehicle, including fork lifts, vehicle impact protection shall be provided in accordance with Section 312.

612.1.7 Combustible storage. Combustible materials not related to the capacitor energy storage system shall not be stored in capacitor rooms.

612.1.8 Testing, maintenance and repairs. Capacitors and associated equipment and systems shall be tested and maintained in accordance with the manufacturer's instructions. Any capacitors or system components used to replace existing units shall be compatible with the capacitor charger, energy management systems, other capacitors, and other safety systems. Introducing other types of capacitors into the capacitor energy storage system shall be treated as a new installation and require approval by the fire code official before the replacements are introduced into service.

612.2 Location, construction and signage. The location, construction and signage for capacitor energy storage systems shall be in accordance with Sections 612.2.1 through 612.2.4.

612.2.1 Location and construction. The location and construction of capacitor energy storage systems within buildings shall be in accordance with Sections 612.2.1.1 through 612.2.1.5.1.

612.2.1.1 Location. Capacitor energy storage systems shall not be located in areas where the floor is located more than 75 feet (22 860 mm) above the lowest level of fire department vehicle access, or where the floor level is more than 30 feet (9144 mm) below the finished floor of the lowest level of exit discharge.

612.2.1.2 Separation. Rooms containing capacitor energy storage systems shall be separated from other areas of the building in accordance with Section 509.1 of the International Building Code. Capacitor energy storage systems shall be allowed to be in the same room with the equipment they support.

612.2.1.3 Capacitor energy storage system arrays. Capacitor energy storage systems shall be segregated into arrays not exceeding 50 KWh (180 Mega joules) each. Each array shall be spaced a minimum three feet (914 mm) from other arrays and from walls in the storage room or area. The storage arrangements shall comply with Chapter 10.

Exception: Listed pre-engineered capacitor energy storage systems and listed prepackaged capacitor energy storage systems shall not exceed 150 KWh (540 Mega joules) each.

612.2.1.4 Separate rooms. Where stationary batteries are installed in a separate equipment room accessible only to authorized personnel, they shall be permitted to be installed on an open rack for ease of maintenance.

612.2.1.5 Occupied work areas. Where stationary capacitors are located in an occupied work center, they shall be housed in a noncombustible cabinet or other enclosure to prevent access by unauthorized personnel.

612.2.2 Signage. Approved signs shall be provided on doors or in locations adjacent to the entrances to capacitor energy storage system rooms and shall include the following or equivalent.

1. A minimum 8 in. (200 mm) wide and 6 in. (150 mm) high sign with:
   a. CAUTION
   b. CAPACITOR ENERGY STORAGE ROOM
   c. THIS ROOM CONTAINS ENERGIZED ELECTRICAL CIRCUITS, AUTHORIZED PERSONNEL ONLY, and
   d. An identification of the type of capacitors present and the potential hazards
associated with the capacitor type.

2. Hazard identification markings in accordance with NFPA 704.

**Exception:** AUTHORIZED PERSONNEL ONLY markings are not required for entrances to occupied work centers that comply with Section 608 requirements.

**612.2.3 Cabinet signage.** Capacitor energy storage systems located in cabinets provided in occupied work centers in accordance with Section 608.2.5 shall have exterior labels that indicate CAUTION, CAPACITOR ENERGY SYSTEM CABINET, THIS CABINET CONTAINS ENERGIZED ELECTRICAL CIRCUITS, AUTHORIZED PERSONNEL ONLY.

**612.2.4 Electrical disconnects.** Where the capacitor energy storage system disconnecting means is not within sight of the main service disconnecting means, placards or directories shall be installed at the location of the main service disconnecting means indicating the location of the capacitor energy storage system disconnecting means in accordance with NFPA 70.

**612.2.5 Outdoor installations.** Capacitor energy storage systems located outdoors shall comply with Sections 612.2.5.1 through 612.2.5.4, in addition to all applicable requirements of Section 612. Installations in outdoor enclosures or containers which can be occupied for servicing, testing, maintenance and other functions shall be treated as capacitor energy storage system rooms.

**Exception:** Capacitor energy storage arrays in noncombustible containers shall not be required to be spaced three feet (914 mm) from the container walls.

**612.2.5.1 Separation.** Capacitor energy storage systems located outdoors shall be separated by a minimum five feet (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

**612.2.5.2 Means of egress.** Capacitor energy storage systems located outdoors shall be separated from any means of egress as required by the fire code official to ensure safe egress under fire conditions, but in no case less than 10 feet (3048 mm).

**612.2.5.3 Security of outdoor areas.** Outdoor areas in which capacitor energy storage systems are located shall be secured against unauthorized entry and safeguarded in an approved manner.

**612.2.5.4 Walk in units.** Where a capacitor energy storage system includes an outer enclosure, the unit shall only be entered for inspection, maintenance and repair of batteries and electronics, and shall not be occupied for other purposes.

**612.3 Maximum allowable quantities.** Fire areas within buildings containing capacitor energy storage systems that exceed 600 KWh of energy capacity shall comply with all applicable High Hazard Group H occupancy requirements in this code and the International Building Code.

**Exception:** Where approved by the fire code official, areas containing capacitor energy
storage systems that exceed 600 KWh shall be treated as incidental use areas and not Group H occupancies based on a hazardous mitigation analysis in accordance with Section 612.1.4 and large scale fire and fault condition testing conducted or witnessed and reported by an approved testing laboratory.

612.4 Capacitors and equipment. The design and installation of capacitors, capacitor energy storage systems, and related equipment shall comply with this section.

612.2.1.5.1 Cabinets. Where stationary capacitors are contained in cabinets in occupied work centers, the cabinet enclosures shall be located within 10 feet (3048 mm) of the equipment that they support.

612.4.1 Listings. Capacitors and capacitor energy storage systems shall comply with the following:

1. Capacitors shall be listed in accordance with UL 1973.
2. Prepackaged and pre-engineered stationary capacitor energy storage systems shall be listed in accordance with UL 9540.

612.4.2 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.

612.4.3 Energy management system. An approved energy management system shall be provided for monitoring and balancing capacitor 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 such as short circuits, overvoltage (overcharge) or under voltage (over discharge) are detected.

612.4.4 Capacitor chargers. Capacitor chargers shall be compatible with the capacitor manufacturer's electrical ratings and charging specifications. Capacitor chargers shall be listed and labeled in accordance with the UL 1564 or provided as part of a listed pre-engineered or prepackaged capacitor energy storage system.

612.4.5 Inverters. Inverters shall be listed and labeled in accordance with UL 1741. Only inverters listed and labeled for utility interactive system use and identified as interactive shall be permitted to operate in parallel with the electric utility power system to supply power to common loads.

612.4.6 Toxic and highly toxic gas. Capacitor energy storage systems that have the potential to release toxic and highly toxic materials during charging, discharging and normal use conditions shall comply with Chapter 60.

612.5 Detection and protection systems. Fire suppression, smoke detection, mechanical ventilation and gas detection shall be provided in rooms containing capacitor energy storage systems as required for stationary storage battery systems in accordance with Section 608.5 through 608.5.4.

612.5.1 Fire suppression systems. Rooms containing capacitor energy storage systems shall be equipped with an automatic sprinkler system installed in accordance with Section 903.3.1.1. Commodity classifications for specific technologies capacitors shall be in accordance with Chapter 5 of NFPA 13. If the capacitor types are not addressed in Chapter 5 of NFPA 13, the fire code official is authorized to approve the fire suppression system based on full scale fire and fault condition testing conducted or witnessed and reported by an approved laboratory.
612.5.1.1 Alternative suppression systems. Capacitor energy systems that utilize water reactive materials shall be protected by an approved alternative automatic fire-extinguishing system in accordance with Section 904. The system shall be listed for protecting the type, arrangement and quantities of capacitors in the room. The fire code official shall be permitted to approve the alternate fire suppression system based on full scale fire and fault condition testing conducted or witnessed and reported by an approved laboratory.

612.5.2 Smoke protection system. An approved automatic smoke detection system shall be installed in rooms containing capacitor energy storage systems in accordance with Section 907.2.

612.5.3 Mechanical ventilation. Ventilation of rooms containing capacitor energy storage systems shall be provided in accordance with the International Mechanical Code and the following:

1. The ventilation system shall operate continuously or be designed to operate upon activation of the gas detection system.
2. The system shall provide ventilation at a rate of not less than 1 cubic foot per minute (cfm) per square foot \(0.00508 \text{m}^3/(\text{s} \cdot \text{m}^2)\) of floor area, but not less than 150 cfm (4 m3/min).
3. The exhaust system shall be designed to provide air movement across all parts of the floor for gases having a vapor density greater than air and across all parts of the vault ceiling for gases having a vapor density less than air.

612.5.3.1 Cabinet ventilation. Cabinets located in occupied spaces containing capacitors shall be provided with mechanical ventilation in accordance with this section.

612.5.3.2 Supervision. Required mechanical ventilation systems for rooms and cabinets containing capacitors shall be supervised by an approved central station, proprietary or remote station service or shall initiate an audible and visual signal at an approved constantly attended on-site location.

612.5.4 Gas detection system. Rooms containing stationary capacitor energy storage systems shall be protected by a continuous gas detection system. The gas detection system shall be designed to activate where the level of flammable gas exceeds 25 percent of the lower flammable limit (LFL), or where the level of toxic or highly toxic gases exceeds the permissible exposure limits (PEL).

612.5.4.1 System activation. Activation of the gas detection system shall result in all the following:

1. Initiation of distinct audible and visible alarms in the capacitor energy storage system room.
2. Transmission of an alarm to an approved location.
3. De-energizing of the capacitor.
4. Activation of the mechanical ventilation system, where the system is interlocked with the gas detection system.

612.6 Spill control and neutralization. Capacitor energy storage systems that contain free electrolytes and other hazardous materials shall be provided with spill control and neutralization
as required in Section 608.5.5 for stationary storage battery systems.

907.2.24 (IBC [F] 907.2.24) Capacitor energy storage systems. An automatic smoke detection system shall be installed in areas containing capacitor energy storage systems as required by Section 612.

2015 International Building Code

Revise as follows:

[F] 307.1.1 Uses other than Group H. An occupancy that stores, uses or handles hazardous materials as described in one or more of the following items shall not be classified as Group H, but shall be classified as the occupancy that it most nearly resembles.

1. Buildings and structures occupied for the application of flammable finishes, provided that such buildings or areas conform to the requirements of Section 416 and the International Fire Code.
2. Wholesale and retail sales and storage of flammable and combustible liquids in mercantile occupancies conforming to the International Fire Code.
3. Closed piping system containing flammable or combustible liquids or gases utilized for the operation of machinery or equipment.
4. Cleaning establishments that utilize combustible liquid solvents having a flash point of 140°F (60°C) or higher in closed systems employing equipment listed by an approved testing agency, provided that this occupancy is separated from all other areas of the building by 1-hour fire barriers constructed in accordance with Section 707 or 1-hour horizontal assemblies constructed in accordance with Section 711, or both.
5. Cleaning establishments that utilize a liquid solvent having a flash point at or above 200°F (93°C).
7. Refrigeration systems.
8. The storage or utilization of materials for agricultural purposes on the premises.
9. Stationary batteries utilized for facility emergency power, uninterruptable power supply or telecommunication facilities, provided that the batteries are provided with safety venting caps and ventilation is provided in accordance with the International Mechanical Code.
10. Capacitor energy storage systems installed in accordance with the International Fire Code.
11. Corrosive personal or household products in their original packaging used in retail display.
12. Commonly used corrosive building materials.
13. Buildings and structures occupied for aerosol storage shall be classified as Group S-1, provided that such buildings conform to the requirements of the International Fire Code.
14. Display and storage of nonflammable solid and nonflammable or noncombustible liquid hazardous materials in quantities not exceeding the maximum allowable quantity per control area in Group M or S occupancies complying with Section 414.2.5.
15. The storage of black powder, smokeless propellant and small arms primers in Groups M and R-3 and special industrial explosive devices in Groups B, F, M and S, provided such storage conforms to the quantity limits and requirements prescribed in the International Fire Code.
<table>
<thead>
<tr>
<th>ROOM OR AREA</th>
<th>SEPARATION AND/OR PROTECTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Furnace room where any piece of equipment is over 400,000 Btu per hour input</td>
<td>1 hour or provide automatic sprinkler system</td>
</tr>
<tr>
<td>Rooms with boilers where the largest piece of equipment is over 15 psi and 10 horsepower</td>
<td>1 hour or provide automatic sprinkler system</td>
</tr>
<tr>
<td>Refrigerant machinery room</td>
<td>1 hour or provide automatic sprinkler system</td>
</tr>
<tr>
<td>Hydrogen fuel gas rooms, not classified as Group H</td>
<td>1 hour in Group B, F, M, S and U occupancies; 2 hours in Group A, E, I and R occupancies.</td>
</tr>
<tr>
<td>Incinerator rooms</td>
<td>2 hours and provide automatic sprinkler system</td>
</tr>
<tr>
<td>Paint shops, not classified as Group H, located in occupancies other than Group F</td>
<td>2 hours; or 1 hour and provide automatic sprinkler system</td>
</tr>
<tr>
<td>In Group E occupancies, laboratories and vocational shops not classified as Group H</td>
<td>1 hour or provide automatic sprinkler system</td>
</tr>
<tr>
<td>In Group I-2 occupancies, laboratories not classified as Group H</td>
<td>1 hour and provide automatic sprinkler system</td>
</tr>
<tr>
<td>In ambulatory care facilities, laboratories not classified as Group H</td>
<td>1 hour and provide automatic sprinkler system</td>
</tr>
<tr>
<td>Laundry rooms over 100 square feet</td>
<td>1 hour or provide automatic sprinkler system</td>
</tr>
<tr>
<td>In Group I-2, laundry rooms over 100 square feet</td>
<td>1 hour</td>
</tr>
<tr>
<td>Group I-3 cells and Group I-2 patient rooms equipped with padded surfaces</td>
<td>1 hour</td>
</tr>
<tr>
<td>In Group I-2, physical plant maintenance shops</td>
<td>1 hour</td>
</tr>
<tr>
<td>In ambulatory care facilities or Group I-2 occupancies, waste and linen collection rooms with containers that have an aggregate volume of 10 cubic feet or greater</td>
<td>1 hour</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>In other than ambulatory care facilities and Group I-2 occupancies, waste and linen collection rooms over 100 square feet</td>
<td>1 hour or provide automatic sprinkler system</td>
</tr>
<tr>
<td>In ambulatory care facilities or Group I-2 occupancies, storage rooms greater than 100 square feet</td>
<td>1 hour</td>
</tr>
<tr>
<td>Stationary storage battery systems having a liquid electrolyte capacity of more than 50 gallons for flooded lead-acid, nickel cadmium or VRLA, or more than 1,000 pounds for lithium-ion and lithium metal polymer used for facility standby power, emergency power or uninterruptable power supplies</td>
<td>1 hour in Group B, F, M, S and U occupancies; 2 hours in Group A, E, I and R occupancies.</td>
</tr>
<tr>
<td>Capacitor energy storage systems having an energy capacity greater than the threshold quantity specified in Section 612.1 of the International Fire Code.</td>
<td>1 hour in Group B, F, M, S and U occupancies; 2 hours in Group A, E, I and R occupancies.</td>
</tr>
</tbody>
</table>

For SI: 1 square foot = 0.0929 m², 1 pound per square inch (psi) = 6.9 kPa, 1 British thermal unit (Btu) per hour = 0.293 watts, 1 horsepower = 746 watts, 1 gallon = 3.785 L, 1 cubic foot = 0.0283 m³.

**Reference standards type:** This reference standard is new to the ICC Code Books  
**Add new standard(s) as follows:**  
**UL 1741 - 2015** Inverters, Converters, Controllers and Interconnection System Equipment for Use With Distributed Energy Resources  
**UL 1973** Standard for Batteries for Use in Light Electric Rail (LER) Applications and Stationary Applications  
**UL 9540** Standard for Energy Storage Systems and Equipment  

**Reason:** The U.S. Department of Energy is working with a wide range of stakeholders to encourage the development of large scale electrical energy storage systems (ESS). ESS are needed because the amount of electricity that can be generated on the electrical grid is relatively fixed over short periods of time, although demand for electricity fluctuates throughout the day. Developing technology to store electrical energy so it can be available to meet demand is being actively pursued with a number of energy storage technologies, including battery storage systems and electrochemical capacitors, among others. The upcoming widespread installation of large ESS systems into existing buildings poses significant hazards to occupants and emergency responders due to the nature of the technologies involved and the large amounts energy...
being stored. These systems are largely unregulated by the IBC and IFC, especially capacitors energy storage systems (CESS) which are just largely under development have the potential to be a significant energy storage source by 2018.

This proposal, which is a companion proposal to the FCAC stationary storage battery system proposal, establishes basic protection requirements for CESS. Without these requirements, these systems will be virtually unregulated by 2018 fire and building codes. This proposal includes safety measures that are similar to the FCAC proposed battery storage system requirements, with some modifications as noted below.

1. Revisions are proposed to IBC Section 307.1.1 and Table 509.1 to allow CESS under the MAQ to be allowed in incidental use areas of buildings, and to not have to comply with hazardous material requirements, which is consistent with current battery storage system requirements. The intent of this proposal is to support the DOE energy storage initiative by allowing significant quantities of capacitors in incidental use areas of buildings, with a reasonable number of protection measures in place to protect occupants and emergency responders in the event of a fire or other incident originating from, or impinging on the CESS.

2. Construction and operational permits are required for CESS systems above the threshold amounts in Section 612.1.

3. The protection concepts in Sections 612.1.1 though 612.2.4 are based FCAC proposed battery storage system requirements.

4. Section 612.3 includes a MAQ of 600 KWh for all capacitor technologies. Installations in excess of this amount cannot be located in incidental use areas of buildings and must be located in Group H occupancies.

5. Sections 612.4 to 612.6 are based on FCAC proposed battery storage system requirements.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire safety and hazardous materials in new and existing buildings and facilities and the protection of life and property in wildland urban interface areas. In 2014 and 2015 the Fire-CAC has held 5 open meetings. In addition, there were numerous conference calls, Regional Work Group and Task Group meetings for the current code development cycle, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC

Cost Impact: Will increase the cost of construction
This proposal introduces a number of new requirements for capacitor energy storage system installations that were previously unregulated.

Analysis: A review of the standard(s) proposed for inclusion in the code,

- **UL 1741 - 2015** Inverters, Converters, Controllers and Interconnection System Equipment for Use With Distributed Energy Resources
- **UL 1973** Standard for Batteries for Use in Light Electric Rail (LER) Applications and Stationary Applications
- **UL 9540** Standard for Energy Storage Systems and Equipment

with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1, 2016.
2015 International Fire Code

Add new definition as follows:

SECTION 202 DEFINITIONS

[BF] MEMBRANE-PENETRATION FIRESTOP SYSTEM. An assemblage consisting of a fire-resistance-rated floor-ceiling, roof-ceiling or wall assembly, one or more penetrating items installed into or passing through the breach in one side of the assembly and the materials or devices, or both, installed to resist the spread of fire into the assembly for a prescribed period of time.

SECTION 202 DEFINITIONS

[BF] OPENING PROTECTIVE. A fire door assembly, fire shutter assembly, fire window assembly or glass-block assembly in a fire-resistance-rated wall or partition.

SECTION 202 DEFINITIONS

SMOKE PARTITION. A wall assembly that extends from the top of the foundation or floor below to the underside of the floor or roof sheathing, deck or slab above or to the underside of the ceiling above where the ceiling membrane is constructed to limit the transfer of smoke.

SECTION 202 DEFINITIONS

[BF] THROUGH-PENETRATION FIRESTOP SYSTEM. An assemblage consisting of a fire-resistance-rated floor, floor-ceiling or wall assembly, one or more penetrating items passing through the breaches in both sides of the assembly and the materials or devices, or both, installed to resist the spread of fire through the assembly for a prescribed period of time.

SECTION 701 GENERAL

Revise as follows:

701.1 Scope. The provisions of this chapter shall govern the inspection and maintenance of the materials, systems and assemblies used for structural fire resistance and fire-resistance-rated construction separation of adjacent spaces and smoke resistant construction to safeguard against the spread of fire and smoke within a building and the spread of fire to or from buildings. New buildings shall comply with the International Building Code.

Add new text as follows:

701.2 Fire-resistance-rated construction. The fire-resistance rating of the following fire-
resistance-rated construction shall be maintained:

1. Structural members.
2. Exterior walls.
3. Fire walls, fire barriers, fire partitions.
4. Horizontal assemblies.
5. Shaft enclosures.

Revise as follows:

703.3 701.2.1 Ceilings Hanging displays. No change to text.

Delete without substitution:

703.1.3 Fire walls, fire barriers and fire partitions. Required fire walls, fire barriers and fire partitions shall be maintained to prevent the passage of fire. Openings protected with approved doors or fire dampers shall be maintained in accordance with NFPA 80.

Add new text as follows:

701.3 Smoke barriers. The fire-resistance rating and smoke resistant characteristics of smoke barriers shall be maintained.

Delete without substitution:

703.1.2 Smoke barriers and smoke partitions. Required smoke barriers and smoke partitions shall be maintained to prevent the passage of smoke. Openings protected with approved smoke barrier doors or smoke dampers shall be maintained in accordance with NFPA 105.

Add new text as follows:

701.4 Smoke partitions. The smoke resistant characteristics of smoke partitions shall be maintained.

701.5 Maintaining protection. Materials, systems and devices used to repair or protect breaches and openings in fire-resistance-rated construction and smoke resistant construction shall be maintained in accordance with Sections 703 through 707.

Revise as follows:

703.1 701.6 Maintenance Owner's responsibility. The required fire-resistance rating fire-resistance-rated and smoke-resistant construction, including, but not limited to, walls, firestops, shaft enclosures, partitions, smoke barriers, floors, fire resistive coatings and sprayed fire resistant materials applied to structural members and fire resistant joint systems, shall be maintained. Such elements the construction included in Sections 703 through 707 shall be visually inspected by the owner annually and properly repaired, restored or replaced where damaged, altered, breached or penetrated. Records of inspections and repairs shall be maintained. Where concealed, such elements shall not be required to be visually inspected by the owner unless the concealed space is accessible by the removal or movement of a panel, access door, ceiling tile or similar movable entry to the space. Openings made therein for the passage of pipes, electrical conduit, wires, ducts, air transfer openings and holes made for any reason shall be protected with approved methods capable of resisting the passage of smoke and fire. Openings through fire-resistance-rated assemblies shall be protected by self- or automatic-closing doors of approved construction meeting the fire
701.2 Unsafe conditions. Where any components in this chapter are not maintained and do not function as intended or do not have the fire resistance or the resistance to the passage of smoke required by the code under which the building was constructed, remodeled or altered, such component(s) or portion thereof shall be deemed an unsafe condition, in accordance with Section 110.1.1. Components or portions thereof determined to be unsafe shall be repaired or replaced to conform to that code under which the building was constructed, remodeled, altered or this chapter, as deemed appropriate by the fire code official.

Where the extent of the conditions of components is such that any building, structure or portion thereof presents an imminent danger to the occupants of the building, structure or portion thereof, the fire code official shall act in accordance with Section 110.2.

SECTION 702 DEFINITIONS

702.1 Definitions. The following terms are defined in Chapter 2:

DRAFTSTOP.
FIRE-RESISTANT JOINT SYSTEM.
FIREBLOCKING.
FIRE-RESISTANT JOINT SYSTEM.
MEMBRANE-PENETRATION FIRESTOP SYSTEM.
OPENING PROTECTIVE.
SMOKE BARRIER.
SMOKE PARTITION.
FIREBLOCKING THROUGH-PENETRATION FIRESTOP SYSTEM.

SECTION 703 FIRE-RESISTANCE-RATED CONSTRUCTION PENETRATIONS

Add new text as follows:

703.1 Maintaining protection. Materials and firestop systems used to protect membrane- and through-penetrations in fire-resistance-rated construction and smoke resistant construction shall be maintained. The materials and firestop systems shall be securely attached to or bonded to the construction being penetrated with no openings visible through or into the cavity of the construction.

703.2 Unprotected penetrations. All unprotected penetrations in fire-resistance-rated construction and smoke resistant construction shall be protected as required in the International Building Code.

SECTION 704 JOINTS AND VOIDS

704.1 Maintaining protection. Where required when the building was originally constructed, materials and systems used to protect joints and voids installed in the following locations shall be maintained. The materials and systems shall be securely attached to or bonded to the adjacent construction, without openings visible through the construction.

1. Joints in or between fire-resistance-rated walls, floors or floor/ceiling assemblies and roof or roof/ceiling assemblies.
2. Joints in smoke barriers.
3. Voids at the intersection of a horizontal floor assembly and an exterior curtain wall.
4. Voids at the intersection of a horizontal smoke barrier and an exterior curtain wall.
5. Voids at the intersection of a nonfire-resistance-rated floor assembly and an exterior curtain wall.
6. Voids at the intersection of a vertical fire barrier and an exterior curtain wall.
7. Voids at the intersection of a vertical fire barrier and a nonfire-resistance-rated roof assembly.

Exception: Unprotected joints and voids do not need to be protected where such joints and voids were not required to be protected when the building was originally constructed.

SECTION 705 DOOR AND WINDOW OPENINGS

705.1 General. Openings through fire-resistance-rated assemblies shall be protected by self- or automatic-closing fire doors, fire windows or floor fire doors capable of resisting the passage of fire. Openings through smoke barriers shall be protected by fire windows or by self- or automatic-closing fire doors capable of resisting the passage of fire and smoke. Openings through smoke partitions shall be protected by windows or self- or automatic-closing doors capable of resisting the passage of smoke.

Revise as follows:

703.2 705.2 Opening protectives Inspection and maintenance. Opening protectives in fire-resistance-rated assemblies shall be inspected and maintained in an operative condition in accordance with NFPA 80. Where allowed by the fire code official smoke barriers, the application of field-applied labels associated with the maintenance of opening protectives shall follow the requirements of the approved third-party certification organization accredited for listing the opening protective. Fire doors and smoke barrier smoke and draft control doors shall not be blocked or obstructed, or otherwise made inoperable. Fusible links shall be replaced promptly whenever fused or damaged. Fire door assemblies and smoke and draft control doors shall not be modified.

Add new text as follows:

705.2.1 Labeling requirements. Components of the fire door and fire window assemblies, floor fire doors, and smoke and draft control doors shall be listed and labeled by an approved agency. Where approved by the fire code official, the application of field-applied labels associated with the maintenance of opening protectives shall follow the requirements of the approved third-party certification organization accredited for listing the opening protective.

Revise as follows:

703.2.1 705.2.2 Signs. Where required by the fire code official, a sign shall be permanently displayed on or near each fire door in letters not less than 1 inch (25 mm) high to read as follows:

1. For doors designed to be kept normally open: FIRE DOOR—DO NOT BLOCK.
2. For doors designed to be kept normally closed: FIRE DOOR—KEEP CLOSED.

703.2.2 705.2.3 Hold-open devices and closers. No change to text.

703.2.3 705.2.4 Door operation. Swinging fire doors shall close from the full-open position and latch automatically. The door closer shall exert enough force to close and latch the door from any partially open position.

704.2 705.2.5 Opening protectives Smoke and heat activated doors. Where openings are
required to be protected, opening protective smoke activated doors shall be maintained self-closing or automatic closing by smoke detection. Existing fusible-link-type automatic door-closing devices are permitted if the fusible link rating does not exceed 135°F (57°C).

703.4 705.2.6 Testing. Horizontal and vertical sliding and rolling fire doors fire doors shall be inspected and tested annually to confirm proper operation and full closure. Records of inspections and testing shall be maintained.

Add new text as follows:

SECTION 706 DUCT AND AIR TRANSFER OPENINGS

706.1 General. Openings for ducts and air transfer openings shall be protected with dampers or other approved methods capable of resisting the passage of fire and smoke.

706.2 Maintaining protection. Dampers protecting ducts and air transfer openings shall be inspected and maintained in accordance with NFPA 80 and 105 and installed in accordance with the manufacturer's instructions. All other products or materials used to protect the openings for ducts and air transfer openings shall be securely attached to or bonded to the construction containing the duct or air transfer opening, without openings visible through or into the cavity of the construction. Any damaged products or materials protecting duct and air transfer openings shall be repaired, restored or replaced.

706.3 Unprotected openings. Unprotected duct and air transfer openings in fire-resistance-rated and smoke resistant construction shall be protected so as to comply with requirements that were in effect when the building was constructed.

Revise as follows:

SECTION 707 CONCEALED SPACES

703.1.1 707.1 Fireblocking and draftstopping. No change to text.

Delete without substitution:

SECTION 704 FLOOR OPENINGS AND SHAFTS

704.1 Enclosure. Interior vertical shafts including, but not limited to, stairways, elevator hoistways, service and utility shafts, that connect two or more stories of a building shall be enclosed or protected as required in Chapter 11. New floor openings in existing buildings shall comply with the International Building Code.

Reason: This proposal was developed by a FCAC working group of interested stakeholders, and is primarily a reorganization of Chapter 7 requirements. It also includes new requirements on how fire and smoke protection features are to be maintained, replaced or repaired. The changes are needed because the current requirements are not arranged in a logical order, skip around between inspection, maintenance and field testing, and are not complete. The proposal starts with new definitions that are not always understood by code users but are needed to properly enforce this code section. The MEMBRANE-PENETRATION FIRESTOP SYSTEM and THROUGH-PENETRATION FIRESTOP SYSTEM definitions are already in the 2015 IBC and the OPENING PROTECTIVE definition was added to the 2018 IBC as a successful Group A change. SMOKE BARRIER is already defined in the IFC. The SMOKE PARTITION definition is new and is based on IBC Section 710.3 and 710.4 requirements.

Chapter 7 is now organized into General (701), Definitions (702), Penetrations (703), Joints and Voids (704), Door and Window Openings (705), Ducts and Air Transfer Openings (706) and Concealed Spaces (707) sections, which incorporate terminology used in the International Building Code.

The concept behind the rewrite is that the General requirements in Section 701 include administrative provisions that were currently in the code, and require fire-resistance-rated construction, smoke barriers, and smoke partitions to
be maintained.

The code mandated means for protecting penetrations, voids and openings in these assemblies, including penetration protection, joint protection, opening protectives, duct and air transfer opening protection, and concealed space protection are covered in Section 703 through 707.

The working group felt that there was no need to retain the Section 704 FLOOR OPENINGS AND SHAFT requirements since these only provided a pointer to Chapter 11 existing building requirements for vertical openings. It was noted that this Chapter did not include pointers to the other fire and smoke resistant construction requirements in Chapter 11. Section 704.2 was retained and moved to the Opening Protective section.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire safety and hazardous materials in new and existing buildings and facilities and the protection of life and property in wildland urban interface areas. In 2014 and 2015 the Fire-CAC has held 5 open meetings. In addition, there were numerous conference calls, Regional Work Group and Task Group meetings for the current code development cycle, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC

Cost Impact: Will not increase the cost of construction

These are maintenance and repair provisions so it does not increase construction cost. However, it may result in an increased cost of maintaining and repairing existing construction.
2015 International Fire Code

Add new text as follows:

**701.3 Repair of Penetrations, Joint and Voids**

Where materials used to protect membrane- and through-penetrations, joints and voids have been damaged, they shall be replaced or repaired with materials and systems that comply with code requirements applicable at the time when the assembly was constructed, remodeled or altered.

*Reason:* This proposal is intended to compliment the work of the Fire Code Action Committee working group of interested stakeholders that proposed the revision to Chapter 7. The working group has proposed to provide detailed requirements on how fire and smoke protection features are to be maintained and replaced. The changes proposed by the FCAC are needed because the current code requirements are not complete or specific enough to ensure consistent code conformance and enforcement.

However, the proposal submitted by FCAC does not fully address what to do with damaged protection for membrane- and through-penetrations, joints and voids. This proposal completes the work of the FCAC working group by stating what should be done when a penetration or joint seal is discovered to be damaged. Although a damaged seal should ideally be replaced with a firestop system complying with the IBC, this Proposal recognizes that penetrations or joints that were sealed in accordance with previous code editions may not have required the tested systems that are mandated by today's building codes. The wording proposed here continues the allowance to grandfather installed penetration and joint seals when they are damaged, nevertheless requiring them to be repaired to meet the requirements that were applicable when the penetration or joint was last installed, repaired or altered.

*Cost Impact:* Will not increase the cost of construction

Based on current IFC, this is already required. This proposal provides additional guidance and compliments other proposals on Chapter 7.
2015 International Fire Code
Revise as follows:

703.1 Maintenance Maintaining Protection. The Smoke resistant construction and the required fire-resistance rating of fire-resistance-rated construction, fire resistance-rated, including, but not limited to, walls, firestops through penetration and membrane penetration firestop systems, shaft enclosures, partitions, smoke barriers, smoke partitions, floors, fire-resistive coatings and sprayed fire-resistant materials applied to structural members and fire-resistant joint systems, shall be maintained. Such elements shall be visually inspected by the owner annually and properly repaired, restored or replaced where damaged, altered, breached or penetrated. Records of inspections and repairs shall be maintained. Where concealed, such elements shall not be required to be visually inspected by the owner unless the concealed space is accessible by the removal or movement of a panel, access door, ceiling tile or similar movable entry to the space. Openings made therein for the passage of pipes, electrical conduit, wires, ducts, air transfer openings and holes made for any reason shall be protected with approved methods capable of resisting the passage of smoke and fire. Openings through fire resistance rated assemblies shall be protected by self or automatic-closing doors of approved construction meeting the fire protection requirements for the assembly.

703.1.1 Fireblocking and draftstopping Inspection. Required fire blocking Fire resistance-rated construction and draftstopping in combustible concealed spaces smoke resistant construction elements shall be maintained to provide visually inspected by the owner annually. The inspection shall verify that the continuity and integrity of such elements is maintained by approved methods. Where damaged, altered, breached, or penetrated by other than approved methods, the construction element shall be properly repaired, restored or replaced. Where concealed, such elements shall not be required to be visually inspected by the owner unless the concealed space is accessible by the removal or movement of a panel, access door, ceiling tile or similar movable entry to the space.

703.1.2 Smoke barriers and smoke partitions Records maintenance. Required smoke barriers Records of inspections and smoke partitions repairs shall be maintained to prevent by the passage of smoke owner and shall be available to the code official upon request. Openings protected with approved smoke barrier doors or smoke dampers. Such records shall be maintained in accordance with NFPA 105 for the life of the installation.

Add new text as follows:

703.1.2.1 Records information. Records shall include a copy of drawings indicating the location of fire resistance rated construction and smoke resistant construction elements and an inspection report indicating a thorough review of all elements required to be inspected in accordance with 703.1.
703.1.2.2 Repair records information. Where repairs are made with listed systems, the system listing and manufacturer’s installation instructions shall be provided to and maintained by the owner.

Revise as follows:

703.1.3 Fire walls, fire barriers and fire partitions Repairs. Required fire walls, fire barriers, Openings and fire partitions shall be maintained to prevent breaches for penetrations, joints made therein for the passage of pipes, electrical conduit, wires, ducts, air transfer openings and holes made for any reason shall be protected with approved methods capable of resisting the passage of smoke and fire. Openings protected with approved doors or fire dampers through fire-resistance-rated assemblies shall be maintained in accordance with NFPA 80 protected by self- or automatic-closing doors of approved construction meeting the fire protection requirements for the assembly.

Add new text as follows:

703.1.4 Unprotected Penetrations. Unprotected penetrations in fire-resistance-rated construction and smoke resistant construction shall be protected with approved methods capable of resisting the passage of smoke and fire.

703.1.5 Fireblocking and draftstopping. Required fireblocking and draftstopping in combustible concealed spaces shall be maintained to provide continuity and integrity of the construction.

703.1.6 Smoke barriers and smoke partitions. Required smoke barriers and smoke partitions shall be maintained to prevent the passage of smoke. Openings protected with approved smoke barrier doors or smoke dampers shall be maintained in accordance with NFPA 105.

703.1.7 Fire walls, fire barriers and fire partitions. Required fire walls, fire barriers and fire partitions shall be maintained to prevent the passage of fire. Openings protected with approved doors or fire dampers shall be maintained in accordance with NFPA 80.

Reason: The Fire and Smoke Protection Features section of the International Fire Code has been evolving for at least 10 years. The National Association of State Fire Marshals last touched the code with the annual inspection by the owner requirements.

The purpose of this proposal is to bring building owner and manager attention to the International Fire Code while not burdening the fire marshal or fire inspector with the detailed inspections. The model for this section already exists in Chapter 9. The requirements have been modified to cover the intent of the Fire and Smoke Protection Features, in IFC’s Chapter 7.

For the AHJ inspector, records kept by the building owner and manager can be verified very quickly - through the UL or other test lab ‘systems’ and manufacturers installation instructions - both of which would be required by this section along with reports of the inspections by the owner. A quick look at the system comparing it to the installation in the existing building will show non compliant situations quickly.

Cost Impact: Will not increase the cost of construction

This will not increase the cost of construction as it is supposed to be part of the handoff from the contractors to the building owner and manager anyway. Maintenance, repairs have been required by the IBC for a long time. This language clarifies what is required to maintain fire resistance rated construction and keep people safe in buildings.
F116-16

IFC: 703.1.3.
Proponent: William Hall, Portland Cement Association, representing Portland Cement Association (jhall@cement.org)

2015 International Fire Code

Revise as follows:

703.1.3 Fire walls, fire barriers and fire partitions. Required fire walls, fire barriers and fire partitions shall be maintained to prevent the passage of fire protection required when constructed. Openings protected with approved doors or fire dampers shall be maintained in accordance with NFPA 80.

Reason: Simply stating that fire resistance rated walls “be maintained to prevent the passage of fire” is vague and un-enforceable. To what degree does the patch or fix have to prevent the passage of fire? The code does not state that it must be equivalent to the hourly rating required for the wall, but only to prevent the passage of fire. An example would be an assembly requiring a 2-hour assembly and where 2 layers of rated gypsum board are used. If the wall sustains a through penetration or other damage resulting in a patch, based on current code language a single layer of gypsum board would suffice to stop the passage of fire and so would oriented strand board for a short period. Also, penetrations can be sealed to prevent the passage of fire, but for how long? This proposal adds language that the method used to repair the wall must have rating that would have been acceptable when construction occurred.

Cost Impact: Will not increase the cost of construction
This is a maintenance item and will not increase the cost of construction


F117-16

IFC: 703.1.4 (New).

Proponent : Bill McHugh, The McHugh Company, representing National Fireproofing Contractors Association (billmchugh-jr@att.net)

2015 International Fire Code

Add new text as follows:

703.1.4 Spray fire resistive materials and Intumescent Fire-Resistant Coatings Required spray fire resistive materials and Intumescent Fire-Resistant Coatings shall be maintained in accordance with the International Building Code. Where required by the fire code official, a sign with letters not less than 1/4" high shall identify the manufacturer of spray fire resistive materials and intumescent fire-resistant coatings.

1. Spray Fire Resistive Material Manufacturer - XXXXXXX
2. Intumescent Fire Resistant Coating Manufacturer - XXXXXX

Reason: Fire and Smoke Protection Features from Chapter 7 are critical to protecting buildings. Recent experience by fire code officials have shown that there is a problem identifying the manufacturer of the spray fire resistive materials and intumescent fire-resistant coatings used on a building after a fire event.

The purpose of this proposal is to provide the fire code official the tools needed to identify the manufacturer of the spray fire resistive materials and intumescent fire-resistant coatings used on a building. This is helpful during post fire investigations as well as ongoing building fire inspections.

This proposal gives the fire code official and building owner/manager the tools needed to identify the manufacturer of the fire resistive materials used as a system on the structure.

Cost Impact: Will increase the cost of construction

This code proposal will increase the cost of construction by a small label in the fire command center.
2015 International Fire Code

Revise as follows:

SECTION 803 INTERIOR WALL AND CEILING FINISH AND TRIM IN EXISTING BUILDINGS

803.1 General. The provisions of this section shall limit the allowable fire performance and smoke development of interior wall and ceiling finishes and interior wall and ceiling trim in existing buildings based on location and occupancy classification. Interior wall and ceiling finishes shall be classified in accordance with Section 803 of the International Building Code. Such materials shall be grouped in accordance with ASTM E 84 NFPA 286, as indicated in Section 803.1.1, or in accordance with NFPA 286 ASTM E84, as indicated in Section 803.1.2.

Exceptions:

1. Materials having a thickness less than 0.036 inch (0.9 mm) applied directly to the surface of walls and ceilings.
2. Exposed portions of structural members complying with the requirements of buildings of Type IV construction in accordance with the International Building Code shall not be subject to interior finish requirements.

Materials tested in accordance with Section 803.1.1 shall not be required to be tested in accordance with Section 803.1.2.

803.1.1 Classification. Interior Wall and Ceiling Finish Materials Tested in accordance with ASTM E 84, NFPA 286. Interior wall and ceiling finish materials shall be grouped in the following classes, classified in accordance with their flame spread NFPA 286 and smoke developed index where tested comply with Section 803.1.1.1. Materials complying with Section 803.1.1 shall be considered also to comply with the requirements of Class A in accordance with ASTM E 84 Section 803.1.2.

Class A: flame spread index 0–25; smoke developed index 0–450.
Class B: flame spread index 26–75; smoke developed index 0–450.
Class C: flame spread index 76–200; smoke developed index 0–450.

Add new text as follows:

803.1.1.1 Acceptance Criteria for NFPA 286. The interior finish shall comply with the following:
1. During the 40 kW exposure, flames shall not spread to the ceiling.
2. The flame shall not spread to the outer extremity of the sample on any wall or ceiling.
3. Flashover, as defined in NFPA 286, shall not occur.
4. The peak heat release rate throughout the test shall not exceed 800 kW.
5. The total smoke released throughout the test shall not exceed 1,000 m$^2$.

Revise as follows:
803.1.2 Classification Interior Wall and Ceiling Finish Materials Tested in accordance with NFPA 286, ASTM E84 or UL 723. Interior wall or ceiling finishes shall be allowed to be classified in accordance with ASTM E84 or UL 723. Such interior finish materials shall be grouped in the following classes in accordance with their flame spread and smoke-developed indexes.

Class A: Flame spread index 0-25; smoke-developed index 0-450;
Class B: Flame spread index 26-75; smoke-developed index 0-450;
Class C: Flame spread index 76-200; smoke-developed index 0-450.

Exception: Materials tested in accordance with NFPA 286. Finishes tested in accordance with NFPA 286 shall comply with Section 803.1.2.1 through 803.15. Interior wall and ceiling finish materials tested in accordance with NFPA 286 and meeting the acceptance criteria of Section 803.1.2.1 shall be allowed to be used where a Class A classification in accordance with ASTM E84 is required.

Add new text as follows:

803.1.3 Interior Wall and Ceiling Finish Materials with Different Requirements. The materials indicated in Sections 803.4 through 803.15 shall be tested as indicated in the corresponding sections.

803.2 Stability. Interior finish materials regulated by this chapter shall be applied or otherwise fastened in such a manner that such materials will not readily become detached where subjected to room temperatures of 200°F (93°C) for not less than 30 minutes.

Revise as follows:

803.3 Interior finish requirements based on occupancy. Interior wall and ceiling finish shall have a flame spread index not greater than that specified in Table 803.3 for the group and location designated. Interior wall and ceiling finish materials tested in accordance with NFPA 286, and meeting the acceptance criteria of Section 803.1.1.1, shall be used where a Class A classification in accordance with ASTM E84 or UL 723 is required.

| TABLE 803.3 |
| INTERIOR WALL AND CEILING FINISH REQUIREMENTS BY OCCUPANCY |

<table>
<thead>
<tr>
<th>GROUP</th>
<th>SPRINKLERED</th>
<th>NONSPRINKLERED</th>
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<tbody>
<tr>
<td></td>
<td>Indoor exit stairways and interior exit ramps and exit passageways</td>
<td>Corridors and enclosure for exit access stairways and exit access ramps</td>
</tr>
<tr>
<td></td>
<td>Indoor exit stairways and interior exit ramps and exit passageways</td>
<td>Corridors and enclosure for exit access stairways and exit access ramps</td>
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<tr>
<td>A-1 &amp; A-2</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>A-3 &amp; A-4</td>
<td>B</td>
<td>B</td>
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<tr>
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<td>C</td>
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<td>U</td>
<td>No Restrictions</td>
<td>No Restrictions</td>
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</tr>
</tbody>
</table>

For SI: 1 inch = 25.4 mm, 1 square foot = 0.0929 m².

a. Class C interior finish materials shall be allowed for wainscoting or paneling of not more than 1,000 square feet of applied surface area in the grade lobby where applied directly to a noncombustible base or over furring strips applied to a noncombustible base and fireblocked as required by Section 803.11 of the *International Building Code*.

b. In exit enclosures of buildings less than three stories in height of other than Group I-3, Class B interior finish for nonsprinklered buildings and Class C for sprinklered buildings shall be permitted.

c. Requirements for rooms and enclosed spaces shall be based upon spaces enclosed by partitions. Where a fire-resistance rating is required for structural elements, the enclosing partitions shall extend from the floor to the ceiling. Partitions that do not comply with this shall be considered as enclosing spaces and the rooms or spaces on both sides shall be considered as one. In determining the applicable requirements for rooms and enclosed spaces, the specific occupancy thereof shall be the governing factor regardless of the group classification of the building or structure.

d. Lobby areas in Group A-1, A-2 and A-3 occupancies shall not be less than Class B materials.

e. Class C interior finish materials shall be allowed in Group A occupancies with an occupant load of 300 persons or less.

f. In places of religious worship, wood used for ornamental purposes, trusses, paneling or chancel furnishing shall be allowed.

g. Class B material is required where the building exceeds two stories.

h. Class C interior finish materials shall be allowed in administrative spaces.

i. Class C interior finish materials shall be allowed in rooms with a capacity of four persons or less.

j. Class B materials shall be allowed as wainscoting extending not more than 48 inches above the finished floor in corridors.
k. Finish materials as provided for in other sections of this code.

l. Applies when the vertical exits, exit passageways, corridors or rooms and spaces are protected by an approved automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2.

803.4 Fire-retardant coatings. The required flame spread or smoke-developed index of surfaces in existing buildings shall be allowed to be achieved by application of approved fire-retardant coatings, paints or solutions to surfaces having a flame spread index exceeding that allowed. Such applications shall comply with NFPA 703 and the required fire-retardant properties shall be maintained or renewed in accordance with the manufacturer's instructions.

803.5 Textiles Textile Wall Coverings. Where used as interior wall or ceiling-finish materials, textiles textile wall coverings, including materials having woven or nonwoven, napped, tufted, looped or similar surface, shall be tested in the manner intended for use, using the product mounting system, including adhesive, and shall comply with the requirements of this section one of the following: Section 803.1.1, Section 803.5.1 or Section 803.5.2.

803.5.1 Textile Room corner test for textile wall coverings or ceiling expanded vinyl wall coverings. Textile wall coverings or ceiling expanded vinyl wall coverings shall comply with one meet the criteria or Section 803.5.1.1 when tested in the manner intended for use in accordance with the Method B protocol of NFPA 265 using the following:

1. The wall or ceiling covering shall have a Class A flame spread index in accordance with ASTM E 84 or UL 723, and be protected by automatic sprinklers installed in accordance with Section 903.3.1.1 or 903.3.1.2.
2. The wall covering shall meet the criteria of Section 803.5.1.1 when tested in the manner intended for use in accordance with NFPA 265 using the product-mounting system, including adhesive, of actual use.
3. The wall or ceiling covering shall meet the criteria of Section 803.1.2.1 when tested in accordance with NFPA 286 using the product-mounting system, including adhesive, of actual use.

803.5.1.1 Acceptance Criteria for NFPA 265 Method B test protocol. Test Protocol During the Method B protocol, the textile wall covering or expanded vinyl wall covering shall comply with the following:

1. During the 40-kW exposure, flames shall not spread to the ceiling.
2. The flame shall not spread to the outer extremities of the samples on the 8-foot by 12-foot (203 by 305 mm) walls.
3. Flashover, as defined in NFPA 265, shall not occur.
4. For newly introduced wall and ceiling coverings, the total smoke released throughout the test shall not exceed 1,000 m².

803.5.2 Newly introduced textile Acceptance criteria for wall and ceiling coverings. Newly introduced textile Textile wall and ceiling coverings and expanded vinyl wall and ceiling coverings shall comply have a Class A flame spread index in accordance with one of the following:

1. The wall or ceiling covering shall have a Class A flame spread index in accordance with ASTM E 84 or UL 723, and be protected by automatic sprinklers installed in accordance with Section 903.3.1.1 or 903.3.1.2. Test specimen preparation and
mounting shall be in accordance with ASTM E 2404.

2. The wall covering shall meet the criteria of Section 803.5.1.1 when tested in the manner intended for use in accordance with NFPA 265 using the product-mounting system (including adhesive) of actual use.

3. The wall or ceiling covering shall meet the criteria of Section 803.1.2.1 when tested in accordance with NFPA 286 using the product-mounting system (including adhesive) of actual use.

ASTM E84 or UL 723, and be protected by an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2. Test specimen preparation and mounting shall be in accordance with ASTM E 2404.

803.6 Expanded vinyl wall or textile ceiling coverings. Expanded vinyl wall or textile ceiling coverings, including materials having a woven or nonwoven, napped, tufted, looped or similar surface and carpet or similar textile materials, shall be tested in the manner intended for use, using the product mounting system, including adhesive, and shall comply with one of the requirements of the following:

1. The wall or ceiling covering shall have a Class A flame spread index in accordance with ASTM E 84 or UL 723, and be protected by automatic sprinklers installed in accordance with Section 903.3.1.1 or 903.3.1.2. Test specimen preparation and mounting shall be in accordance with ASTM E 2404.

2. The wall covering shall meet the criteria of Section 803.5.1.1 when tested in the manner intended for use in accordance with NFPA 265 using the product-mounting system (including adhesive) of actual use.

3. The wall or ceiling covering shall meet the criteria of Section 803.1.2.1 when tested in accordance with NFPA 286 using the product-mounting system (including adhesive) of actual use.

Section 803.1.1 or of Section 803.5.2.

Add new text as follows:

803.7 Expanded vinyl wall coverings Where used as interior wall finish materials, expanded vinyl wall coverings shall be tested in the manner intended for use, using the product mounting system, including adhesive, and shall comply with the requirements of one of the following: Section 803.1.1, Section 803.5.1 or Section 803.5.2.

803.8 Expanded vinyl ceiling coverings Where used as interior ceiling finish materials, expanded vinyl ceiling coverings shall be tested in the manner intended for use, using the product mounting system, including adhesive, and shall comply with the requirements of Section 803.1.1 or of Section 803.5.2.

Revise as follows:

[BF] 803.9 High-density polyethylene (HDPE) and polypropylene (PP). Where high-density polyethylene or polypropylene is used as an interior finish it shall comply with Section 803.1.2.

[BF] 803.10 Site-fabricated stretch systems. Where used as newly installed interior wall or interior ceiling finish materials, site-fabricated stretch systems containing all three components described in the definition in Chapter 2 shall be tested in the manner intended for use, and shall comply with the requirements of Section 803.1.1 or 803.1.2. If the materials are tested in
accordance with ASTM E 84 or UL 723, specimen preparation and mounting shall be in accordance with ASTM E 2579.

803.8 803.11 Foam plastic materials. Foam plastic materials shall not be used as interior wall and ceiling finish unless specifically allowed by Section 803.8.1 803.11.1 or 803.8.2 803.11.2. Foam plastic materials shall not be used as interior trim unless specifically allowed by Section 803.8.3 804.2.

803.8.1 803.11.1 Combustibility Foam plastics combustibility characteristics. No change to text.

803.8.2 803.11.2 Thermal barrier. No change to text.

803.7 803.12 Facings or wood veneers intended to be applied on site over a wood substrate. Facings or veneers intended to be applied on site over a wood substrate shall comply with one of the following:

1. The facing or veneer shall have a Class A, B or C flame spread index and smoke-developed index, based on the requirements of Table 803.3, in accordance with ASTM E 84 or UL 723. Test specimen preparation and mounting shall be in accordance with ASTM E 2404.

2. The facing or veneer shall meet the criteria of Section 803.1.1 when tested in accordance with NFPA 286 using the product-mounting system, including adhesive, described in Section 5.8.9 of NFPA 286.

Add new text as follows:

803.13 Laminated products factory-produced with a wood substrate. Laminated products factory-produced with a wood substrate shall comply with one of the following:

1. The laminated product shall meet the criteria of Section 803.1.1 when tested in accordance with NFPA 286 using the product-mounting system, including adhesive, of actual use.

2. The laminated product shall have a Class A, B or C flame spread index and smoke-developed index, based on the requirements of Table 803.3, in accordance with ASTM E 84 or UL 723. Test specimen preparation and mounting shall be in accordance with ASTM E 2579.

803.14 Thickness exemption. Materials having a thickness less than 0.036 inch (0.9 mm) applied directly to the surface of walls or ceilings shall not be required to be tested.

803.15 Heavy timber exemption. Exposed portions of building elements complying with the requirements of Type IV construction in accordance with the International Building Code shall not be subject to interior finish requirements, except in interior exit stairways, interior exit ramps, and exit passageways.

SECTION 804 INTERIOR WALL AND CEILING TRIM AND INTERIOR FLOOR FINISH IN NEW AND EXISTING BUILDINGS

Revise as follows:
804.1 Interior trim. Material, other than foam plastic, used as interior trim in new and existing buildings shall have minimum Class C flame spread and smoke-developed indices, when tested in accordance with ASTM E 84 or UL 723, as described in Section 803.1.1. Combustible trim, excluding handrails and guardrails, shall not exceed 10 percent of the specific wall or ceiling areas to which it is attached. Material, other than foam plastic, used as interior trim shall comply with Section 804.1.1 or with Section 804.1.2. Foam plastic used as interior trim shall comply with Section 804.2.

804.1.1 Alternative testing. Testing in accordance with NFPA 286. Interior trim material shall be tested in accordance with NFPA 286 and comply with the acceptance criteria in Section 803.1.1.1. When the interior trim material has been tested as an interior finish in accordance with NFPA 286 and complies with the acceptance criteria in Section 803.1.2.1 803.1.1.1, it shall not be required to be tested for flame spread index and smoke-developed index in accordance with ASTM E 84 or UL 723.

Add new text as follows:

804.1.2 Testing in accordance with ASTM E84 or UL 723. Material, other than foam plastic, used as interior trim shall have minimum Class C flame spread and smoke-developed indices, when tested in accordance with ASTM E84 or UL 723, as described in Section 803.1.2.

Revise as follows:

804.2 Foam plastic. Interior trim. No change to text.

804.2.1 Density. The minimum density of the interior trim shall be 20 pounds per cubic foot (320 kg/m³).

804.2.2 Thickness. The maximum thickness of the interior trim shall be \( \frac{1}{2} \) inch (12.7 mm) and the maximum width shall be 8 inches (203 mm).

804.2.3 Area limitation. The interior trim shall not constitute more than 10 percent of the specific wall or ceiling area to which it is attached.

804.2.4 Flame spread. The flame spread index shall not exceed 75 where tested in accordance with ASTM E 84 or UL 723. The smoke-developed index shall not be limited.

Exception: When the interior trim material has been tested as an interior finish in accordance with NFPA 286 and complies with the acceptance criteria in Section 803.1.2.1 803.1.1.1, it shall not be required to be tested for flame spread index in accordance with ASTM E 84 or UL 723.

Delete without substitution:

803.8.3 Trim. Foam plastic shall be allowed for trim in accordance with Section 804.2.

803.1.2.1 Acceptance criteria for NFPA 286. The interior finish shall comply with the following:

1. During the 40 kW exposure, flames shall not spread to the ceiling.
2. The flame shall not spread to the outer extremity of the sample on any wall or ceiling.
3. Flashover, as defined in NFPA 286, shall not occur.
4. The peak heat release rate throughout the test shall not exceed 800 kW.
The total smoke released throughout the test shall not exceed 1,000 m².

**Reference standards type:** This is an update to reference standard(s) already in the ICC Code Books

**Add new standard(s) as follows:**

ASTM E2579 *(Standard Practice for Specimen Preparation and Mounting of Wood Products to Assess Surface Burning Characteristics)* 2015 - It was added during the 2015 IBC Fire safety hearings

**Reason:** This reorganizes section 803 to make it follow the testing logic, and makes it consistent with what was approved (by the technical committee and by the membership) in the IBC in proposal FS139-15, with the associated proposals FS132-15 (from David Tyree), FS135-15 and FS136-15.

The requirements of FS136-15 are already included in IFC 2015 (section 803.7). The requirements of FS135-15 are proposed to be added into new section 803.8. The action of FS132-15 is proposed to be moved from the present exception #2 to 803.1 into a new section 803.15.

The logic accepted by the IBC Fire Safety committee (and the membership at the comment hearings) is that any interior wall and ceiling finish material is permitted to be tested to NFPA 286 and therefore this should come first, as section 803.1.1. This needs to be followed by the criteria for NFPA 286 testing. The section also needs to say that anything that passes NFPA 286 (i.e. the corresponding criteria) is acceptable as a Class A in accordance with ASTM E84 and does not need retesting.

Then comes the section on ASTM E84, with the corresponding criteria, as section 803.1.2.

The next section, 803.1.3, addresses the materials that have other requirements and cannot simply be tested to either one of the above without further details. That includes all of the materials in sections through 803.15.

Textile wall coverings and expanded vinyl wall coverings are covered in 803.5 and 803.7. Therefore the testing in accordance with NFPA 265 needs to move to those sections and that is being done. When dealing with expanded vinyl wall coverings the criteria are not repeated but just reference the textile wall coverings section.

Textile and expanded vinyl ceiling coverings stay as is, just with the section reference changed. The same is true for fire-retardant coatings, HDPE and PP, foam plastics and site-fabricated stretch systems, always without changing requirements. The section dealing with stability stays as is without change.

The section 803.5.2 dealing with newly introduced textile wall and ceiling coverings is actually a repeat of section 803.5.1. In both cases the requirements are the same: NFPA 286, ASTM E84 or UL 723 Class A and sprinklers or NFPA 265 (for wall coverings only) and the duplicate section is being eliminated. Note that the requirements for smoke in accordance with NFPA 265 apply only to new installations of wall coverings.

Table 803.3 does not need any changes.

Section 803 contained some language on trim which simply pointed to section 804. This is being made clearer so that section 804 deals with interior trim, whether foam plastic or not.

The old sections 803.1.2.1 was deleted as was the old section 803.8.3 but the information remains, in sections 803.1.1.1 and 803.11, respectively.

In section 804 a general section was included (dealing with the area limitations) and then the same fire safety requirements were kept, with sections 804.1.1 or 804.1.2 relating to trim other than foam plastic and section 804.2 dealing with foam plastic interior trim.

In order to ensure that the proposed reorganization appears in the correct order, I attach a copy of the text as it should read, in its final form.

**Sections 803 and 804 (trim) as final**

803 - INTERIOR WALL AND CEILING FINISH IN EXISTING BUILDINGS

803.1 General. The provisions of this section shall limit the allowable fire performance and smoke development of interior wall and ceiling finishes in existing buildings based on location and occupancy classification. Interior wall and ceiling finishes shall be classified in accordance with Section 803 of the International Building Code. Such materials shall be grouped in accordance with NFPA 286, as indicated in Section 803.1.1, or in accordance with ASTM E84, as indicated in Section 803.1.2. Materials tested in accordance with Section 803.1.1 shall not be required to be tested in accordance with Section 803.1.2.

803.1.1 Interior wall and ceiling finish materials tested in accordance with NFPA 286. Interior wall and ceiling finish materials shall be classified in accordance with NFPA 286 and comply with Section 803.1.1.1. Materials complying with Section 803.1.1.1 shall be considered also to comply with the requirements of a Class A in accordance with Section 803.1.2.
803.1.1 Acceptance criteria for NFPA 286. The interior finish shall comply with the following:
1. During the 40 kW exposure, flames shall not spread to the ceiling.
2. The flame shall not spread to the outer extremity of the sample on any wall or ceiling.
3. Flashover, as defined in NFPA 286, shall not occur.
4. The peak heat release rate throughout the test shall not exceed 800 kW.
5. The total smoke released throughout the test shall not exceed 1,000 m².

803.1.2 Interior wall and ceiling finish materials tested in accordance with ASTM E84 or UL 723. Interior wall and ceiling finish materials shall be classified in accordance with ASTM E84 or UL 723. Such interior finish materials shall be grouped in the following classes in accordance with their flame spread and smoke-developed indexes.

Class A: Flame spread index 0-25; smoke developed index 0-450.
Class B: Flame spread index 26-75; smoke developed index 0-450.
Class C: Flame spread index 76-200; smoke developed index 0-450.

Exception: Materials tested in accordance with Section 803.1.1 and as indicated in Section 803.1.3 through 803.15.

803.1.3 Interior wall and ceiling finish materials with different requirements. The materials indicated in Sections 803.4 through 803.15 shall be tested as indicated in the corresponding sections.

803.2 Stability. Interior finish materials regulated by this chapter shall be applied or otherwise fastened in such a manner that such materials will not readily become detached where subjected to room temperatures of 200°F (93°C) for not less than 30 minutes.

803.3 Interior finish requirements based on occupancy. Interior wall and ceiling finish shall have a flame spread index not greater than that specified in Table 803.3 for the group and location designated. Interior wall and ceiling finish materials tested in accordance with NFPA 286 and meeting the acceptance criteria of Section 803.1.1.1, shall be permitted to be used where a Class A classification in accordance with ASTM E84 or UL 723 is required.

803.4 Fire retardant coatings. The required flame spread or smoke-developed index of surfaces in existing buildings shall be allowed to be achieved by application of approved fire retardant coatings, paints or solutions to surfaces having a flame spread index exceeding that allowed. Such applications shall comply with NFPA 703 and the required fire-retardant properties shall be maintained or renewed in accordance with the manufacturer's instructions.

803.5 Textile wall coverings. Where used as interior wall finish materials, textile wall coverings, including materials having woven or nonwoven, napped, tufted, looped or similar surface and carpet and similar textile materials, shall be tested in the manner intended for use, using the product mounting system, including adhesive, and shall comply with the requirements of one of the following: Section 803.1.1, Section 803.5.1 or Section 803.5.2.

803.5.1 Room corner test for textile wall coverings or expanded vinyl wall coverings. Textile wall coverings or expanded vinyl wall coverings shall meet the criteria of Section 803.5.1.1 when tested in the manner intended for use in accordance with the Method B protocol of NFPA 265 using the product-mounting system, including adhesive.

803.5.1.1 Acceptance criteria for NFPA 265 Method B Test Protocol. The interior finish shall comply with the following:
1. During the 40 kW exposure, flames shall not spread to the ceiling.
2. The flame shall not spread to the outer extremities of the samples on the 8-foot by 12-foot (203 by 305 mm) walls.
3. Flashover, as defined in NFPA 265, shall not occur.
4. For newly introduced wall coverings, the total smoke released throughout the test shall not exceed 1,000 m².

803.5.2 Acceptance criteria for textile or ceiling coverings or expanded vinyl wall or ceiling coverings tested to ASTM E84 or UL 723. Textile wall or ceiling coverings or expanded vinyl wall or ceiling coverings shall have a Class A flame spread index in accordance with ASTM E84 or UL 723 and be protected by an automatic sprinkler system installed in accordance with Section 803.3.1.1 or 903.3.1.2. Test specimen preparation and mounting shall be in accordance with ASTM E2404.

803.6 Textile ceiling coverings. Where used as interior ceiling finish materials, textile ceiling coverings, including materials having woven or nonwoven, napped, tufted, looped or similar surface and carpet and similar textile materials, shall be tested in the manner intended for use, using the product mounting system, including adhesive, and shall comply with the requirements of Section 803.1.1 or of Section 803.5.2.

803.7 Expanded vinyl wall coverings. Where used as interior wall finish materials, expanded vinyl wall coverings shall be tested in the manner intended for use, using the product mounting system, including adhesive, and shall comply with the requirements of one of the following: Section 803.1.1, Section 803.5.1 or Section 803.5.2.

803.8 Expanded vinyl ceiling coverings. Where used as interior ceiling finish materials, expanded vinyl ceiling coverings shall be tested in the manner intended for use, using the product mounting system, including adhesive, and shall comply with the requirements of Section 803.1.1 or of Section 803.5.2.

803.9 High-density polyethylene (HDPE) and polypropylene (PP). Where high-density polyethylene or polypropylene is used as an interior finish it shall comply with Section 803.1.1.

803.10 Site-fabricated stretch systems. Where used as newly installed interior wall or interior ceiling finish materials, site-fabricated stretch systems containing all three components described in the definition in Chapter 2 shall be
tested in the manner intended for use, and shall comply with the requirements of Section 803.1.1 or 803.1.2. If the materials are tested in accordance with ASTM E84 or UL 723, specimen preparation and mounting shall be in accordance with ASTM E2573.

803.11 Foam plastic materials. Foam plastic materials shall not be used as interior wall finish or interior ceiling finish unless specifically allowed by Section 803.11.1 or 803.11.2. Foam plastic materials shall not be used as interior trim unless specifically allowed by Section 804.2.

803.11.1. Combustibility Characteristics. Foam plastic materials shall be allowed on the basis of fire tests that substantiate their combustibility characteristics for the use intended under actual fire conditions, as indicated in Section 2603.9 of the International Building Code. This section shall apply both to exposed foam plastics and to foam plastics used in conjunction with a textile or vinyl facing or cover.

803.11.2. Thermal barrier. Foam plastic material shall be allowed if it is separated from the interior of the building by a thermal barrier in accordance with Section 2603.4 of the International Building Code.

803.12 Facings or wood veneers intended to be applied on site over a wood substrate. Facings or veneers intended to be applied on site over a wood substrate shall comply with one of the following:

1. The facing or veneer shall meet the criteria of Section 803.1.1 when tested in accordance with NFPA 286 using the product-mounting system, including adhesive, described in Section 5.8.9 of NFPA 286.

2. The facing or veneer shall have a Class A, B or C flame spread index and smoke-developed index, based on the requirements of Table 803.3, in accordance with ASTM E84 or UL 723. Test specimen preparation and mounting shall be in accordance with ASTM E2404.

803.13 Laminated products factory-produced with a wood substrate. Laminated products factory-produced with a wood substrate shall comply with one of the following:

1. The laminated product shall meet the criteria of Section 803.1.1 when tested in accordance with NFPA 286 using the product-mounting system (including adhesive) of actual use.

2. The laminated product shall have a Class A, B, or C flame spread index and smoke developed index, based on the requirements of Table 803.3, in accordance with ASTM E84 or UL 723. Test specimen preparation and mounting shall be in accordance with ASTM E2579.

803.14 Thickness exemption. Materials having a thickness less than 0.036 inch (0.9 mm) applied directly to the surface of walls or ceilings shall not be required to be tested.

803.15 Heavy timber exemption. Exposed portions of building elements complying with the requirements of buildings of Type IV construction in accordance with the International Building Code shall not be subject to interior finish requirements, except in interior exit stairways, interior exit ramps, and exit passageways.

804 - Interior Wall and Ceiling Trim and Interior Floor Finish in New and Existing Buildings

804.1 Interior trim. Combustible trim in new and existing buildings, excluding handrails and guardrails, shall not exceed 10 percent of the specific wall or ceiling areas to which it is attached. Material, other than foam plastic, used as interior trim shall comply with Section 804.1.1 or with Section 804.1.2. Foam plastic used as interior trim shall comply with Section 804.2.

804.1.1 Testing in accordance with NFPA 286. Interior trim material shall be tested in accordance with NFPA 286 and comply with the acceptance criteria in Section 803.1.1. When the interior trim material has been tested as an interior finish in accordance with NFPA 286 and complies with the acceptance criteria in Section 803.1.1.1, it shall not be required to be tested for flame spread index and smoke-developed index in accordance with ASTM E84 or UL 723.

804.1.2 Testing in accordance with ASTM E84 or UL 723. Material, other than foam plastic, used as interior trim shall have minimum Class C flame spread and smoke-developed indices, when tested in accordance with ASTM E84 or UL 723, as described in Section 803.1.2.

804.2 Foam plastic interior trim. Foam plastic used as interior trim shall comply with Sections 804.2.1 through 804.2.4.

804.2.1 Density. The minimum density of the interior trim shall be 20 pounds per cubic foot (320 kg/m³).

804.2.2 Thickness. The maximum thickness of the interior trim shall be 1/2 inch (12.7 mm) and the maximum width shall be 8 inches (203 mm).

804.2.3 Area limitation. The interior trim shall not constitute more than 10 percent of the specific wall or ceiling area to which it is attached.

804.2.4 Flame spread. The flame spread index shall not exceed 75 where tested in accordance with ASTM E84 or UL 723. The smoke-developed index shall not be limited.

Exception: When the interior trim material has been tested as an interior finish in accordance with NFPA 286 and complies with the acceptance criteria in Section 803.1.1.1, it shall not be required to be tested for flame spread index in accordance with ASTM E84 or UL 723.
**Cost Impact:** Will not increase the cost of construction
This is simply a reorganization for logical use and consistency with IBC.
2015 International Fire Code

Revise as follows:

803.1 General. The provisions of this section shall limit the allowable fire performance and smoke development of interior wall and ceiling finishes and interior wall and ceiling trim in existing buildings based on location and occupancy classification. Interior wall and ceiling finishes shall be classified in accordance with Section 803 of the International Building Code. Such materials shall be grouped in accordance with ASTM E 84, as indicated in Section 803.1.1, or in accordance with NFPA 286, as indicated in Section 803.1.2.

Exceptions:

1. Materials having a thickness less than 0.036 inch (0.9 mm) applied directly to the surface of walls and ceilings.
2. Exposed portions of structural members complying with the requirements of buildings of Type IV construction in accordance with the International Building Code shall not be subject to interior finish requirements, except in interior exit stairways, interior exit ramps and exit passageways.

Reason: This provides consistency with the change incorporated into the IBC as a result of accepted proposal FS132-15, from David Tyree. The rationale for the proposal was as follows:

"Cross laminated timber may be used to form the entire interior surfaces of egress elements and should be regulated in those circumstances.

The requirement is the same for any other material used in those circumstances. For a complete list of AWC code change proposals and additional information please go to http://www.awc.org/Code-Officials/2015-IBC-Code-Changes."

This change is also being incorporated as part of the overall proposed change for section 803 in a different proposal.

Cost Impact: Will increase the cost of construction
There will be a need for fire testing of some heavy timber materials.
TABLE 803.3
INTERIOR WALL AND CEILING FINISH REQUIREMENTS BY OCCUPANCY

For SI: 1 inch = 25.4 mm, 1 square foot = 0.0929 m².

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Class C interior finish materials shall be allowed for wainscoting or</td>
<td>Requires a non-combustible base and fireblocked as required by Section</td>
</tr>
<tr>
<td>paneling of not more than 1,000 square feet of applied surface area in</td>
<td>803.11 of the International Building Code.</td>
</tr>
<tr>
<td>the grade lobby. When applied directly to a noncombustible base or over</td>
<td></td>
</tr>
<tr>
<td>furring strips applied to a noncombustible base and fireblocked as</td>
<td></td>
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<tr>
<td>required by Section 803.11 of the International Building Code.</td>
<td></td>
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<tr>
<td>b. In exit enclosures of buildings less than three stories in height of</td>
<td></td>
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<tr>
<td>other than Group I-3, Class B interior finish for nonsprinklered buildings</td>
<td></td>
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<tr>
<td>and Class C for sprinklered buildings shall be permitted.</td>
<td></td>
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<tr>
<td>c. Requirements for rooms and enclosed spaces shall be based upon spaces</td>
<td></td>
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<tr>
<td>enclosed by partitions. Where a fire-resistance rating is required for</td>
<td></td>
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<tr>
<td>structural elements, the enclosing partitions shall extend from the floor</td>
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<tr>
<td>to the ceiling. Partitions that do not comply with this shall be</td>
<td></td>
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<tr>
<td>considered as enclosing spaces and the rooms or spaces on both sides shall</td>
<td></td>
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<tr>
<td>be considered as one. In determining the applicable requirements for</td>
<td></td>
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<tr>
<td>rooms and enclosed spaces, the specific occupancy thereof shall be</td>
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<tr>
<td>the governing factor regardless of the group classification of the building</td>
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</tr>
<tr>
<td>or structure.</td>
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<tr>
<td>d. Lobby areas in Group A-1, A-2 and A-3 occupancies shall not be less</td>
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<tr>
<td>than Class B materials.</td>
<td></td>
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<tr>
<td>e. Class C interior finish materials shall be allowed in Group A</td>
<td></td>
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<tr>
<td>occupancies with an occupant load of 300 persons or less.</td>
<td></td>
</tr>
<tr>
<td>f. In places of religious worship, wood used for ornamental purposes,</td>
<td></td>
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<tr>
<td>trusses, paneling or chancel furnishing shall be allowed.</td>
<td></td>
</tr>
<tr>
<td>g. Class B material is required where the building exceeds two stories.</td>
<td></td>
</tr>
<tr>
<td>h. Class C interior finish materials shall be allowed in administrative</td>
<td></td>
</tr>
<tr>
<td>spaces.</td>
<td></td>
</tr>
<tr>
<td>i. Class C interior finish materials shall be allowed in rooms with a</td>
<td></td>
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<tr>
<td>capacity of 4 persons or less.</td>
<td></td>
</tr>
<tr>
<td>j. Class B materials shall be allowed as wainscoting extending not more</td>
<td></td>
</tr>
<tr>
<td>than 48 inches above the finished floor in corridors.</td>
<td></td>
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<tr>
<td>k. Finish materials as provided for in other sections of this code.</td>
<td></td>
</tr>
<tr>
<td>l. Applies when the vertical exits, exit passageways, corridors or rooms</td>
<td></td>
</tr>
<tr>
<td>and spaces are protected by an approved automatic sprinkler system</td>
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</tr>
<tr>
<td>installed in accordance with Section 903.3.1.1 or 903.3.1.2.</td>
<td></td>
</tr>
<tr>
<td>m. Corridors in ambulatory care facilities shall have a Class B or greater</td>
<td></td>
</tr>
<tr>
<td>interior finish material.</td>
<td></td>
</tr>
</tbody>
</table>

**Reason:** The increase in requirements for sprinklered buildings is consistent with federal requirements for ambulatory care facilities. While this not an additional requirement for non-sprinklered buildings, it was felt that if the reference to the footnote was not there it would be more confusing. This proposal is submitted by the ICC Ad Hoc Committee on Healthcare (AHC). The AHC was established by the ICC Board to evaluate and assess contemporary code issues relating to hospitals and ambulatory healthcare facilities. This is a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. In 2014 and 2015 the ICC Ad Hoc Committee has held 4 open meetings and numerous Work Group meetings and conference calls for the current code development cycle which included members of the committees as well as any interested party to discuss and debate the proposed changes. Information on the AHC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the AHC effort can be downloaded from the AHC website at: AHC.

**Note to staff:** Footnote m has to be added to the table for Group B corridors - however, the table is not showing up in CDPaccess.

**Cost Impact:** Will not increase the cost of construction

This change proposal is consistent with current federal standards that healthcare facilities follow, and will therefore not increase the cost of construction.
F121-16

IFC: 803.4.

Proponent: Tim Earl, representing GBH International (tearl@gbhinternational.com)

2015 International Fire Code

Revise as follows:

803.4 Fire-retardant coatings. The required flame spread or smoke-developed index of surfaces in existing buildings shall be allowed to be achieved by application of approved fire-retardant coatings, paints or solutions to surfaces having a flame spread index exceeding that allowed. Such applications shall comply with NFPA 703 and the required fire-retardant properties shall be maintained or renewed in accordance with the manufacturer's instructions. The fire retardant paint, coating, or solution shall have been assessed by testing over the same substrate to be used in the application.

Reason: It is important to clarify that, if fire retardant coatings are to be used to achieve an improved flame spread or smoke-developed index, they must have been tested on the actual product (substrate) to which they will be applied. There have been instances of manufacturers applying coatings to a noncombustible surface and running an ASTM E84 test in an attempt to demonstrate compliance. (See figures below). This obviously does not reflect real world performance and is not the intent of the code. This proposal would make the requirement more explicit.
RESULTS:

TEST RESULTS:
The test results, calculated in accordance with ASTM E-84-04 for Flame Spread and Smoke Developed Values are as follows:

<table>
<thead>
<tr>
<th>Test Specimen</th>
<th>Flame Spread Index*</th>
<th>Smoke Developed Value*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paint Additive Flame Retardant</td>
<td>0</td>
<td>10</td>
</tr>
</tbody>
</table>

*Rounded off to the nearest 5 units. Graphs of the Flame Spread, Smoke Developed and Time-Temperature are shown on the attached charts at the end of this report.

OBSERVATIONS:
Ignition was not noted there was charring of the sample during the test.

RATING:

The classifications are as follows:
- Class A Interior Wall & Ceiling Finish: Flame Spread - 0-25, Smoke Developed - 0-450
- Class B Interior Wall & Ceiling Finish: Flame Spread - 26-75, Smoke Developed - 0-450
- Class C Interior Wall & Ceiling Finish: Flame Spread - 76-200, Smoke Developed - 0-450

Since the sample received a Flame Spread of 0 and a Smoke Developed Value of 10, it would fall into the Class A Interior Wall & Ceiling Finish Category.

Cost Impact: Will increase the cost of construction
This may increase the cost of construction by requiring tests to be run on the surface intended to be used.
F122-16
IFC: 803.5.1.
Proponent: Tim Earl, representing GBH International (tearl@gbhinternational.com)

2015 International Fire Code

Revise as follows:

803.5.1 Textile wall or ceiling coverings. Textile wall or ceiling coverings shall comply with one of the following:

1. The wall or ceiling covering shall have a Class A flame spread index in accordance with ASTM E 84 or UL 723, and be protected by automatic sprinklers installed in accordance with Section 903.3.1.1 or 903.3.1.2. Test specimen preparation and mounting shall be in accordance with ASTM E 2404.

2. The wall covering shall meet the criteria of Section 803.5.1.1 when tested in the manner intended for use in accordance with NFPA 265 using the product-mounting system, including adhesive, of actual use.

3. The wall or ceiling covering shall meet the criteria of Section 803.1.2.1 when tested in accordance with NFPA 286 using the product-mounting system, including adhesive, of actual use.

Reason: ASTM E2404 is the mounting method for textile wall and ceiling coverings when testing to ASTM E84. Throughout this section, when these materials are tested to ASTM E84, this statement appears, but somehow it was missed in this section. This proposal is intended to correct that oversight.

Cost Impact: Will not increase the cost of construction
This proposal simply adds a reference to the appropriate mounting method when testing these materials to ASTM E84, as required elsewhere in this section. It will not increase the cost of construction.
F123-16

IFC: 803.5.1.1.
Proponent: Tim Earl, representing GBH International (tearl@gbhinternational.com)

2015 International Fire Code

Revise as follows:

803.5.1.1 NFPA 265 Method B test protocol. During
Where testing to NFPA 265, during the Method B protocol, the textile wall covering or expanded
vinyl wall covering shall comply with the following:

1. During the 40-kW exposure, flames shall not spread to the ceiling.
2. The flame shall not spread to the outer extremities of the samples on the 8-foot by
   12-foot (203 by 305 mm) walls.
3. Flashover, as defined in NFPA 265, shall not occur.
4. For newly introduced wall and ceiling coverings, the total smoke released throughout
   the test shall not exceed 1,000 m$^2$.

Reason: This section refers to "Method B test protocol" without any reference to a test method, which may confuse
some users. This proposal would simply clarify that "Method B test protocol" is found in NFPA 265.

Cost Impact: Will not increase the cost of construction
This change is a simple clarification of the code language with no impact on cost.
F124-16

IFC: 803.11 (New).

Proponent: Marcelo Hirschler, representing GBH International (gbhint@aol.com)

2015 International Fire Code

Add new text as follows:

803.11 Laminated products factory-produced with a wood substrate

Laminated products factory-produced with a wood substrate shall comply with one of the following:

1. The laminated product shall have a Class A, B, or C flame spread index and smoke-developed index, based on the requirements of Table 803.3, in accordance with ASTM E84 or UL 723. Test specimen preparation and mounting shall be in accordance with ASTM E2579.

2. The laminated product shall meet the criteria of 803.1.2 when tested in accordance with NFPA 286 using the product mounting system, including adhesive, of actual use.

Reference standards type: This is an update to reference standard(s) already in the ICC Code Books

Add new standard(s) as follows:

ASTM E2579 - Standard Practice for Specimen Preparation and Mounting of Wood Products to Assess Surface Burning Characteristics (2015) - It was added during the IBC fire safety hearings.

Reason: This language has not yet been incorporated into the IFC (which did incorporate the language dealing with on site applied facings in IFC section 803.7), because it wanted the IBC to take the lead. ASTM has developed mounting methods for both “facings or wood veneer intended to be applied on site over a wood substrate” and laminated products that are factory-produced and have a wood substrate. The concept is that facings that are produced as part of a commercial (factory-produced) panel are finished products and the manufacturer should be responsible to ensure that the product itself (the full panel) is safe and there is no need to discuss a substrate. It has been shown that, when veneers are applied over a wood substrate the resulting flame spread is much higher than when applied over gypsum board or over a non-combustible substrate. Therefore the requirement in ASTM E2579 is that the testing be done with the full product and, thus, there will no need to retest for different substrates. Similarly, NFPA 286 contains a section that addresses testing of wall covering materials, including facings applied on site and laminated products produced in the factory. Facings applied on site over wood substrates are tested using ASTM E2404.

Note that this proposal should really be incorporated between existing sections 803.7 and 803.8, following the section on requirements for facings or wood veneers intended to be applied on site over a wood substrate.

This proposed section is also being incorporated into the proposed reorganization of section 803, in a different proposal.

NFPA 286 language

5.8 Wall or Ceiling Covering Materials.

5.8.2 Where the wall or ceiling covering system is a factory produced wall panel, the adhesive shall be the same one used in the manufacture of the factory-produced wall or ceiling panel.

ASTM E2579 - Standard Practice for Specimen Preparation and Mounting of Wood Products to Assess Surface Burning

1. Scope

1.1 This practice describes procedures for specimen preparation and mounting when testing wood products to assess flame spread and smoke development as surface burning characteristics using Test Method E84.

1.2 This practice applies also to laminated products factory produced with a wood substrate (see 8.6). This practice does not apply to wood veneers or facings intended to be applied on site over a wood substrate, which are covered by Practice E2404.

1.3 Testing is conducted with Test Method E84.

ASTM E2404 – Standard Practice for Specimen Preparation and Mounting of Textile, Paper or Polymeric (Including
Vinyl) Wall or Ceiling Coverings, and of Facings and Wood Veneers Intended to be Applied on Site Over a Wood Substrate, to Assess Surface Burning Characteristics

1. Scope
1.1 This practice describes procedures for specimen preparation and mounting when testing textile, paper or polymeric (including vinyl and expanded vinyl) wall or ceiling covering materials to assess flame spread and smoke development as surface burning characteristics using Test Method E84.
1.2 This practice applies also to facings or wood veneers intended to be applied on site over a wood substrate (see 8.7). This practice does not apply to laminated products factory produced with a wood substrate, which are covered by Practice E2579.
1.3 Testing is conducted with Test Method E84.

Cost Impact: Will increase the cost of construction
These factory produced panels were not always fire tested in the past.

Analysis. ASTM E2579 was included in code change proposal FS135-15 which was Approved as Submitted.
F125-16
IFC: 804.3.1, 804.3.2, 804.4.
Proponent: Tim Earl, GBH International, representing GBH International (tearl@gbhinternational.com)

2015 International Fire Code

Revise as follows:

804.3.1 Classification. Interior floor finish and floor covering materials required by Section 804.3.2 to be of Class I or II materials shall be classified in accordance with ASTM E648 or NFPA 253. The classification referred to herein corresponds to the classifications determined by ASTM E648 or NFPA 253 as follows: Class I, 0.45 watts/cm$^2$ or greater; Class II, 0.22 watts/cm$^2$ or greater.

804.3.2 Testing and identification. Interior floor finish and floor covering materials shall be tested by an approved agency in accordance with ASTM E648 or NFPA 253 and identified by a hang tag or other suitable method so as to identify the manufacturer or supplier and style, and shall indicate the interior floor finish or floor covering classification in accordance with Section 804.3.1. Carpet-type floor coverings shall be tested as proposed for use, including underlayment. Test reports confirming the information provided in the manufacturer's product identification shall be furnished to the fire code official upon request.

804.4 Interior floor-wall base. Interior floor-wall base that is 6 inches (152 mm) or less in height shall be tested in accordance with ASTM E648 or NFPA 253 and shall be not less than Class II. Where a Class I floor finish is required, the floor-wall base shall be Class I. The classification referred to herein corresponds to the classifications determined by ASTM E648 or NFPA 253 as follows: Class I, 0.45 watt/cm$^2$ or greater; Class II, 0.22 watts/cm$^2$ or greater.

Exception: Interior trim materials that comply with Section 804.1.

Reference standards type: This reference standard is new to the ICC Code Books
Add new standard(s) as follows:
ASTM E648-15e1 Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source -

Reason: This change simply adds a reference to another standard, allowing users to reference either ASTM E648 or NFPA 253, which are equivalent standards. Similar proposals were approved this cycle for the IBC.

Cost Impact: Will not increase the cost of construction
This change simply adds a reference to another standard, allowing users to reference either ASTM E648 or NFPA 253, so there is no impact on cost.

Analysis. ASTM E648-was included in code change proposal FS140-15 which was Approved as submitted.
2015 International Fire Code

Revise as follows:

805.1.1.2 Heat release rate. Newly introduced upholstered furniture shall have limited rates of heat release when tested in accordance with ASTM E 1537 or California Technical Bulletin 133, as follows:

1. The peak rate of heat release for the single upholstered furniture item shall not exceed 80 kW.
   Exception: Upholstered furniture in rooms or spaces protected by an approved automatic sprinkler system installed in accordance with Section 903.3.1.1.

2. The total energy heat released by the single upholstered furniture item during the first 10 minutes of the test shall not exceed 25 megajoules (MJ).
   Exception: Upholstered furniture in rooms or spaces protected by an approved automatic sprinkler system installed in accordance with Section 903.3.1.1.

805.1.2.2 Heat release rate. Newly introduced mattresses shall have limited rates of heat release when tested in accordance with ASTM E 1590 or California Technical Bulletin 129, as follows:

1. The peak rate of heat release for the single mattress shall not exceed 100 kW.
   Exception: Mattresses in rooms or spaces protected by an approved automatic sprinkler system installed in accordance with Section 903.3.1.1.

2. The total energy heat released by the single mattress during the first 10 minutes of the test shall not exceed 25 MJ.
   Exception: Mattresses in rooms or spaces protected by an approved automatic sprinkler system installed in accordance with Section 903.3.1.1.

805.2.1.2 Heat release rate. Newly introduced upholstered furniture shall have limited rates of heat release when tested in accordance with ASTM E 1537 or California Technical Bulletin 133, as follows:

1. The peak rate of heat release for the single upholstered furniture item shall not exceed 80 kW.
   Exception: Upholstered furniture in rooms or spaces protected by an approved automatic sprinkler system installed in accordance with Section 903.3.1.1.

2. The total energy heat released by the single upholstered furniture item during the first 10 minutes of the test shall not exceed 25 MJ.
   Exception: Upholstered furniture in rooms or spaces protected by an approved automatic sprinkler system installed in accordance with Section 903.3.1.1.
805.2.2.2 **Heat release rate.** Newly introduced mattresses shall have limited rates of heat release when tested in accordance with ASTM E 1590 or California Technical Bulletin 129, as follows:

1. The peak rate of heat release for the single mattress shall not exceed 100 kW.
   **Exception:** Mattresses in rooms or spaces protected by an approved automatic sprinkler system installed in accordance with Section 903.3.1.1.
2. The total energy heat released by the single mattress during the first 10 minutes of the test shall not exceed 25 MJ.
   **Exception:** Mattresses in rooms or spaces protected by an approved automatic sprinkler system installed in accordance with Section 903.3.1.1.

805.3.1.2 **Heat release rate.** Newly introduced upholstered furniture shall have limited rates of heat release when tested in accordance with ASTM E 1537, as follows:

1. The peak rate of heat release for the single upholstered furniture item shall not exceed 80 kW.
2. The total energy heat released by the single upholstered furniture item during the first 10 minutes of the test shall not exceed 25 MJ.

805.3.2.2.1 **Heat release rate.** Newly introduced mattresses shall have limited rates of heat release when tested in accordance with ASTM E 1590 or California Technical Bulletin 129, as follows:

1. The peak rate of heat release for the single mattress shall not exceed 100 kW.
2. The total energy heat released by the single mattress during the first 10 minutes of the test shall not exceed 25 MJ.

805.4.1.2 **Heat release rate.** Newly introduced upholstered furniture shall have limited rates of heat release when tested in accordance with ASTM E 1537 or California Technical Bulletin 133, as follows:

1. The peak rate of heat release for the single upholstered furniture item shall not exceed 80 kW.
   **Exception:** Upholstered furniture in rooms or spaces protected by an approved automatic sprinkler system installed in accordance with Section 903.3.1.1.
2. The total energy heat released by the single upholstered furniture item during the first 10 minutes of the test shall not exceed 25 MJ.
   **Exception:** Upholstered furniture in rooms or spaces protected by an approved automatic sprinkler system installed in accordance with Section 903.3.1.1.

805.4.2.2 **Heat release rate.** Newly introduced mattresses shall have limited rates of heat release when tested in accordance with ASTM E 1590 or California Technical Bulletin 129, as follows:

1. The peak rate of heat release for the single mattress shall not exceed 100 kW.
Exception: Mattresses in rooms or spaces protected by an approved automatic sprinkler system installed in accordance with Section 903.3.1.1.

2. The total energy heat released by the single mattress during the first 10 minutes of the test shall not exceed 25 MJ.

Exception: Mattresses in rooms or spaces protected by an approved automatic sprinkler system installed in accordance with Section 903.3.1.1.

Reason: The standards referenced in this section measure and report "total heat released" not "total energy released." This proposal will update this section so that the term used in the code matches the term users would find on a test report.

Cost Impact: Will not increase the cost of construction
This is simply an editorial change with no cost impact.
F127-16
IFC: 805.2, 805.2.1, 805.2.1.1.

Proponent: John Williams, CBO, representing Adhoc Healthcare Committee (AHC@iccsafe.org); Carl Baldassarra, P.E., FSFPE, representing Code Technology Committee (CTC@iccsafe.org)

2015 International Fire Code

Revise as follows:

805.2 Group I-2, nursing homes and hospitals ambulatory care facilities. The requirements in Sections 805.2.1 through 805.2.2 shall apply to nursing homes Group I-2 occupancies and hospitals classified in Group I-2 ambulatory care facilities.

805.2.1 Upholstered furniture. Newly introduced upholstered furniture shall meet the requirements of Sections 805.2.1.1 through 805.2.1.3.

805.2.1.1 Ignition by cigarettes. Newly introduced upholstered furniture shall be shown to resist ignition by cigarettes as determined by tests conducted in accordance with one of the following: (a) mocked-up composites of the upholstered furniture shall have a char length not exceeding 1.5 inches (38 mm) when tested in accordance with NFPA 261 or (b) the components of the upholstered furniture shall meet the requirements for Class I when tested in accordance with NFPA 260.

Exception: Upholstered furniture belonging to the patients in sleeping rooms of nursing homes (Group I-2) Condition 1 occupancies, provided that a smoke detector is installed in such rooms. Battery-powered, single-station smoke alarms shall be allowed.

Reason: This requirement is already in place in facilities that conform with federal standards, which is effective for the patient care environment. Flamespread in ambulatory care facilities, where patients are rendered incapable of self preservation, are important to prevent the spread of fire to protect that vulnerable population. The language in the Exception of 805.2.2.1 is being clarified to reflect the accurate Condition for Nursing Home Occupancies, which is I-2, Exception 1, which was changed in the 2015 cycle. This is a joint proposal submitted by the ICC Ad Hoc Committee on Healthcare (AHC) and the ICC Code Technology Committee (CTC). The AHC was established by the ICC Board to evaluate and assess contemporary code issues relating to hospitals and ambulatory healthcare facilities. This is a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. In 2014 and 2015 the ICC Ad Hoc Committee has held 4 open meetings and numerous Work Group meetings and conference calls for the current code development cycle which included members of the committees as well as any interested party to discuss and debate the proposed changes. Information on the AHC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the AHC effort can be downloaded from the AHC website at: AHC. The two remaining CTC Areas of Study are Care Facilities and Elevator Lobbies/WTC Elevator issues. This proposal falls under the Care Facilities Area of Study. In 2014 and 2015 ICC CTC Committee has held 4 open meetings and numerous Work Group meetings and conference calls for the current code development cycle which included members of the committees as well as any interested party to discuss and debate the proposed changes. Information on the CTC, including: the sunset plan; meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the CTC website CTC.

Cost Impact: Will not increase the cost of construction
This requirement is already met by a wide range of manufacturers that specialize in furniture in the healthcare environment, making products available and at competitive pricing.
**F128-16**

**IFC: 202 (New), 805.3.2.2.1.**

Proponent: Marcelo Hirschler, representing GBH International (gbhint@aol.com)

### 2015 International Fire Code

Revise as follows:

**805.3.2.2.1 Heat release rate.** Newly introduced mattresses shall have limited rates of heat release when tested in accordance with ASTM E 1590 or California Technical Bulletin 129, as follows and shall comply with the following:

1. The peak rate of heat release for the single mattress shall not exceed 100 kW.
2. The total energy released by the single mattress during the first 10 minutes of the test shall not exceed 25 MJ.
3. Flaming droplets shall not be formed during the test.

**Add new definition as follows:**

**SECTION 202 DEFINITIONS**

**FLAMING DROPLETS.** Flaming liquefied or viscous material that separates and drips from the test specimen during the fire test and continues to burn with flame on the surface upon which it lands.

**Reason:** It has been shown that some mattresses intended for detention occupancies (I-3) pass the ASTM E1590 test by virtue of melting and generating flaming droplets, which can then ignite material on the floor (possessions of the inmate) and spread the fire. The flaming of liquefied material can also contribute to additional ignition of the original item(s). The proposed change introduces a requirement that mattresses should not generate flaming droplets when they burn. Mattress fire test criteria to eliminate flaming droplets is already a requirement by the US Navy. Approval of the code change would mean that such mattresses would not be permitted in detention facilities. This will not eliminate the majority of the mattresses in actual use.

A definition is proposed for flaming droplets to clarify what is meant.

**Cost Impact:** Will increase the cost of construction

This change may increase the cost of construction for some mattresses made of synthetic materials with a tendency to melt or drip, with flaming droplets. Thus, it is possible that the added requirement may mean that some materials will be unable to meet all the provisions. However, many of the mattresses used in this application already meet this requirement so there will not necessarily be an increase in cost of construction.
F130-16
806, 806.2, 806.3, 806.4, 806.5, 807, 807.1, 807.5 (New), 807.5.1 (New), 807.5.2 (New), 807.5 (IBC [F] 806.1)

Proponent: Marcelo Hirschler, representing GBH International (gbhint@aol.com); Robert Davidson, Davidson Code Concepts, LLC, representing Self (rjd@davidsoncodeconcepts.com)

2015 International Fire Code
Revise as follows:

SECTION 806 NATURAL DECORATIVE VEGETATION IN NEW AND EXISTING BUILDINGS

Delete without substitution:

806.2 Artificial decorative vegetation. Artificial decorative vegetation shall meet the flame propagation performance criteria of Test Method 1 or Test Method 2, as appropriate, of NFPA 701. Meeting the flame propagation performance criteria of Test Method 1 or Test Method 2, as appropriate, of NFPA 701 shall be documented and certified by the manufacturer in an approved manner. Alternatively, the artificial decorative vegetation item shall be tested in accordance with NFPA 289, using the 20 kW ignition source, and shall have a maximum heat release rate of 100 kW.

Revise as follows:

806.3 806.2 Obstruction of means of egress. No change to text.

806.4 806.3 Open flame. No change to text.

806.5 806.4 Electrical fixtures and wiring. The use of unlisted electrical wiring and lighting on natural vegetation, including natural cut trees and artificial decorative vegetation, shall be prohibited. The use of electrical wiring and lighting on artificial trees constructed entirely of metal shall be prohibited.

SECTION 807 DECORATIVE MATERIALS OTHER THAN NATURAL DECORATIVE VEGETATION IN NEW AND EXISTING BUILDINGS

807.1 General. Combustible decorative materials, other than including artificial decorative vegetation, shall comply with Sections 807.2 through 807.6. Natural decorative vegetation shall comply with Section 806.

Add new text as follows:

807.5 Artificial Decorative Vegetation Artificial decorative vegetation shall comply with this section as well as with the requirements of Sections 806.2 and 806.3.

807.5.1 Flammability Artificial decorative vegetation shall meet the flame propagation performance criteria of Test Method 1 or Test Method 2, as appropriate, of NFPA 701. Meeting the flame propagation performance criteria of Test Method 1 or Test Method 2, as appropriate, of NFPA 701 shall be documented and certified by the manufacturer in an approved manner. Alternatively, the artificial decorative vegetation shall be tested in accordance with NFPA 289, using the 20 kW ignition source, and shall have a maximum heat release rate of 100 kW.

807.5.2 Electrical Fixtures and Wiring on Artificial Vegetation The use of unlisted electrical wiring and lighting on artificial decorative vegetation shall be prohibited. The use of electrical...
wiring and lighting on artificial trees constructed entirely of metal shall be prohibited.

Revise as follows:

807.5 807.6 Occupancy-based requirements. In occupancies specified, combustible decorative materials not complying with Section 807.3 shall comply with Sections 807.5.1 807.6.1 through 807.5.6 807.6.6.

Reason: This proposal moves all of the requirements for artificial decorative vegetation into the section on decorative materials. In that way the limitations in section 807.2 through 807.4 will apply to them as well. It has been claimed that there is often interest in displaying seasonal decorative items like a wreath and that it is not always possible to determine compliance of these items with NFPA 701 or NFPA 289. However, large artificial vegetation items that do not comply with either of the fire tests have been shown to generate massive amounts of heat when they burn. Therefore, this proposal would allow the fire code official to handle these items like any other combustible decorative material within the limitations of section 807.

This proposal creates a new section 807.5 dealing with artificial decorative vegetation within 807, which is the section on all decorative materials. The existing section 806.2 is moved to 807.5.1 and the requirements dealing with lighting and electrical are split so that section 806 contains only those dealing with natural vegetation and the new section 807.5.2 contains those dealing with artificial vegetation.

All existing section 807.5, dealing with specific occupancies, is being moved to become section 807.6, without change.

Cost Impact: Will not increase the cost of construction
Reorganizes the section to include artificial decorative vegetation with all other decorative materials.
806.1.4 Fire retardant treatments for natural cut trees. If a fire retardant treatment is used to improve the fire performance of a natural cut tree the treatment shall have been approved for the application.

Reason: It has been shown that multiple treatments exist that claim to be appropriate for improving the fire performance of natural cut trees (typically Christmas trees) but not all of them are equally suitable for the application. If a treatment is used it must have been approved. In the state of California such an approval procedure exists and in ASTM a committee has developed a test method for conducting such approvals. The present proposal does not endorse any specific method because that is up to the AHJ, but it is important that someone approves the use of any treatment being proposed for use. When a natural tree burns it can generate very high rates of heat release.

Cost Impact: Will increase the cost of construction
This will require treatments to show that they are effective before being allowed for regulated use.
F132-16
IFC: 806.2.

Proponent: Carl Baldassarra, P.E., FSFPE, representing the Code Technology Committee (CTC@iccsafe.org)

2015 International Fire Code

Revise as follows:

806.2 Artificial vegetation. Artificial decorative vegetation shall meet the flame propagation performance criteria of Test Method 1 or Test Method 2, as appropriate, of NFPA 701. Meeting the flame propagation performance criteria of Test Method 1 or Test Method 2, as appropriate, of NFPA 701 shall be documented and certified by the manufacturer in an approved manner. Alternatively, the artificial decorative vegetation item shall be tested in accordance with NFPA 289, using the 20 kW ignition source, and shall have a maximum heat release rate of 100 kW.

Exception: In Groups I-1, I-2 Condition 1 or R-4 equipped throughout with an approved automatic sprinkler system installed in accordance with 903.3.1, artificial vegetation shall be of limited quantities such that a hazard of fire development or spread is not present.

Reason: In Group I-1 (Assisted Living), I-2 Condition 1 (Nursing homes) and R-4 (Group homes) residents often seek to create a home-like environment and personalize their space by displaying seasonal decorative items, like a wreath at their unit entry door. It is not always possible, or practical, to determine compliance with NFPA 701 or NFPA 289, especially for items procured by individual residents. The language of this proposed text is similar to the provisions for decorative materials in these use groups under Section 807. Further, by adding the language requiring sprinkler coverage, there would be a reduced risk for detrimental effects of limited quantities of artificial vegetation. Last code cycle, a similar proposal was brought to the floor and the committee approved it, with the deletion of the NFPA 701 testing method. The public comment sought to reinstate the NFPA 701 testing, but deleted the exception language at the same time. We are seeking to keep all of the testing methods, but make sure that the exception language, that the committee approved, is added.

This proposal is submitted by the ICC Code Technology Committee (CTC). The ICC Board has decided to sunset the CTC. The sunset plan includes re-assigning many of the CTC Areas of Study to the applicable Code Action Committee (CAC). The two remaining CTC Areas of Study are Care Facilities and Elevator Lobbies/WTC Elevator issues. This proposal falls under the Care Facilities Area of Study. In 2014 and 2015 ICC CTC Committee has held 4 open meetings and numerous Work Group meetings and conference calls for the current code development cycle which included members of the committees as well as any interested party to discuss and debate the proposed changes. Information on the CTC, including: the sunset plan; meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the CTC website CTC.

Cost Impact: Will not increase the cost of construction
This is a reduction in elements for review by the Fire Code official.
F133-16

IFC: 806.2.

Proponent: Amy Carpenter, SFCS Architects, representing Hulda B. and Maurice L. Rothschild Foundation

2015 International Fire Code

Revise as follows:

806.2 Artificial vegetation. Artificial decorative vegetation shall meet the flame propagation performance criteria of Test Method 1 or Test Method 2, as appropriate, of NFPA 701. Meeting the flame propagation performance criteria of Test Method 1 or Test Method 2, as appropriate, of NFPA 701 shall be documented and certified by the manufacturer in an approved manner. Alternatively, the artificial decorative vegetation item shall be tested in accordance with NFPA 289, using the 20 kW ignition source, and shall have a maximum heat release rate of 100 kW.

Exceptions: Testing of artificial vegetation is not required in Groups R-2 and R-3 occupancies, equipped throughout with an approved automatic sprinkler system installed in accordance with Section 903.3.1, where such artificial vegetation complies with the following:
1. Wreaths and other decorative items on doors shall not obstruct the door operation and shall not exceed 50% of the surface area of the door.
2. Decorative artificial vegetation shall be limited to not more than 30% of the wall area to which they are attached.
3. Decorative artificial vegetation, not on doors or walls, shall not exceed 3 feet (914 mm) in any dimension.

Reason: In many apartment buildings, residents often seek to create a welcoming environment and personalize their space by displaying seasonal decorative items like a wreath at their entry door. It is not always possible, or practical, to determine compliance with NFPA 701 or 289, especially for items procured by individual residents. While this decorative practice is already very common in apartment buildings across the country, it is not addressed by the code and not uniformly enforced. This proposal seeks to add language clarifying what can be permitted, give the AHJ guidance, and to make sure that this only occurs in sprinklered buildings.

The language of this proposed text is similar to the provisions for combustible decorative materials in Section 807. Further, the proposal seeks to provide more guidance to what has previously been allowed under "limited quantities". The concern is, for artificial vegetation, that it is difficult to quantify and limit the objects. We have set three limiting factors.
1. Items such as wreaths on apartment entry doors, we are quantifying a maximum size and stating that it can't interfere with the operation of the door itself.
2. Items such as garlands or other items that might be attached to a wall, we are taking the same language limiting combustible decorations as is currently in the code in Section 807.5.3.3 for Nursing Homes.
3. Lastly, because often decorative vegetation items are not on a wall or a door, but rather placed on a shelf or table, like in the attached image, we have placed a size limit on these other items. Larger items, such as an artificial tree or larger artificial plant would need to comply with the NFPA testing requirements in the base paragraph.

Last code cycle, a similar proposal was brought to the floor that allowed for "limited quantities" of untested vegetation, but also replaced the NFPA 701 testing method with the NFPA 289 test. The committee approved it. A public comment was brought to the floor to reinstate the NFPA 701 test, but removed the limited quantities provision at the same time. We are maintaining all of the testing methods, but seeking to allow the defined, limited quantities of untested vegetation.

I invite you to also look at the following research: BRE Global, LTD report: Effectiveness of Fire Sprinklers in Residential Premises (2005) – This study found residential sprinklers effective to stop the majority of residential fires. Fuel sources included furniture, finishes and draperies. http://www.bre.co.uk/page.jsp?id=422
**Cost Impact:** Will not increase the cost of construction
As most decorative vegetation is supplied by individual residents, it will have no impact on the cost of construction. It may actually decrease the cost for code officials by decreasing the number of elements for review.
807.1 (IBC [F] 806.1)

**Proponent**: Michael O’Brien representing the Fire Code Action Committee (FCAC@iccsafe.org)

### 2015 International Fire Code

**Revise as follows:**

**807.1 General. Combustible**

In Groups A, E, I and R-1, and dormitories in Group R-2, combustible decorative materials, other than decorative vegetation, shall comply with Sections 807.2 through 807.5.6.

**Reason:** When F109-13 was submitted, the reason stated that it was only a clarification. But in fact, the requirements for combustible decorative materials which previously had only applied to A, E, I, R-1 and dormitories in R-2 suddenly applied to all occupancies. It appears that change was done unintentionally, so this proposal intends to correct that situation.

There is no significant reason to begin regulating drapes and curtains in Group F, S or U occupancies.

Additionally, there are no specific occupancy limitations noted in Sections 807 and 808 for Groups F, S and U. So this proposal is consistent with the remainder of the provisions.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire safety and hazardous materials in new and existing buildings and facilities and the protection of life and property in wildland urban interface areas. In 2014 and 2015 the Fire-CAC has held 5 open meetings. In addition, there were numerous conference calls, Regional Work Group and Task Group meetings for the current code development cycle, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC

**Cost Impact:** Will not increase the cost of construction

This proposal will not increase the cost of construction. In fact, it will reduce the cost of construction in those occupancies which do not need to comply.
2015 International Fire Code

807.3 Combustible decorative materials. In other than Group I-3, curtains, draperies, fabric hangings and other similar combustible decorative materials suspended from walls or ceilings shall comply with Section 807.4 and shall not exceed 10 percent of the specific wall or ceiling area to which they are attached. In Group I-3 combustible decorative materials are prohibited.

Fixed or movable walls and partitions, paneling, wall pads and crash pads applied structurally or for decoration, acoustical correction, surface insulation or other purposes shall be considered interior finish, shall comply with Section 803 and shall not be considered decorative materials or furnishings.

Exceptions:

1. In auditoriums in Group A, the permissible amount of curtains, draperies, fabric hangings and other similar combustible decorative material suspended from walls or ceilings shall not exceed 75 percent of the aggregate wall area where the building is equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1, and where the material is installed in accordance with Section 803.13 of the International Building Code.

2. In Group R-2 dormitories, within sleeping units and dwelling units, the permissible amount of curtains, draperies, fabric hangings and other similar decorative materials suspended from walls or ceilings shall not exceed 50 percent of the aggregate wall areas where the building is equipped throughout with an approved automatic sprinkler system installed in accordance with Section 903.3.1.

3. In Group B and M occupancies, the amount of combustible fabric partitions suspended from the ceiling and not supported by the floor shall comply with Section 807.4 and shall not be limited.

4. In other than Group I-3, curtains, draperies, fabric hangings and similar combustible decorative materials used as window coverings.

Reason: The first change would reinstate the prohibition against the use of combustible materials in Group I-3 occupancies. The second change would remove any limitations on window coverings. Virtually every hotel room in the world has a window; in fact natural light in hotel rooms is a requirement under section 1205 of the code. Some hotel rooms use glazing for the entire exterior wall. Without this proposal typical hotel room drapes at required windows could not be used. This proposal intends to solve any interpretation issues that may occur with window coverings.

Cost Impact: Will not increase the cost of construction

The proposal will provide clarity for Group I-3 occupancies and more flexibility for window coverings, therefore there are no cost impacts associated with this proposal.
807.3 Combustible decorative materials. In other than occupancies in Groups A, E, I-1, I-2, I-4, and R-1, and dormitories in Group I-3 R-2, curtains, draperies, fabric hangings and other similar combustible decorative materials suspended from walls or ceilings shall comply with Section 807.4 and shall not exceed 10 percent of the specific wall or ceiling area to which they are attached.

Fixed or movable walls and partitions, paneling, wall pads and crash pads applied structurally or for decoration, acoustical correction, surface insulation or other purposes shall be considered interior finish, shall comply with Section 803 and shall not be considered decorative materials or furnishings.

Exceptions:

1. In auditoriums in Group A, the permissible amount of curtains, draperies, fabric hangings and other similar combustible decorative material suspended from walls or ceilings shall not exceed 75 percent of the aggregate wall area where the building is equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1, and where the material is installed in accordance with Section 803.13 of the International Building Code.

2. In Group R-2 dormitories, within sleeping units and dwelling units, the permissible amount of curtains, draperies, fabric hangings and other similar decorative materials suspended from walls or ceilings shall not exceed 50 percent of the aggregate wall areas where the building is equipped throughout with an approved automatic sprinkler system installed in accordance with Section 903.3.1.

3. In Group B and M occupancies, the amount of combustible fabric partitions suspended from the ceiling and not supported by the floor shall comply with Section 807.4 and shall not be limited.

Reason: Section 807 was re-arranged and modified in the 2015 edition. The language proposed would change the charging statement for curtains, draperies, and hangings back to the legacy language. The current 2015 edition wording would apply the 701 limitation and 10% criteria to all new and existing occupancies other than I-3. Such a change is a tremendous expansion of the requirement and unenforceable. No justification that I could find (and I did call ICC to clarify and notify them of the issue) was provided in the code change to the 2015 edition to account for this vast change in the requirement.

This proposed change is just an effort to go back to the more reasonable requirement from past editions of the code and to correct the apparent mistake that occurred in the 2015 edition. I would be supportive of increasing the requirement in general, especially for new construction, but such should be substantiated and justified to the committee and membership.

Cost Impact: Will not increase the cost of construction

This change could save many thousands of dollars, possibly millions, especially considering the effect that the 2015 edition requirement would have on existing buildings if the language were to be enforced as written across the country.
F137-16
IFC: 808.1.
Proponent: John Williams, CBO, representing Adhoc Healthcare Committee (AHC@iccsafe.org)

2015 International Fire Code

Revise as follows:

808.1 Wastebaskets and linen containers in Group I-1, I-2 and I-3 occupancies and ambulatory care facilities. Wastebaskets, linen containers and other waste containers, including their lids, located in Group I-1, I-2 and I-3 occupancies and ambulatory care facilities shall be constructed of noncombustible materials or of materials that meet a peak rate of heat release not exceeding 300 kW/m$^2$ when tested in accordance with ASTM E 1354 at an incident heat flux of 50 kW/m$^2$ in the horizontal orientation. Metal wastebaskets and other metal waste containers with a capacity of 20 gallons (75.7 L) or more shall be listed in accordance with UL 1315 and shall be provided with a noncombustible lid. Portable containers exceeding 32 gallons (121 L) shall be stored in an area classified as a waste and linen collection room and constructed in accordance with Table 509 of the International Building Code.

Reason: This proposal as accepted for Group I-2 occupancies, both hospitals and nursing homes, due to the amount of paper used with sensitive patient information. The size of the waste container is designed to handle locked bins that are used for recycling. This change adds language for Ambulatory care facilities, which handle patient care information the same way as in a hospital.

This proposal is submitted by the ICC Ad Hoc Committee on Healthcare (AHC). The AHC was established by the ICC Board to evaluate and assess contemporary code issues relating to hospitals and ambulatory healthcare facilities. This is a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. In 2014 and 2015 the ICC Ad Hoc Committee has held 4 open meetings and numerous Work Group meetings and conference calls for the current code development cycle which included members of the committees as well as any interested party to discuss and debate the proposed changes. Information on the AHC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the AHC effort can be downloaded from the AHC website at: AHC.

Cost Impact: Will not increase the cost of construction
These waste containers are widely used in the healthcare environment, so there is no additional cost to conform to this standard.
F138-16
IFC: 808.1, 808.1.1 (New), 808.1.2 (New).

Proponent: John Williams, CBO, representing Adhoc Healthcare Committee (AHC@iccsafe.org); Carl Baldassarra, P.E., FSFPE, representing Code Technology Committee (CTC@iccsafe.org)

2015 International Fire Code

808.1 Wastebaskets and linen containers in Group I-1, I-2 and I-3 occupancies. Wastebaskets, linen containers and other waste containers, including their lids, located in Group I-1, I-2 and I-3 occupancies shall be constructed of noncombustible materials or of materials that meet a peak rate of heat release not exceeding 300 kW/m$^2$ when tested in accordance with ASTM E 1354 at an incident heat flux of 50 kW/m$^2$ in the horizontal orientation. Metal wastebaskets and other metal waste containers with a capacity of 20 gallons (75.7 L) or more shall be listed in accordance with UL 1315 and shall be provided with a noncombustible lid. Portable containers exceeding 32 gallons (121 L) shall be stored in an area classified as a waste and linen collection room and constructed in accordance with Table 509 of the International Building Code.

Add new text as follows:

808.1.1 Capacity density. The average capacity density of containers located in an individual room or space shall not be greater than 0.5 gal/ft$^2$ (20.4 L/m$^2$).

808.1.2 Recycling clean waste containers. Recycling clean waste containers, including their lids, shall not exceed an individual capacity of 96 gallons (363 L).

Reason: This proposal will provide correlation with NFPA 101-2012, originally base Section 19.7.5.7.1, which contains similar provisions for healthcare occupancies. This proposal will also provide correlation with current CMS licensure inspection requirements.

In I-1, I-2 and I-3 occupancies, there is a great need for containers to handle a wide range of waste material. For institutional settings where occupants are sleeping, this is a particular issue. On a patient bed unit (either hospital, nursing home, or skilled care) or an inmate area, hampers containing soiled linen, regulated medical waste, and infectious waste are needed to be placed in rooms in a safe manner. In a clerical setting, there is paper with sensitive information that needs to be specially handled and destroyed, which requires separate waste containers. Paper recycling is also a concern for proper storage. This standard seeks to regulate the concentration of these materials so as not to create a hazard that goes beyond the active and passive fire containment systems in place in the hospital. The recommended size and space concentration are based on current federal standards, which are already being followed by hospitals, nursing homes, correctional facilities, and any other facility receiving federal funding.

This is a joint proposal submitted by the ICC Ad Hoc Committee on Healthcare (AHC) and the ICC Code Technology Committee (CTC) in cooperation with Robert Davidson.

The AHC was established by the ICC Board to evaluate and assess contemporary code issues relating to hospitals and ambulatory healthcare facilities. This is a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. In 2014 and 2015 the ICC Ad Hoc Committee has held 4 open meetings and numerous Work Group meetings and conference calls for the current code development cycle which included members of the committees as well as any interested party to discuss and debate the proposed changes. Information on the AHC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the AHC effort can be downloaded from the AHC website at: AHC.

The two remaining CTC Areas of Study are Care Facilities and Elevator Lobbies/WTC Elevator issues. This proposal falls under the Care Facilities Area of Study. In 2014 and 2015 ICC CTC Committee has held 4 open meetings and numerous Work Group meetings and conference calls for the current code development cycle which included members of the committees as well as any interested party to discuss and debate the proposed changes.
Information on the CTC, including: the sunset plan; meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the CTC website CTC.

Robert Davison is co-sponsoring this code change proposal regarding Group I-3 criteria.

**Cost Impact:** Will not increase the cost of construction
The proposed change is reflective of current operational practices, and will not increase construction costs.
F139-16

IFC: 809 (New), 809.1 (New).
Proponent: Marcelo Hirschler, representing GBH International (gbhint@aol.com)

2015 International Fire Code

Add new text as follows:

SECTION 809 CHILDREN’S PLAY STRUCTURES

809.1 General. Children’s play structures installed inside all occupancies covered by this code that exceed 10 feet (3048 mm) in height or 150 square feet (14 m²) in area shall comply with Section 424 of the International Building Code.

Reason: This is simply a pointer from the IFC to the IBC for children’s play structures incorporated into existing occupancies. The fire testing that led to its inclusion into the IBC showed that these children’s playground structures or play structures can release very large amounts of heat when they burn and need to be regulated.

Cost Impact: Will increase the cost of construction
If children’s play structures are included as part of new construction, the IBC already applies but if they are built later they would need to be covered by this code.

F139-16 : 809 (NEW)-HIRSCHLER11865
CHAP ER 9—FIRE PROTECTION AND LIFE SAFETY SYSTEMS

901.1 Scope. The provisions of this chapter shall specify where fire protection systems and life safety systems are required and shall apply to the design, installation, inspection, operation, testing and maintenance of all fire protection systems.

Reason: The title of Chapter 9 is Fire Protection Systems, but over the years the chapter has expanded to include emergency alarm systems, smoke control systems, explosion control, and carbon monoxide detection, which are not fire protection systems. A more appropriate title for this section is Fire Protection and Life Safety Systems, which would cover all of the Sections in Chapter 9. This proposal revises the Chapter title accordingly, along with section 901.1.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire safety and hazardous materials in new and existing buildings and facilities and the protection of life and property in wildland urban interface areas. In 2014 and 2015 the Fire-CAC has held 5 open meetings. In addition, there were numerous conference calls, Regional Work Group and Task Group meetings for the current code development cycle, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC

Cost Impact: Will not increase the cost of construction
The proposal is editorial only and introduces no new construction requirements.
2015 International Fire Code

Revise as follows:

901.4.6 Pump and riser room size. Where provided, fire pump rooms and automatic sprinkler system riser rooms shall be designed with adequate space for all equipment necessary for the installation, as defined by the manufacturer, with sufficient working space around the stationary equipment. Clearances around equipment to elements of permanent construction, including other installed equipment and appliances, shall be sufficient to allow inspection, service, repair or replacement without removing such elements of permanent construction or disabling the function of a required fire-resistance-rated assembly. Fire pump and automatic sprinkler system riser rooms shall be provided with a door(s) and an unobstructed passageway large enough to allow removal of the largest piece of equipment.

903.3 Installation requirements. Automatic sprinkler systems shall be designed and installed in accordance with Sections 903.3.1 through 903.3.9.

Add new text as follows:

903.3.6 (IBC [F] 903.3.6) Fire sprinkler riser rooms. Where the main water control valve for automatic sprinkler systems designed in accordance with Section 903.3.1.1 is installed on the riser, the riser shall be located in a fire sprinkler riser room. Fire sprinkler riser rooms shall only contain automatic sprinkler system risers and appurtenances, fire alarm equipment and devices and fire pump equipment.

Exceptions:

1. A fire sprinkler riser room is not required for automatic sprinkler systems controlled by wall-mounted post indicator valves operable from the exterior of the building.
2. In multi-story facilities, floor control valves are permitted to be located on each floor level in an exit stairway enclosure.

903.3.6.1 (IBC [F] 903.3.6.1) Size. Fire sprinkler riser rooms containing one fire sprinkler riser shall have a minimum area of 16 square feet (1.49 m²), with a minimum dimension of 4 feet (102 mm).

903.3.6.2 (IBC [F] 903.3.6.2) Working space. A working space of not less than 36 inches (914 mm) in width, 36 inches (914 mm) in depth and 78 inches (1981 mm) in height shall be provided in front of each riser.

903.3.6.3 (IBC [F] 903.3.6.3) Exterior Access Door. Fire sprinkler riser rooms shall have an exterior access door with a minimum clear width of 32 inches (813 mm) and a minimum height of 80 inches (2032 mm).

903.3.6.4 (IBC [F] 903.3.6.4) Marking on access doors. Exterior access doors for fire sprinkler
riser rooms shall be labeled on the exterior side with the following sign or other approved sign:

**FIRE SPRINKLER RISER ROOM**

The lettering shall be in a contrasting color to the background. Letters shall have a minimum height of 2-inches (51 mm) with a minimum stroke of 3/8-inch (10 mm).

**903.3.6.5 (IBC [F] 903.3.6.5) Equipment access.** Fire sprinkler riser rooms shall be provided with doors and an unobstructed accessway large enough to allow removal of the largest piece of equipment.

**903.3.6.6 (IBC [F] 903.3.6.6) Environment.** Fire sprinkler riser rooms shall be maintained at a minimum temperature of 40°F (4°C) and a maximum temperature of 100°F (38°C). Heating and cooling units for the fire sprinkler riser room shall be permanently installed.

**Exception:** The maximum temperature requirement does not apply to fire sprinkler riser rooms that do not contain a fire alarm control unit or spare sprinkler heads.

**903.3.6.7 (IBC [F] 903.3.6.7) Lighting.** Permanently installed artificial illumination shall be provided in the fire sprinkler riser room.

**Reason:** This proposal provides a minimum level of protection and location for fire sprinkler risers. A fire sprinkler riser room is only required where a system is designed under NFPA 13 and the main control valve is on the riser. Other installations with wall-mounted PIVs or yard PIVs would not require a riser room since the only equipment on that portion of the riser would typically be just a flow switch.

Placing the fire riser within a riser room creates a layer of protection for the riser and any other fire protection equipment which may be in riser room. The exterior door provides easy access for firefighting operations, inspection and testing requirements, and maintenance on the system.

The minimum size and the lighting requirements insure the room will be large enough and well lit for proper maintenance and testing. The minimum temperature requirement of the room provides protection from freezing for the sprinkler system and fire pump, if collocated in the room, as required by NFPA 13 and 20. The maximum temperature protects spare sprinkler heads from temperatures above their listings and fire alarm control units, if collocated in the room, as required by NFPA 13 and 72.

A fire sprinkler riser room provides the following benefits:

- Quick, easy access to the fire sprinkler risers by fire fighters during a fire event.
- Provides a secure location away malicious mischief and vandalism.
- Provides protection from any potential vehicular traffic where the riser may otherwise be located in a parking lot.
- Protects the valves and appurtenances from weathering, reducing long term maintenance costs.
- Results in a more dependable system for the life of the building.

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**Cost Impact:** Will increase the cost of construction

This proposal will result in a minimal increase to the cost of construction to provide a riser room of 16 square feet.
F142-16

IFC: 901.4.7 (New).

Proponent: Jeff Hugo, National Fire Sprinkler Association, representing National Fire Sprinkler Association (hugo@nfsa.org)

2015 International Fire Code

Add new text as follows:

901.4.7 Freeze Protection. The areas and spaces in a building that contain fire protection system piping that contains water or other agents susceptible to freezing, shall be maintained at or above 40 degrees Fahrenheit, or such piping shall be protected from freezing by other approved methods in accordance with Section 901.4

Reason: Several fire protection installation standards, including but not limited to; NFPA 13, NFPA 13R, NFPA 14 require the water filled piping to be at, or above 40 degrees Fahrenheit. The other approved methods can be limited use of frost-proof casings, insulation and listed heat trace tape. A professional engineer is also permitted to prove through heat loss calculations that the piping will not freeze when the area or space is maintained below 40 degrees.

This is not a new technical requirement but it is a good measure to bring this out into the body of the code for users and code officials to be aware of the temperature of the spaces that the fire protection piping is installed.

Cost Impact: Will not increase the cost of construction
Not a new technical requirement.
F143-16

IFC: 901.5, 901.6.

Proponent: Jeff Hugo, National Fire Sprinkler Association, representing National Fire Sprinkler Association (hugo@nfsa.org)

2015 International Fire Code

Revise as follows:

901.5 Installation acceptance testing. Fire detection and alarm systems, fire extinguishing systems, fire hydrant systems, fire standpipe systems, fire pump systems, private fire service mains and all other
fire Fire protection systems and appurtenances thereto shall be subject to acceptance tests as contained in the installation standards and as approved by the fire code official. The fire code official shall be notified before any required acceptance testing.

901.6 Inspection, testing and maintenance. Fire detection, alarm, and extinguishing systems, mechanical smoke exhaust systems, and smoke and heat vents
Fire protection systems shall be maintained in an operative condition at all times, and shall be replaced or repaired where defective. Nonrequired fire protection systems and equipment shall be inspected, tested and maintained or removed.

Reason: The lists in both sections are long and missed specifically naming automatic fire sprinkler systems. The defined term, fire protection systems, covers automatic sprinkler systems, along with every other system named in the list. Other sections in the IFC combines all systems under fire protection systems such as, Section 901.4.

Cost Impact: Will not increase the cost of construction
Not a technical change.
2015 International Fire Code

Add new definition as follows:

SECTION 202 DEFINITIONS

SUBORDINATE (SYSTEM). A system that is activated by another fire protection or life safety system. For example, where a fire alarm system activates a smoke removal or elevator recall system, the smoke removal or elevator recall system is considered to be "subordinate" to the fire alarm system.

Add new text as follows:

901.6.2 Integrated Testing. Integrated testing shall comply with this section.

901.6.2.1 General. Where two or more fire protection or life safety systems are interconnected, the intended response of subordinate fire protection and life safety systems shall be verified when required testing of the initiating system is conducted.

901.6.2.2 High-rise Buildings. For high-rise buildings, integrated testing shall comply with NFPA 4, with an integrated test performed prior to issuance of the certificate of occupancy and at intervals not exceeding 5 years. If an equipment failure is detected during integrated testing, a repeat of the integrated test shall not be required, except as necessary to verify operation of fire protection or life safety functions that are initiated by equipment that was repaired or replaced.

901.6.2.3 Smoke Control Systems. Where a fire alarm system is integrated with a smoke control system as outlined in Section 909, integrated testing shall comply with NFPA 4, with an integrated test performed prior to issuance of the certificate of occupancy and at intervals not exceeding 5 years. If an equipment failure is detected during integrated testing, a repeat of the integrated test shall not be required, except as necessary to verify operation of fire protection or life safety functions that are initiated by equipment that was repaired or replaced.

909.12.2 Integrated system testing. Where smoke control systems are integrated with fire alarm systems, integrated testing shall be performed in accordance with Section 901.6.2.3.

Reference standards type: This reference standard is new to the ICC Code Books
Add new standard(s) as follows:
It can be viewed here:

Reason: Fire alarm systems integrate with many other fire protection and life safety systems. Some systems are more complex than others. The interface between systems must be verified to ensure proper operation of the systems. The only document currently available that provides requirements for integrated testing is NFPA 4, Standard for Integrated Fire Protection and Life Safety System Testing. Systems with minimal integrations, such as a fire sprinkler system connected to a fire alarm system, may not need to follow all the requirements of NFPA 4. Larger, more complex systems such as fire alarm systems integrating with a smoke control system or integrated
systems in a high-rise building must have a qualified person to oversee the integrated testing as well as having documentation provided of the successful operations of the systems together. NFPA 4 provides the guidance for this to help ensure proper operation of the integrated systems in an emergency. These requirements would include providing a detailed test plan and an Integrated Testing Agent.

**Cost Impact:** Will not increase the cost of construction
Since each system and the integration of multiple systems are supposed to be tested, this does not add to the cost of construction. This language simply clarifies the need for the testing. Adding the reference to NFPA 4 adds a reference for designers, installers and AHJ's to ensure compliance.

**Analysis:** A review of the standard(s) proposed for inclusion in the code, NFPA 4-2015 with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1, 2016.
F145-16
202, 901.6.2 (New), 901.6.2.1 (New), 901.6.2.2 (New), Chapter 16, [IBC [F] 202, [F] 901.6.2 (New), [F] 901.6.2.1 (New), [F] 901.6.2.2 (New), Chapter 35]

Proponent: Michael O’Brian representing the Fire Code Action Committee (FCAC@iccsafe.org)

2015 International Fire Code

SECTION 202 DEFINITIONS

INTEGRATED FIRE PROTECTION AND LIFE SAFETY SYSTEM TESTING. Integrated Fire Protection and Life Safety System Testing. A testing procedure to establish the operational status, interaction and coordination of two or more fire protection and safety systems.

SECTION 202 DEFINITIONS

SUBORDINATE (SYSTEM). A system that is activated by another fire-protection or life-safety system. For example, where a fire alarm system activates a smoke removal or elevator recall system, the smoke removal or elevator recall system is considered to be “subordinate” to the fire alarm system.

Add new text as follows:

901.6.2 Integrated Testing. Testing of fire protection systems shall be in accordance with Section 901.6.2.1 or 901.6.2.2.

901.6.2.1 General. Where two or more fire-protection or life-safety systems are interconnected, the intended response of subordinate fire-protection and life-safety systems shall be verified when required testing of the initiating system is conducted.

901.6.2.2 High-rise buildings. For high-rise buildings only, integrated testing shall comply with NFPA 4, with an integrated test performed prior to issuance of the certificate of occupancy and at intervals not exceeding 5 years. If an equipment failure is detected during integrated testing, a repeat of the integrated test shall not be required, except as necessary to verify operation of fire-protection or life-safety functions that are initiated by equipment that was repaired or replaced.

Reference standards type: This reference standard is new to the ICC Code Books

Add new standard(s) as follows:


It can be viewed here:


Reason: The IFC clearly intends to require proper operation of integrated features of fire-protection and life-safety systems. In some cases, such as a fire alarm system initiating a complex response of doors, dampers, elevators and fans in a high-rise building, the integration is highly complex, involving cooperation of many different trades, controls and systems. In other cases, such as notifying a monitoring service when a fire sprinkler operates, the integration is relatively simple. The challenge in writing a specific IFC requirement for testing of integrated systems is ensuring that required testing of integrated features is scaled in a manner that is reasonable for a wide range of applications.

NFPA 4 is a newly published standard that deals with testing of integrated systems. While there is broad agreement...
that the 2015 edition of this standard reasonably addresses testing of complex system integrations, such as those found in high-rise buildings, concerns have been expressed by some stakeholder groups about the suitability of this inaugural edition of the standard for less complex situations.

Accordingly, this proposal presents a two-tiered approach to integrated testing that is applicable when a code-required test is conducted. The first tier is a general requirement for verifying the functionality of fire-protection and life-safety system integrations. Then, for high-rise buildings only, which are well known to have complex fire-protection and life-safety system integrations, NFPA 4 is referenced. The text makes it clear that the IFC will not require NFPA 4 compliance for any other application; although, that limitation could be reconsidered in the future based on changes in subsequent editions of NFPA 4.

It should also be noted that the proposed general requirement established by Section 901.6.2.1 intends to convey that required testing of integrated features should follow a top down approach, where testing of an initiating device or control warrants verification of subordinate systems or functions, but not necessarily the contrary. For example, where a smoke detector is intended to trigger an automatic damper (the damper being a "subordinate" device to the smoke detector), the test protocol should verify that the damper system responds as intended when the smoke detector activates. However, if a damper control system is tested simply to exercise dampers and to verify that dampers are operating, such testing should not require integrated testing of the initiating smoke detector or fire alarm system.

Lastly, with respect to high-rises, the proposed IFC text makes it clear that a repeat of the entire integrated test is not required when failed initiating equipment is repaired or replaced. The IFC must include this provision because NFPA 4-2015 does not provide complete guidance on the subject.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire safety and hazardous materials in new and existing buildings and facilities and the protection of life and property in wildland urban interface areas. In 2014 and 2015 the Fire-CAC has held 5 open meetings. In addition, there were numerous conference calls, Regional Work Group and Task Group meetings for the current code development cycle, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC

**Cost Impact:** Will increase the cost of construction

Although it is currently the intent of the IFC for fire-protection and life-safety systems to be thoroughly tested, including ensuring that integrated systems and features work properly, this requirement has not been previously addressed by specific code text. Accordingly, adding a specific requirement for integrated testing might arguably be regarded as having a construction cost impact. In addition, specifically with respect to high-rise buildings, the required planning and execution of integrated testing to comply with NFPA 4 will likely increase the cost of building commissioning tests.

**Analysis:** A review of the standard(s) proposed for inclusion in the code, NFPA 4-2015 with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1, 2016.

F145-16 : 901.6.2 (NEW)-O'BRIAN10940
2015 International Fire Code

Add new text as follows:

**901.6.3 Notification prior to testing.** Fire protection system testing activities shall not commence until notification has been posted at the premises when testing will be and any supervising or monitoring services are notified. Actions necessary to prevent an unnecessary emergency response shall be implemented prior to fire protection system testing and maintenance activities.

**901.6.4 Testing completion.** Notify the supervising or monitoring services that the system is back in service when the testing has been completed.

Reason: Unwanted alarms continue to negatively impact fire service resources. Unwanted alarms unnecessarily commit resources to responses. With good planning and notifications, a property owner and contractor can prevent unnecessary responses by emergency personnel.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire safety and hazardous materials in new and existing buildings and facilities and the protection of life and property in wildland urban interface areas. In 2014 and 2015 the Fire-CAC has held 5 open meetings. In addition, there were numerous conference calls, Regional Work Group and Task Group meetings for the current code development cycle, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: [FCAC](http://www.iccsafe.org)

Cost Impact: Will not increase the cost of construction

This proposal is intended to reduce unwanted alarms and reduce the unnecessary burden on the fire service to respond to these alarms.
F147-16
IFC: 901.7.
Proponent: William Hall, Portland Cement Association (jhall@cement.org)

2015 International Fire Code

Revise as follows:

901.7 Systems out of service. Where a required fire protection system is out of service, all occupants, the fire department and the fire code official shall be notified immediately and, where required by the fire code official, the building shall be either evacuated or an approved fire watch shall be provided for all occupants left unprotected by the shutdown until the fire protection system has been returned to service. During any time period that the automatic fire suppression system is out of service for a period of over 4 hours, a placard viewable from the exterior shall be placed on all exterior doors serving as exit discharge.

1. The placards shall be placed such that it is centered in the width of the door and the center of the placard be not less than 4 feet (1219 mm) and no more than 6 feet (1,829 mm) above the threshold.
2. The placards shall be 8 inches high by 16 inches long (203 mm by 406 mm) in size with a white background, black letters and a black border.
3. Placards shall state:
   3.1. Line 1: "FIRE SPRINKLERS"
   3.2. Line 2: "in this building are"
   3.3. Line 3: "OUT OF SERVICE ."

   Where utilized, fire watches shall be provided with not less than one approved means for notification of the fire department and their only duty shall be to perform constant patrols of the protected premises and keep watch for fires.

Reason: We have discovered what we feel is an oversight in the fire code. As the codes are developed to be a vital component to life safety, information shared to the occupants of the building, when it affects them should be equally vital. When the fire suppression system which was designed and installed to protect the occupants within a structure is not working or out of service, it would make sense that those same occupants or visitors should be aware that the system is out of service. This proposal would require that occupants currently in the building be notified immediately and placards be placed at the doors to alert others, if over 4 hours, until the situation is resolved and the fire sprinkler system is operational. When sprinkler system become out of service, rarely are buildings evacuated or proper fire watches established. After large storms or disasters, water supply or electrical service may not be available for days or even weeks. Emergency maintenance issues arise where parts or fire pump may not available for a period of time. Frozen and busted pipes are additional common reasons for fire systems being out of service. It would seem incumbent on the fire code to notify occupants when their safety net is not up. A text message or email would be sufficient to meet the intent of the new language.

Cost Impact: Will not increase the cost of construction
This proposal will not increase the cost of construction other than printing costs for re-usable signs.
F148-16

IFC: 901.7.6.
Proponent: William Hall (jhall@cement.org)

2015 International Fire Code

Revise as follows:

901.7.6 Restoring systems to service. When impaired equipment is restored to normal working order, the impairment coordinator shall verify that all of the following procedures have been implemented:

1. Necessary inspections and tests have been conducted to verify that affected systems are operational.
2. Supervisors have been advised that protection is restored.
3. The fire department has been advised that protection is restored.
4. The occupants, building owner/manager, insurance carrier, alarm company and other involved parties have been advised that protection is restored.
5. The impairment tag has been removed.

Reason: We have discovered what we feel is an oversight in the fire code. As the codes are developed to be a vital component to life safety, information shared to the occupants of the building, when it affects them should be equally vital. When the fire suppression system which was designed and installed to protect the occupants within a structure is not working or out of service, it would make sense that those same occupants or visitors should be aware that the system is out of service. This proposal would require that occupants currently in the building be notified immediately and placards be placed at the doors to alert others, if over 4 hours, until the situation is resolved and the fire sprinkler system is operational. Lets be real, how many buildings get evacuated when the sprinkler system is down and how many actually have fire watches established? After large storms or disasters water supply or electrical service may not be available for days or even weeks. Emergency maintenance issues arise where parts or fire pump may not available for a period of time. Frozen and busted pipes are additional common reasons for fire systems being out of service. It would seem incumbent on the fire code to notify occupants when their safety net is not up as well as notifying when the system is restored.

Cost Impact: Will not increase the cost of construction
Email or text delivery
F149-16
IFC: 901.8.2.
Proponent: Bob Morgan, representing Fort Worth Fire Department

2015 International Fire Code

Revise as follows:

901.8.2 Removal of existing occupant-use hose lines. The fire code official is authorized to permit the removal of existing occupant-use hose lines where all of the following conditions exist:

1. Installation is not required by this code or the International Building Code.
2. The hose line would not be utilized by trained personnel or the fire department.
3. The remaining outlets are compatible with local fire department fittings.

Reason: If the existing hose lines will not be utilized by the occupants or the fire department, then what exactly is the point of having them? We regularly field this request to remove occupant-use hose lines, and if the occupants are not trained in their use, and the fire department will not utilize them, then they serve no purpose, other than to possibly serve as an attractive nuisance, maintenance expense, and to slow down the fire department attempting to connect their own hose to the hose valve outlet. This change would simply give the fire code official the authority to allow removal of these hose lines. It would not require anyone to do so.

Cost Impact: Will not increase the cost of construction
This change would expand the ability to allow removal of occupant-use hose lines, and therefore, save the significant costs of testing and maintaining these hose lines.
901.11 (IBC [F] 901.9 (New)), 903.2.10 (New) (IBC [F] 903.2.10 (New))

**Proponent:** Jeff Hugo, National Fire Sprinkler Association, representing National Fire Sprinkler Association (hugo@nfsa.org)

## 2015 International Fire Code

Add new text as follows:

**901.11 (IBC [F] 901.9) Risk Category** Fire protection requirements based on Risk Category shall use the classification of buildings and structures in accordance with Table 901.11.

### Table 901.11
Risk Category of Buildings and Other Structures

<table>
<thead>
<tr>
<th>RISK CATEGORY</th>
<th>NATURE OF OCCUPANCY</th>
</tr>
</thead>
</table>
| I             | Buildings and other structures that represent a low hazard to human life in the event of failure, including but not limited to:  
  • Agricultural facilities.  
  • Certain temporary facilities.  
  • Minor storage facilities. |
| II            | Buildings and other structures except those listed in Risk Categories I, III and IV. |
| III           | Buildings and other structures that represent a substantial hazard to human life in the event of failure, including but not limited to:  
  • Buildings and other structures whose primary occupancy is public assembly with an occupant load greater than 300.  
  • Buildings and other structures containing Group E occupancies with an occupant load greater than 250.  
  • Buildings and other structures containing educational occupancies for students above the 12th grade with an occupant load greater than 500.  
  • Group I-2 occupancies with an occupant load of 50 or more resident care recipients but not having surgery or emergency treatment facilities.  
  • Group I-3 occupancies.  
  • Any other occupancy with an occupant load greater than 5,000.a  
  • Power-generating stations, water treatment facilities for potable water, wastewater treatment facilities and other public utility facilities not included in Risk Category IV.  
  • Buildings and other structures not included in Risk Category IV containing quantities of toxic or explosive materials that: Exceed maximum allowable quantities per control area as given in Table 307.1(1) or 307.1(2) or per outdoor control area in accordance with the *International Fire Code*; and |
Are sufficient to pose a threat to the public if released.

<table>
<thead>
<tr>
<th>IV</th>
<th>Building and other structures designated as essential facilities, including but not limited to:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>◦ Group I-2 occupancies having surgery or emergency treatment facilities.</td>
</tr>
<tr>
<td></td>
<td>◦ Fire, rescue, ambulance and police stations and emergency vehicle garages.</td>
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<tr>
<td></td>
<td>◦ Designated earthquake, hurricane, or other emergency shelters.</td>
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<tr>
<td></td>
<td>◦ Designated emergency preparedness, communications and operations centers and other facilities required for emergency response.</td>
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<tr>
<td></td>
<td>◦ Power-generating stations and other public utility facilities required as emergency backup facilities for Risk Category IV structures.</td>
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<tr>
<td></td>
<td>◦ Buildings and other structure containing quantities of highly toxic materials that:</td>
</tr>
<tr>
<td></td>
<td>◦ Exceed maximum allowable quantities per control area as given in Table 307.1(2) or per outdoor control area in accordance with the <em>International Fire Code</em>; and</td>
</tr>
<tr>
<td></td>
<td>◦ Are sufficient to pose a threat to the public if released.</td>
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<tr>
<td></td>
<td>◦ Aviation control towers, air traffic control centers and emergency aircraft hangars.</td>
</tr>
<tr>
<td></td>
<td>◦ Buildings and other structures having critical national defense functions.</td>
</tr>
<tr>
<td></td>
<td>◦ Water storage facilities and pump structures required to maintain water pressure for fire suppression.</td>
</tr>
</tbody>
</table>

903.2.10 **Risk Category** An automatic sprinkler system, according to Section 903.3.1.1, shall be provided throughout all buildings and structures assigned as Risk III or Risk IV by Table 901.11 with a building area greater than 1,000 square feet.

**Exceptions:**
1. Airport traffic control towers in accordance with Section 412.3 of the International Building Code.
2. Storm shelters with an occupant load of 16 or less.

**Reason:** These buildings and structures represent a substantial benefit to human life in the event of a catastrophe in the community and are designated as essential facilities by the IBC. Fire sprinklers protect property and provide life safety to these buildings in times of need by the community (before and) after any disaster. Experience with fire sprinklers shows that where fire occurs, fire sprinklers control the fire with minimal downtime and damage to the facility.

Table 901.11 is an exact reproduction of *IBC* Table 1604.5. The structural importance of a facility that is elevated for the reason of availability and service after a disaster is just as important to Chapter 9 as it is to Chapter 16 of the IBC. Some of these buildings and structures in Table 1604.5 of the *IBC* and the proposed IFC Table 901.11 are required to have sprinklers from other sections of the code (Chapter 9, Chapter 5 of the IBC). However, some can be classified as business or educational occupancies that the code determines to not be required to have fire sprinklers. If the message from Table 1604.5 for buildings in Risk III and IV is viability and resilience, then active fire protection should certainly be a part of these buildings. Fire sprinklers control fires and provide continuity. Fire sprinklers enhance a structure's performance and by leaving sprinklers out of some of these structures, they are compromised. This change provides consistency and provides a baseline for life and fire safety for these critical buildings in the community.
Cost Impact: Will increase the cost of construction

Fire sprinkler systems increase the initial cost of the structure, however there are numerous economic benefits with having a fire sprinkler system installed throughout the building. Reduction in insurance premiums, business continuity, construction exceptions, community ratings, to name a few that provide a balance and payback of system installation costs.


F151-16
IFC: 903.2 (IBC: [F] 903.2)

Proponent: Jay Hyde, representing Sacramento Valley Association of Building Officials (jhyde@mognot.com)

2015 International Fire Code

Revise as follows:

903.2 Where required. Approved automatic sprinkler systems in new buildings and structures shall be provided in the locations described in Sections 903.2.1 through 903.2.12. Where approved automatic sprinkler systems are required based on the number of occupants, only those occupants of the occupancy group under consideration shall be used to determine automatic fire sprinkler system requirements.

Exception: Spaces or areas in telecommunications buildings used exclusively for telecommunications equipment, associated electrical power distribution equipment, batteries and standby engines, provided those spaces or areas are equipped throughout with an automatic smoke detection system in accordance with Section 907.2 and are separated from the remainder of the building by not less than 1-hour fire barriers constructed in accordance with Section 707 of the International Building Code or not less than 2-hour horizontal assemblies constructed in accordance with Section 711 of the International Building Code, or both.

Reason: This proposal will bring the requirements for automatic sprinkler systems into conformity with the 2012 International Building Code commentary published by the International Code Council which states: "Where the thresholds for sprinkler protection include the number of occupants in the fire area, it is important to remember that the proper application is to determine the hazard present. If the actual fire area is less than the fire area threshold but the total occupant load exceeds the occupant load threshold, it is still necessary to determine whether or not the occupant load of that occupancy is present. For example, if the occupant load threshold is 300 for a given occupancy, it is necessary to determine that there are 300 occupants of that occupancy classification. Just because a fire area has an occupant load exceeding the occupant load threshold does not in itself indicate that sprinkler protection is required... it is important to note that they are to be evaluated and applied per occupancy and not as an aggregate of all occupancies that may be present in the building."

Cost Impact: Will not increase the cost of construction
Construction costs may be decreased for some occupancies due to proper application of the automatic fire sprinkler requirements.
F152-16
903.2.1(IBC [F] 903.2.1), 903.2.1.1 (IBC [F] 903.2.1.1), 903.2.1.2 (IBC [F] 903.2.1.2), 903.2.1.3 (IBC [F] 903.2.1.3), 903.2.1.4 (IBC [F] 903.2.1.4), 903.2.1.5 (IBC [F] 903.2.1.5)

Proponent: Maureen Traxler, City of Seattle Dept of Construction & Inspections (maureen.traxler@seattle.gov)

2015 International Fire Code

903.2.1 Group A. An automatic sprinkler system shall be provided throughout buildings and portions thereof used as Group A occupancies as provided in this section. For Group A-1, A-2, A-3 and A-4 occupancies, the automatic sprinkler system shall be provided throughout the story where the fire area containing the Group A-1, A-2, A-3 or A-4 occupancy is located, and throughout all stories from the Group A occupancy to, and including, the levels of exit discharge serving the Group A occupancy. For Group A-5 occupancies, the automatic sprinkler system shall be provided in the spaces indicated in Section 903.2.1.5.

903.2.1.1 Group A-1. An automatic sprinkler system shall be provided for fire areas throughout stories containing Group A-1 occupancies and intervening floors throughout all stories from the Group A-1 occupancy to, and including, the levels of exit discharge serving that occupancy where one of the following conditions exists:

1. The fire area exceeds 12,000 square feet (1115 m²).
2. The fire area has an occupant load of 300 or more.
3. The fire area is located on a floor other than a level of exit discharge serving such occupancies.
4. The fire area contains a multiplex or cinema complex.

903.2.1.2 Group A-2. An automatic sprinkler system shall be provided for fire areas throughout stories containing Group A-2 occupancies and intervening floors throughout all stories from the Group A-2 occupancy to, and including, the levels of exit discharge serving that occupancy where one of the following conditions exists:

1. The fire area exceeds 5,000 square feet (464 m²).
2. The fire area has an occupant load of 100 or more.
3. The fire area is located on a floor other than a level of exit discharge serving such occupancies.

903.2.1.3 Group A-3. An automatic sprinkler system shall be provided for fire areas throughout stories containing Group A-3 occupancies and intervening floors throughout all stories from the Group A-3 occupancy to, and including, the levels of exit discharge serving that occupancy where one of the following conditions exists:

1. The fire area exceeds 12,000 square feet (1115 m²).
2. The fire area has an occupant load of 300 or more.
3. The fire area is located on a floor other than a level of exit discharge serving such occupancies.

903.2.1.4 Group A-4. An automatic sprinkler system shall be provided for fire areas throughout stories containing Group A-4 occupancies and intervening floors throughout all stories from the
Group A-4 occupancy to, and including, the levels of the building- exit discharge serving that occupancy where one of the following conditions exists:

1. The fire area exceeds 12,000 square feet (1115 m²).
2. The fire area has an occupant load of 300 or more.
3. The fire area is located on a floor other than a level of exit discharge serving such occupancies.

903.2.1.5 Group A-5. An automatic sprinkler system shall be provided for Group A-5 occupancies in the following areas: concession stands, retail areas, press boxes and other accessory use areas in excess of 1,000 square feet (93 m²).

Reason: There is an inconsistency in the current code sections. 903.2.1 says that sprinklers are required on the story with the Group A and on all floors to grade, including the level of exit discharge. Sections 903.2.1.1 through 903.2.1.4 use the term “intervening” as shorthand for that requirement. However, the definition of “intervene” is “to occur or be between two things.” Stories “intervening” or “between” the Group A occupancy and the level of exit discharge doesn’t require sprinklers on the level of exit discharge. This proposal puts that important code provision in each section where it applies. It’s worth a small amount of redundancy to gain clarity and accuracy. This proposal makes it less likely that these important code provisions will be overlooked and misapplied.

Cost Impact: Will not increase the cost of construction
This proposal clarifies existing code provisions and will have no effect on the cost of construction.
2015 International Fire Code

Revise as follows:

903.2.1.5 Group A-5. An automatic sprinkler system shall be provided for all enclosed Group A-5 occupancies in the following areas: concession stands, retail areas, press boxes and other accessory use areas in excess of 1,000 square feet (93 m²).

Add new text as follows:

903.2.1.5.1 Spaces under grandstands or bleachers Enclosed spaces under grandstands or bleachers shall be equipped with an automatic sprinkler system in accordance with Section 903.3.1.1 where any of the following exist:

1. The enclosed area is 1,000 square feet or less and is not constructed in accordance with Section 1029.1.1.1.
2. The enclosed area exceeds 1,000 square feet.

Revise as follows:

304.1.3 Space underneath seats. Spaces underneath grandstand and bleacher seats shall be kept free from combustible and flammable materials. Except where enclosed in not less than 1-hour fire-resistance-rated construction in accordance with the International Building Code, spaces underneath grandstand and bleacher seats shall not be occupied or utilized for purposes other than means of egress.

Add new text as follows:

304.1.3.1 Spaces underneath grandstand Spaces underneath grandstands or bleacher shall not be occupied or utilized for purposes other than means of egress except where equipped with an automatic sprinkler system in accordance with Section 903.2.1.5.1, or are separated with fire barriers and horizontal assemblies in accordance with Section 1029.1.1.1.

2015 International Building Code

Revise as follows:

1029.1.1.1 Spaces under grandstands and bleachers. Where spaces under grandstands or bleachers are used for purposes other than ticket booths less than 100 square feet (9.29 m²) and toilet rooms, such spaces shall be separated by fire barriers complying with Section 707 and horizontal assemblies complying with Section 711 with not less than 1-hour fire-resistance-rated construction.

Exceptions:

1. Ticket booths less than 100 square feet in area.
2. **Toilet rooms.**
3. **Other accessory use areas 1,000 square feet or less in area and equipped with an automatic sprinkler system in accordance with Section 903.3.1.1.**

**Reason:** The main purpose of this proposal is to correlate the grandstand and bleacher requirements between the IFC and IBC. There are no technical changes. The accessory spaces under the bleacher or grandstand were required to be constructed of 1-hr fire barriers, but this requirement in the IBC isn’t known or correlated to the IFC user. This proposal ties the requirement of both codes together.

**IFC 304.1.3** - Removes text for spaces under bleachers to a new subsection 304.1.3.1.

**IFC 304.1.3.1** - New text to clarify the use of the space under bleacher. The new text also correlates to new IBC 1029.1.1.1 for the general bleacher requirements (fire barrier and horizontal assemblies) and then to new IBC/IFC 903.2.1.5.1 for sprinkler requirements.

**IFC/IBC 903.2.1.5** - Removes list of accessory areas and clarifies that the enclosed areas in excess of 1,000 sq. ft requires fire sprinklers.

**IFC/IBC 903.2.1.5.1** - Provides sprinkler requirements for enclosed spaces under bleachers for 1,000 sq ft and over or directs user back to IBC Section 1029.1.1.1 for passive fire protection.

**IBC 1029.1.1.1** - Rearranges section to pull out the list in the charging text and arranges in an exceptions list.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire safety and hazardous materials in new and existing buildings and facilities and the protection of life and property in wildland urban interface areas. In 2014 and 2015 the Fire-CAC has held 5 open meetings. In addition, there were numerous conference calls, Regional Work Group and Task Group meetings for the current code development cycle, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: [FCAC](http://www.fccac.org).

**Cost Impact:** Will not increase the cost of construction

Both requirements are established in each code. This proposal pulls together the active and passive requirements.
F154-16
903.2.2 (IBC [F] 903.2.2)

Proponent: John Williams, CBO, representing Adhoc Healthcare Committee (AHC@icc safe.org)

2015 International Fire Code

Revise as follows:

903.2.2 Ambulatory care facilities. An automatic sprinkler system shall be installed throughout the entire floor containing an ambulatory care facility where either of the following conditions exist at any time:

1. Four or more care recipients are incapable of self-preservation, whether rendered incapable by staff or staff has accepted responsibility for care recipients already incapable.
2. One or more care recipients that are incapable of self-preservation are located at other than the level of exit discharge serving such a facility.

In buildings where ambulatory care is provided on levels other than the level of exit discharge, an automatic sprinkler system shall be installed throughout the entire floor where such care is provided as well as all floors below, and all floors between the level of ambulatory care and the nearest level of exit discharge, including the level of exit discharge and all floors below the level of exit discharge.

Exception: Floors classified as an open parking garage are not required to be sprinklered.

Reason: Currently the code requires sprinklering between the level that contains the ambulatory care down to the nearest level of exit discharge. This does not provide protection from issues below the nearest level of exit discharge. While this concept is covered in the federal regulation by regulating floors below the LED as a different construction type, we believe this is confusing and could be better accomplished through providing fire sprinklers throughout all levels below. There are many scenarios and designs where the nearest LED will have several floors of useable space beneath it. An exception is provided for open parking garage, consistent with other sections of the code.

This proposal is submitted by the ICC Ad Hoc Committee on Healthcare (AHC). The AHC was established by the ICC Board to evaluate and assess contemporary code issues relating to hospitals and ambulatory healthcare facilities. This is a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. In 2014 and 2015 the ICC Ad Hoc Committee has held 4 open meetings and numerous Work Group meetings and conference calls for the current code development cycle which included members of the committees as well as any interested party to discuss and debate the proposed changes. Information on the AHC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the AHC effort can be downloaded from the AHC website at: AHC.

Cost Impact: Will increase the cost of construction
Increasing sprinkler coverage below the level of exit discharge will add the cost of sprinklers. The total cost will vary per building and design. On hilly sites where there may be several floors below the LED, the cost will be more extreme. The cost impact to existing tenants by adding sprinklers should be considered as well. Some building may be ruled out by tenants due to lack of sprinkler coverage.

F154-16 : 903.2.2-
WILLIAMS12022
F155-16
IFC: 903.2.2 (IBC: [F] 903.2.2)
Proponent : Earl Shoemaker, representing Accutron Inc. (dshoemaker@accutron-inc.com)

2015 International Fire Code

Add new text as follows:

903.2.2 Ambulatory care facilities. An automatic sprinkler system shall be installed throughout the entire floor containing an ambulatory care facility where either of the following conditions exist at any time:

1. Four or more care recipients are incapable of self-preservation, whether rendered incapable by staff or staff has accepted responsibility for care recipients already incapable.
2. One or more care recipients that are incapable of self-preservation are located at other than the level of exit discharge serving such a facility.

Exception: For the purpose of dental Nitrous Oxide/Oxygen administration, with no inhalation anesthesia, patients are not rendered incapable of self-preservation.

In buildings where ambulatory care is provided on levels other than the level of exit discharge, an automatic sprinkler system shall be installed throughout the entire floor where such care is provided as well as all floors below, and all floors between the level of ambulatory care and the nearest level of exit discharge, including the level of exit discharge.

Reason: A patient/care recipient receiving light or minimal sedation is capable of self-preservation. When the recipient is administered sedation that is medium, deep, or general, they are considered to be incapable of self-preservation.

Nitrous Oxide/Oxygen sedation in dentistry is recognized as minimal or light sedation, therefore the recipients are capable of self-preservation.

Flow meters sold into dentistry since the 1970’s have limiters that prevent the administration of Oxygen lower than 30%. The level of Nitrous Oxide therefore never exceeds 70%, keeping the patients out of anesthetic levels. (This is the ADA and FDA standard for the dental Nitrous delivery devices).

Nitrous Oxide/Oxygen sedation is the best therapy for anxiety relief, which is the most chronic concern for dental patients. It is not part of the pain management therapy.

Pain management falls under either local injections at the pain site or stronger inhalation anesthetics. Inhalation anesthesia (Medium, Deep, or General) fall under 903.2.2.1 & 2 patients incapable of self-preservation.

The NFPA, 99 defines three categories (levels) of care in medical facilities. Chapter 4 defines the risk level to patients. Category 3 is the lowest risk because no anesthetic gasses are allowed for this category.

Category 3 (NFPA 99, 5.3) allows for the use of Nitrous Oxide/Oxygen sedation, but does not allow for the use of any other medical gas. Therefore WAGD is not allowed, and WAGD is required for any anesthetic gas delivery. This is how the NFPA permits a category of facility where the risk to the patient is minimal.

The text by Morris Clark (the most widely recognized authority on nitrous oxide in dentistry), “The Handbook of Nitrous Oxide and Oxygen Sedation”, supports the determination that patients receiving dental Nitrous Oxide/Oxygen sedation remain capable of self-preservation.

Nitrous Oxide/Oxygen sedation is the safest sedation for patients. Restrictions of nitrous oxide/oxygen plumbed into dental facilities can limit the dentist from prescribing and administering light sedation via. Nitrous Oxide/Oxygen and this opens the door for oral or IV medications for these patients.

Oral and IV medications can metabolize and be slow to degrade, allowing patients to exit the facility still under the influence.
Nitrous Oxide does not metabolize, therefore all Nitrous Oxide will dissipate from the bloodstream within 3-5 minutes of Oxygen administration, allowing these patients to exit the facility with no remaining gas influence.

**Cost Impact:** Will not increase the cost of construction
The cost impact of this new sub section would lower the cost of construction for dental offices by not requiring automatic sprinklers in the whole dental office where nitrous oxide/oxygen sedation is the only medical gasses used and the office would not be permitted under this proposal to use anesthetic gasses.
2015 International Fire Code

903.2.3 Group E. An automatic sprinkler system shall be provided for Group E occupancies as follows:

1. Throughout all Group E fire areas greater than 12,000 square feet (1115 m²) in area.
2. Throughout every portion of educational buildings below the lowest level of exit discharge serving that portion of the building.

Exception: An automatic sprinkler system is not required in any area below the lowest level of exit discharge serving that area where every classroom throughout the building has not fewer than one exterior exit door at ground level.

Reason: The purpose of this code change is to clarify the intent of the code. The current language is awkward and difficult to read for many code officials. As currently written it is unclear if the exception applies to the entire section or to item number 2. It is also unclear as to what the exception even says. It makes no sense as written. What I am proposing is to change the code language to the way it read in the 2006 and earlier editions of the IBC. The way the code was previously written allowed for an exception to providing automatic fire sprinklers when every classrooms throughout the building had at least one direct exit at ground level.

In our jurisdiction, we have several 1 story schools that were built in the late 50's and 60's. They have no sprinklers but all of the classrooms have individual exits at grade. Previous code additions would have made allowance for this fact and thus fire sprinklers would not have been required for small additions. For example, for one particular school the local school district wanted to make the school cafeteria more accessible and usable to all students. To accomplish this they needed to add 400 sqft to the kitchen. The existing building code states that for additions one must comply with Chapter 9 of the IBC. The threshold for automatic fire sprinklers is 12,000 sqft. The building in question had an existing fire area of 15000 sqft. The way the current code is written the addition cannot be built unless fire sprinklers are installed. The previous code addition would have granted an exception because each classroom has its own grade level exit. These are old schools and will be eventually torn down. It seems impractical to me to ask the school district to install fire sprinklers in a building that has been in existence for several decades especially when previous code additions would have made allowance for the addition.

Cost Impact: Will not increase the cost of construction
This is a clarification of the requirements of the current code.
F157-16
903.2.3 (IBC [F] 903.2.3)

Proponent: Stephen DiGiovanni, Clark County Department of Building and Fire Prevention, representing Southern Nevada Chapter of ICC (sdigiovanni@clarkcountynv.gov)

2015 International Fire Code

Revise as follows:

903.2.3 Group E. An automatic sprinkler system shall be provided for Group E occupancies as follows:

1. Throughout all Group E fire areas greater than 12,000 square feet (1115 m²) in area.
2. The fire area has an occupant load of 50 or more.
3. Throughout every portion of educational buildings below the lowest level of exit discharge serving that portion of the building.
   Exception: An automatic sprinkler system is not required in any area below the lowest level of exit discharge serving that area where every classroom throughout the building has not fewer than one exterior exit door at ground level.
4. The fire area is located on a floor other than a level of exit discharge serving such occupancies.
   Exception: An automatic sprinkler system is not required in any area below the lowest level of exit discharge serving that area where every classroom throughout the building has not fewer than one exterior exit door at ground level.

Reason: Currently the Fire Code does not contain a fire sprinkler trigger in Group E occupancies based on occupant load. The occupant load derived from current code can be up to 600 persons, using the occupant load factor of 20 and the square footage trigger of 12,000 sf. This occupant load far exceeds the occupant load triggers provided for Group A occupancies. However, children are less capable of self-preservation than adults, yet the code provides more protection to adults than to children. There is also a discrepancy in construction type, where the allowable areas for educational facilities often exceed the allowable areas for assembly occupancies. When looking at IBC Table 503, excluding outdoor group A-5 occupancies, the allowable area for each type of construction is greater for group E occupancies than for any of Groups A-1, A-2, A-3, and A-4. Essentially, children are located in less fire-resistant buildings and with less fire sprinkler protection.

To further complicate the issue, due to recent events in society, more and more schools are developing protect-in-place strategies to ensure safety for children. It is reasonable to expect a higher level of protection for occupancies where egress may be slowed.

This proposal seeks to add a fire sprinkler trigger of 50 person occupant load for educational buildings. The 50 person trigger has been used in Clark County for 20 years. The proposal desires to expand this code requirement to the base IFC.

Cost Impact: Will increase the cost of construction
Will require a fire sprinkler system installation in many education buildings that are currently not required by the IFC to have fire sprinkler protection
2015 International Fire Code

903.2.3 Group E. An automatic sprinkler system shall be provided for Group E occupancies as follows:

1. Throughout all Group E fire areas greater than 12,000 4,500 square feet (1115 m²) in area.
2. Throughout all Group E occupancies that are designated as a community storm shelter in accordance with Section 423 of the International Building Code.
3. Throughout every portion of educational buildings below the lowest level of exit discharge serving that portion of the building.

Exception: An automatic sprinkler system is not required in any area below the lowest level of exit discharge serving that area where every classroom throughout the building has not fewer than one exterior exit door at ground level.

Reason: The main purpose of this proposal is to provide a baseline for safe schools, but remain flexible for communities. Schools are often the neighboring community shelter that become the community center after a disaster. Schools have also become targets for many active shooters that target innocent students and citizens. Public schools are often used as a public shelter, before or after a tornado, hurricane, flood, wildfire, etc. Some states require new schools be built as public shelters. In many emergencies, natural or man-made disasters, a school becomes the center for several temporary occupancies that provide emergency services, such as; cooking, nursing, surgery, psychiatric, along with housing, to area residents. All of these emergency uses, if built separately, require fire sprinkler systems installed.

The "NFPA School Safety, Codes and Security Workshop" report from December of 2014 makes several suggestions to improve school safety and security. Several areas of the report suggest improving school safety with fire sprinklers. One of the more convenient and inexpensive security measures to thwart active shooters is locking devices. While there are several positive attributes with these devices, the purpose is to delay egress. A procedure that holds students and staff in a room or area that prevents egress after a fire alarm activation is a concept contrary to the intent of this code and other life safety codes. The only reasonable counter measure for delayed egress is have an active fire protection system. Fire sprinklers are the most cost effective fire protection system.

Schools are a significant investment by the community, state and federal government. Losing modern day schools through fire is irresponsible. This proposal attempts to balance life safety features by providing safer schools with increased active or passive fire protection. The 4,500 square feet fire area is based on 300 occupants (A-3 occupancy that the gymnasium/cafeteria often is) multiplied by 15 square feet per person. This provides a higher compartmented building that becomes more manageable to the first responders and supports delayed egress more than the current 12,000 square feet fire area. Having a smaller fire area would increase construction costs, but it would accommodate rural areas that may not have readily available water supplies.

Cost Impact: Will increase the cost of construction
Having a smaller fire area would increase construction costs, but it would accommodate rural areas that may not have readily available water supplies.
903.7 Group M. An automatic sprinkler system shall be provided throughout buildings containing a Group M occupancy where one of the following conditions exists:

1. A Group M fire area exceeds 12,000 square feet (1115 m²).
2. A Group M fire area is located more than three stories above grade plane.
3. The combined area of all Group M fire areas on all floors, including any mezzanines, exceeds 24,000 square feet (2230 m²).
4. A Group M occupancy fire area used for the display and sale of upholstered furniture or mattresses exceeds 5,000 square feet (464 m²).

903.9 Group S-1. An automatic sprinkler system shall be provided throughout all buildings containing a Group S-1 occupancy where one of the following conditions exists:

1. A Group S-1 fire area exceeds 12,000 square feet (1115 m²).
2. A Group S-1 fire area is located more than three stories above grade plane.
3. The combined area of all Group S-1 fire areas on all floors, including any mezzanines, exceeds 24,000 square feet (2230 m²).
4. A Group S-1 fire area used for the storage of commercial motor vehicles where the fire area that exceeds 5,000 square feet (464 m²).
5. A Group S-1 occupancy fire area used for the storage of upholstered furniture or mattresses that exceeds 2,500 square feet (232 m²), with the exception of a self-service storage facility.

Reason: Based upon IFC Interpretation 20-14, any Group S-1 Occupancy over 2,500 sf where mattresses or upholstered furniture are present is required to be sprinklered. This interpretation states "This is regardless of how much upholstered furniture and/or mattresses are actually stored." From this a small self-storage location where household goods including incidental pieces of upholstered furniture or mattress are stored would be required to be sprinklered. In areas used for the storage of upholstered furniture and mattresses there is a significant increase in fire loading when compared to other S-1 storage, in self-storage locations where these materials are typically incidental the fire loading would be substantially the same as all other S-1 storage so this would appear to be an unnecessary burden upon these locations.

The change of the word occupancy to fire area for both Group M and S-1 is to correlate it with the other requirements in the section and clarify how this section is to be enforced as fire area is a defined term where as occupancy is not.

Cost Impact: Will not increase the cost of construction
This proposal would not require sprinklers in areas where the current code would require them, leading to a reduction in construction costs in these locations
F160-16
903.2.9 (IBC [F] 903.2.9)

Proponent: Marcus Dunn, Self Storage Association, representing Self Storage Association (mdunn@selfstorage.org)

2015 International Fire Code

Add new text as follows:

903.2.9 Group S-1. An automatic sprinkler system shall be provided throughout all buildings containing a Group S-1 occupancy where one of the following conditions exists:

1. A Group S-1 fire area exceeds 12,000 square feet (1115 m$^2$).
2. A Group S-1 fire area is located more than three stories above grade plane.
3. The combined area of all Group S-1 fire areas on all floors, including any mezzanines, exceeds 24,000 square feet (2230 m$^2$).
4. A Group S-1 fire area used for the storage of commercial motor vehicles where the fire area exceeds 5,000 square feet (464 m$^2$).
5. A Group S-1 occupancy used primarily for the storage of upholstered furniture or mattresses exceeds 2,500 square feet (232 m$^2$).

Reason: We believe the fifth sprinkler threshold is provided for warehouses that primarily store upholstered furniture or mattresses. It is not the intent of the code for a single mattress or the incidental storage of upholstered furniture to trigger this requirement.

Cost Impact: Will not increase the cost of construction
Current code presents a considerable cost to new construction of self-storage facilities. In our opinion, the current requirement is excessive for the facility being served.
2015 International Fire Code
Revise as follows:

903.2.9 Group S-1. An automatic sprinkler system shall be provided throughout all buildings containing a Group S-1 occupancy where one of the following conditions exists:

1. A Group S-1 fire area exceeds 12,000 square feet (1115 m²).
2. A Group S-1 fire area is located more than three stories above grade plane.
3. The combined area of all Group S-1 fire areas on all floors, including any mezzanines, exceeds 24,000 square feet (2230 m²).
4. A Group S-1 fire area used for the storage of commercial motor vehicles where the fire area exceeds 5,000 square feet (464 m²).
5. A Group S-1 occupancy fire area used for the storage of upholstered furniture or mattresses exceeds 2,500 square feet (232 m²).

Reason: Code section needs clarification --- is the building or fire area 2500 sq/ft?
Scenario 1 = mini-storage warehouses -- if "FIRE AREA" exceeds 2500 sq/ft then a 2 hr wall would be required to separate the building. As it is written now if the building exceeds 2500 sq/ft it would have to be sprinkled?
Scenario 2 = a 11,000 sq/ft warehouse has taped off (on floor) 1500 sq/ft of space for mattress storage -- does the building need to be sprinkled?

Cost Impact: Will not increase the cost of construction
This is a clarification of the requirements of the current code.
F162-16
IFC: 903.2.10 (IBC: [F] 903.2.10)

Proponent: Jay Hyde, representing Sacramento Valley Association of Building Officials (jhyde@mognot.com)

2015 International Fire Code

Revise as follows:

903.2.10 Group S-2 enclosed parking garages. An automatic sprinkler system shall be provided throughout buildings classified as enclosed parking garages in accordance with Section 406.6 of the International Building Code where either of the following conditions exists:

1. Where the fire area of the enclosed parking garage exceeds 12,000 square feet (1115 m²).
2. Where the enclosed parking garage is located beneath other groups.
   Exception: Enclosed parking garages located beneath Group R-3 occupancies.

Garages serving Group R Occupancies within the same building shall be sprinklered with the same type of sprinkler system used throughout the Group R Occupancy.

Reason: According to the 2012 International Building Code Commentary published by the International Code Council, "Fire records have shown that fires in parking structures typically involve a single automobile with minor damage to adjacent vehicles... The requirement that the enclosed parking garage located beneath other occupancy groups is required to be sprinklered is based on the potential for a fire to develop undetected, which would endanger the occupants of the other occupancy... The exception exempts enclosed garages in buildings where garages are located below a Group R-3 Occupancy. The exception is essentially moot since the code requires all buildings of Group R-3 occupancy to be sprinklered throughout. Because the entire building with the residential occupancy is required to be sprinklered according to Section 903.2.8, the garage would be sprinklered as well. It should be noted that if the Group R-3 occupancy was protected with an NFPA 13D system, the enclosed parking garage would not require sprinklers."

This Code Change Proposal clarifies that where residential buildings are protected throughout by an automatic sprinkler system in conformance with Section 903.3.1.1, the sprinkler system is permitted to be extended to the S2 garage portion of the building and that a sprinkler system according to Section 903.3.1.1 is not required. The locations of fire sprinklers for R-3 occupancies protected with a fire sprinkler system in conformance with Section 903.3.1.3 are governed by NFPA 13D.

Cost Impact: Will not increase the cost of construction
May decrease the cost of construction by clarifying that NFPA 13R sprinklers may be extended into the S2 enclosed garage.
F163-16
903.2.11.1 (IBC [F] 903.2.11.1)

Proponent: Jonathan Roberts (jonathan.roberts@ul.com)

2015 International Fire Code

Revise as follows:

903.2.11.1 Stories without openings. An automatic sprinkler system shall be installed throughout all stories, including basements, of all buildings where the floor area exceeds 1,500 square feet (139.4 m²) and where there is the story does not provide comply with the following criteria for exterior wall openings:

1. Openings below grade that lead directly to ground level by an exterior stairway complying with Section 1011 or an outside ramp complying with Section 1012. Openings shall be located in each 50 linear feet (15 240 mm), or fraction thereof, of exterior wall in the story on at least one side. The required openings shall be distributed such that the lineal distance between adjacent openings does not exceed 50 feet (15 240 mm).

2. Openings entirely above the adjoining ground level totaling not less than 20 square feet (1.86 m²) in each 50 linear feet (15 240 mm), or fraction thereof, of exterior wall in the story on at least one side. The required openings shall be distributed such that the lineal distance between adjacent openings does not exceed 50 feet (15 240 mm). The height of the following types bottom of exterior wall openings:

   2.1. Openings below grade that lead directly to ground level by an exterior stairway complying with Section 1011 or an outside ramp complying with Section 1012. Openings shall be located in each 50 linear feet (15 240 mm), or fraction thereof, of exterior wall in the story on at least one side. The required openings shall be distributed such that the lineal distance between adjacent openings does not exceed 50 feet (15 240 mm).

   2.2. Openings entirely above the adjoining ground level totaling not less than 20 square feet (1.86 m²) in each 50 linear feet (15 240 mm), or fraction thereof, of exterior wall in the story on at least one side. The required openings shall be distributed such that the lineal distance between adjacent openings does not exceed 50 feet (15 240 mm). The height of the bottom of the clear opening shall not exceed 44 inches (1118 mm) measured from the floor.

Reason: This code change is intended to provide language that clarifies the intended requirements by removing the double negative that is found in the current code section.

Cost Impact: Will not increase the cost of construction
This is simply language change and would not increase construction.
F164-16
903.2.11.5 (IBC [F] 903.2.11.5)

Proponent: Stephen DiGiovanni, Clark County Department of Building and Fire Prevention, representing Southern Nevada Chapter of ICC (sdigiovanni@clarkcountynv.gov)

2015 International Fire Code

Revise as follows:

903.2.11.5 Commercial cooking operations. An automatic sprinkler system shall be installed in commercial kitchen exhaust hood and duct systems where an automatic sprinkler system is used to comply with Section 904, and for the entire length of the duct where the duct length exceeds 75 feet.

Reason: The purpose of this amendment is to correlate the IFC with the requirements of NFPA 13 Section 7.10.3.4.1, which requires sprinkler protection throughout the duct when the duct length exceeds 75 feet. This is due to the limitation of testing, where the test apparatus is a 75 foot long duct. In certain kitchen designs, there may be instances where the length of the duct exceeds the 75 foot threshold. It is necessary to require additional protection for these longer ducts, as there is no evidence that UL-approved systems can handle this duct length.

Cost Impact: Will increase the cost of construction
For those exhaust ducts that were greater than 75 feet and were not compliant with the NFPA 13 requirements for sprinkler protection, this would be a cost increase.
F165-16
903.3.1.1.2 (IBC [F] 903.3.1.1.2)

Proponent: Carl Baldassarra, P.E., FSFPE, representing the Code Technology Committee (CTC@iccsafe.org)

2015 International Fire Code

Revise as follows:

903.3.1.1.2 Bathrooms. In Group R occupancies, other than Group R-4 occupancies, sprinklers shall not be required in bathrooms that do not exceed 55 square feet (5 m²) in area and are located within individual dwelling units or sleeping units, provided that walls and ceilings, including the walls and ceilings behind a shower enclosure or tub, are of noncombustible or limited-combustible materials with a 15-minute thermal barrier rating.

Reason: This exception is permitted for all other Group R occupancies. NFPA 101 does not require sprinklers in bathrooms based on fire studies in similar occupancies. There is no technical reason to require sprinklers in bathrooms in Group R-4.

This proposal is submitted by the ICC Code Technology Committee (CTC). The ICC Board has decided to sunset the CTC. The sunset plan includes re-assigning many of the CTC Areas of Study to the applicable Code Action Committee (CAC). The two remaining CTC Areas of Study are Care Facilities and Elevator Lobbies/WTC Elevator issues. This proposal falls under the Care Facilities Area of Study. In 2014 and 2015 ICC CTC Committee has held 4 open meetings and numerous Work Group meetings and conference calls for the current code development cycle which included members of the committees as well as any interested party to discuss and debate the proposed changes. Information on the CTC, including: the sunset plan; meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the CTC website CTC.

Cost Impact: Will not increase the cost of construction
This is a reduction in sprinkler coverage requirements from current code.
Add new text as follows:

**903.3.1.1.3 Detached non-combustible canopies.** Sprinklers shall not be required to protect detached non-combustible exterior canopies located adjacent to buildings protected with a sprinkler system where all of the following conditions are satisfied:

1. The canopy shall be supported directly on grade.
2. Canopies shall be located not less than 10 ft. from an adjacent canopy, lot line or building.
3. Canopies shall not cover a fire area with more than 750 sq. ft. (46.45 m²).
4. Canopies shall not be used for storage or to cover high-piled stock or rack storage.
5. Canopies shall have all sides fully open.
6. Canopies shall be covered with materials permitted in Section 3105 or non-combustible materials.

**Reason:** The IBC is silent in regards to omission of fire sprinklers from beneath canopies or beneath canopies located at fire separation distances less than 10 feet. This proposed code change addresses a condition commonly found in restaurants with exterior patios where outdoor covered exterior dining areas are provided as well as adjacent to office buildings and retail buildings. Canopies are not considered buildings, however they contribute to fire area when located closer than a fire separation distance of 20 feet. These areas are generally not surrounded with walls and cover portions of exterior dining areas.

When Section 903.2.1.2 was modified in the 2009 IBC to require fire sprinklers when the occupant load in the Group A-2 fire area is 100 or more, many drinking or dining establishments are protected with sprinklers. As a result exterior accessory structures such as canopies not located at a fire separation distance of 20 ft relative to the main building require protection. NFPA 13 is silent on this issue. This will require an underground water supply line beneath the patio to extend sprinkler protection to the exterior canopy which can be onerous. Many restaurants as a result provide umbrellas (fixed or portable) or create trellises that they later cover to not extend the protection.

Additionally, canopies located within a yard used for frontage in unlimited area buildings are also required to be protected with a fire sprinkler system when located less than 40 ft from a very large building. The reason is that the IBC considers that the canopy contributes to the fire load in the unlimited area building and therefore poses a risk to the building if not protected.

The proposal will result in a canopy that is about 22 ft by 22 ft with occupants generally located within 11 ft from the exterior of the canopy. Unlike when occupants are located within an enclosed building, occupants under the canopy do not have to search for exits by looking at exit signs, pass through corridors and then reach exterior doors. Occupants will be a few steps away from the exterior.

The proposed code change includes restrictions on the size and construction of the canopy to reduce the fire exposure from the construction of the canopy and to allow a short distance for occupants to egress from under the canopy. Additionally the proposed code change prohibits storage under a non-protected canopy and requires that the canopy be at least 10 ft from buildings, lot lines and other canopies.

**Cost Impact:** Will not increase the cost of construction

The cost of construction will not change since many Code Officials seem to consider the space between a canopy and a protected building however small to be a break in the fire area. The proposed code change provides a basis addressing the actual issue through the code rather than through interpretation.
F167-16
903.3.1.2 (IBC [F] 903.3.1.2)

Proponent: Robert Davidson, Davidson Code Concepts, LLC, representing Self (rjd@davidsoncodeconcepts.com)

2015 International Fire Code

Revise as follows:

903.3.1.2 NFPA 13R sprinkler systems. Automatic sprinkler systems in Group R occupancies up to and including four stories in height above grade plane in buildings not exceeding 60 feet (18288 mm) in height above grade plane shall be permitted to be installed throughout in accordance with NFPA 13R.

The number of stories of Group R occupancies constructed in accordance with Sections 510.2 and 510.4 of the International Building Code shall be measured from the horizontal assembly creating separate buildings.

Reason: The purpose of this proposal is two-fold. One is to delete the language inappropriately added last cycle permitting the number of stories to be measured from the pedestal. The second is to add reference to the grade plane to match the scoping of the NFPA 13R standard.

This section of code had a significant change occur in the 2015 edition of the code by the addition of the second paragraph which reads:

"The number of stories of Group R occupancies constructed in accordance with Sections 510.2 and 510.4 shall be measured from the horizontal assembly creating separate buildings."

This is a significant modification which will allow the application of a NFPA 13R sprinkler system in structures with more than 4 stories above grade plane. The wording in the 2012 edition of the IFC/IBC was as:

"903.3.1.2 NFPA 13R sprinkler systems. Automatic sprinkler systems in Group R occupancies up to and including four stories in height shall be permitted to be installed throughout in accordance with NFPA 13R."

This is an important restriction, it makes it clear that the NFPA 13R systems cannot be installed in buildings that are greater than 4 stories above grade plane. This restriction matches the scoping of NFPA 13R. From the NFPA "Automatic Sprinkler Systems for Residential Occupancies Handbook, 2013 edition":

"NFPA 13R is appropriate for use as an option to NFPA 13 only in those residential occupancies, as defined in this standard, up to and including four above ground stories in height, and limited to buildings that are 60 ft (18 m) or less in height above grade plane, which is consistent with limits established by model building codes for buildings of Type V construction. The height of a building above grade plane is determined by model building codes, which base the height on the average height of the highest roof surface above grade plane. For further information on the building height story limits, see model building codes.

Where buildings are greater than four stories in height, or where buildings are of mixed use where residential is not the predominant occupancy, residential portions of such buildings should be protected with residential or quick-response sprinklers in accordance with 8.4.5 of NFPA 13. Other portions of such buildings should be protected in accordance with NFPA 13."

From NFPA 13-2013 edition:

1.1* Scope. This standard shall cover the design and installation of automatic sprinkler systems for protection against fire hazards in residential occupancies up to and including four stories in height in buildings not exceeding 60 ft (18 m) in height above grade plane.

A.1.1 NFPA 13R is appropriate for use as an option to NFPA 13 only in those residential occupancies, as defined in this standard, up to and including four aboveground stories in height, and limited to buildings that are 60 ft (18 m) or less in height above grade plane, which is consistent with limits established by model building codes for buildings of Type V construction. The height of a building above grade plane is determined by model building codes, which base the height on the average height of the highest roof surface above grade plane. For further information on the building height story limits, see model building codes.
What the new language in the second paragraph does is allow the 4 stories for the NFPA 13R limitation to not start from grade plane, but instead to start from the top of a horizontal assembly of a 'pedestal' building. The building could now be a five story building, placing rescue and firefighting needs further out of the reach of fire department ground ladders.

The proposed change was submitted to ICC as a clarification with the claim that there was confusion about where to start measuring from when applying a NFPA 13R system to a Section 510.2 or Section 510.4 building. That was a false claim that should have been refuted by ICC staff at that time, there was no confusion, there is an existing ICC Formal Technical opinion stating the measurement starts from grade plane. IFC Interpretation No. 43-03 dates back to 2005 and was for the 2003 edition of the code and is still current and applicable for all following editions including the current one.

The proposal was submitted and passed under false pretenses, it has a negative impact on occupant and firefighter safety and should be reversed by deleting the new language from last cycle as shown in the proposal.

Cost Impact: Will increase the cost of construction
In theory this proposal could raise construction costs, but only for those jurisdictions who have adopted the 2015 edition of the I-Codes with the new language entact.
F168-16
903.3.1.2 (IBC [F] 903.3.1.2), 903.3.1.2.1 (IBC [F] 903.3.1.2.1), 903.3.1.2.2 (IBC [F] 903.3.1.2.2), 903.3.1.2.3 (New) (IBC[F] 903.3.1.2.3 (New))

Proponent: William Hall, Portland Cement Association (jhall@cement.org)

2015 International Fire Code

903.3.1.2 NFPA 13R sprinkler systems. Automatic sprinkler systems in Group R occupancies up to and including four stories in height in buildings not exceeding 60 feet (18 288 mm) in height above grade plane shall be permitted to be installed throughout in accordance with NFPA 13R.

The number of stories of Group R occupancies constructed in accordance with Sections 510.2 and 510.4 of the International Building Code shall be measured from the horizontal assembly creating separate buildings.

903.3.1.2.1 Balconies and decks. Sprinkler protection shall be provided for exterior balconies, decks and ground floor patios of dwelling units and sleeping units where the building is of Type V construction, provided there is a roof or deck above. Sidewall sprinklers that are used to protect such areas shall be permitted to be located such that their deflectors are within 1 inch (25 mm) to 6 inches (152 mm) below the structural members and a maximum distance of 14 inches (356 mm) below the deck of the exterior balconies and decks that are constructed of open wood joist construction.

903.3.1.2.2 Open-ended corridors. Sprinkler protection shall be provided in open-ended corridors and associated exterior stairways and ramps as specified in Section 1027.6, Exception 3.

Add new text as follows:

903.3.1.2.3 Attics Sprinkler protection shall be provided in attics that are used or intended for living purposes or storage or that contain fuel-fired equipment. Other attics, where located in buildings of Type III, IV or Type V construction that have a roof assembly located more than 45 feet (16 764 mm) above the lowest level of required fire department vehicle access, shall comply with one of the following:

1. Attics provided with sprinkler protection.
2. Attics constructed of noncombustible materials.
3. Attics constructed of fire-retardant-treated wood complying with Section 2303.2.
4. Attics filled with noncombustible insulation.

The height of the roof assembly shall be determined by measuring the distance from the lowest required fire vehicle access road surface adjacent to the building to either the eave of the highest pitched roof, the intersection of the highest roof to the exterior wall, or the top of the highest parapet, whichever yields the greatest distance. Required fire vehicle access roads shall only include roads that are necessary for compliance with IFC Section 503.

Reason: This proposal was developed to address fire service concerns of un-protected combustible attic spaces greater than 45 feet. While NFPA 13R would still be permitted to protect residential structures up to 60 ft., sprinkler protection or other approved methods correlating with NFPA 13 would be required in the attic spaces when roof heights exceed 45 ft. from the required lowest level of fire dept access.
Cost Impact: Will increase the cost of construction
This proposal will increase the cost of construction by requiring sprinkler protection in combustible attic spaces over 45 feet in height.
F169-16
IFC: 903.3.1.2 (IBC: [F] 903.3.1.2)

Proponent: Matthew Hunter, representing American Wood Council (mhunter@awc.org)

2015 International Fire Code

903.3.1.2 NFPA 13R sprinkler systems. Automatic sprinkler systems in Group R occupancies up to and including four stories in height in buildings and where the highest point of the roof does not exceed 60 feet (18 288 mm) in height above grade plane the lowest level of fire department vehicle access shall be permitted to be installed throughout in accordance with NFPA 13R.

The number of stories of Group R occupancies constructed in accordance with Sections 510.2 and 510.4 of the International Building Code shall be measured from the horizontal assembly creating separate buildings.

Reason: The scope of NFPA 13R allows for buildings that do not exceed 60 feet in height, but does not say how to measure the height of interest. The code is clear on how building height is measured and as a result, it is possible to have portions of a building equipped with an NFPA 13R system that are more than 60 feet from the adjacent grade level. The figures below show how building height is measured in accordance with the current code \( h_{current} \), compared to how the proposed language will measure building height for the purpose of limiting the use of an NFPA 13R sprinkler system \( h_{proposed} \).

The NFPA 13R standard allows the omission of sprinklers in unoccupied attics. Since it is possible that fires can spread up the exterior of the building and enter the attic, the code should ensure that all portions of the roof, when measured from the lowest point of fire department access, are within the 60 foot height limit provided in the standard.

Cost Impact: Will increase the cost of construction
Will increase the cost of some construction. For buildings that exceed these height parameters, increased cost associated with providing a full NFPA 13 system instead of an NFPA 13R system will depend on the parameters of the building size and plan. The majority of buildings will not see a cost increase associated with this change. The cost of providing a complete NFPA 13 system versus an NFPA 13R system can be somewhat offset by a number of cost incentives the code allows for NFPA 13 systems, which depend on the particular design of the building.
F170-16
903.3.1.2.1 (IBC [F] 903.3.1.2.1)

Proponent: William Hall, Portland Cement Association (jhall@cement.org)

2015 International Fire Code
Revise as follows:

903.3.1.2.1 Balconies and decks. Sprinkler protection shall be provided for exterior balconies, decks and ground floor patios of dwelling units and sleeping units where the building is of Type V construction, provided there is a roof or deck above. Sprinkler protection shall be provided for exterior balconies, decks and ground floor patios of dwelling units and sleeping units where the building is of Type III and IV construction and where there is a combustible balcony, roof or deck above. Sidewall sprinklers that are used to protect such areas shall be permitted to be located such that their deflectors are within 1 inch (25 mm) to 6 inches (152 mm) below the structural members and a maximum distance of 14 inches (356 mm) below the deck of the exterior balconies and decks that are constructed of open wood joist construction.

Reason: IBC Section 1406.3 exception #3 permits combustible balconies and decks on the exterior walls of Type III, IV and V construction only if sprinkler protection is extended out to these areas. This proposal brings forth the exception and places it within the Balconies and Decks section located in Chapter 9 section 903.3.1.2.1. A fire which begins on a combustible balcony or deck has the same propensity to spread vertically and involve several floors at the same time, overwhelming a sprinkler system while fire continues to spread up the building regardless of construction type. Vertical fire from the balcony or deck can run up to the combustible roof which may not have sprinkler protection in the attic. Construction Types I and II allow fire retardant treated wood or Heavy Timber for three stories or less.

IBC Section 1403 (Shown for reference only)
1406.3 Balconies and similar projections. Balconies and similar projections of combustible construction other than fire-retardant-treated wood shall be fire-resistance rated where required by Table 601 for floor construction or shall be of Type IV construction in accordance with Section 602.4. The aggregate length of the projections shall not exceed 50 percent of the building's perimeter on each floor.

Exceptions:
1. On buildings of Type I and II construction, three stories or less above grade plane, fire-retardant-treated wood shall be permitted for balconies, porches, decks and exterior stairways not used as required exits.
2. Untreated wood is permitted for pickets and rails or similar guardrail devices that are limited to 42 inches (1067 mm) in height.
3. Balconies and similar projections on buildings of Type III, IV and V construction shall be permitted to be of Type V construction, and shall not be required to have a fire-resistance rating where sprinkler protection is extended to these areas.
A fire which begins on a combustible balcony or deck has the same propensity to spread vertically and involve several floors at the same time, overwhelming a sprinkler system while fire continues to spread up the building regardless of construction type. Vertical fire from the balcony or deck can run up to the combustible roof which may not have sprinkler protection in the attic. Construction Types I and II allow fire retardant treated wood or Heavy Timber for three stories or less.

**Cost Impact:** Will not increase the cost of construction
This proposal does not add any new requirements and therefore will not increase the cost of construction.
F171-16
903.3.1.2.3 (New) (IBC [F] 903.3.1.2.3 (New))

Proponent: Robert Davidson, Davidson Code Concepts, LLC, representing Self (rjd@davidsoncodeconcepts.com)

2015 International Fire Code

SECTION 903 AUTOMATIC SPRINKLER SYSTEMS

903.3.1.2 NFPA 13R sprinkler systems. Automatic sprinkler systems in Group R occupancies up to and including four stories in height in buildings not exceeding 60 feet (18 288 mm) in height above grade plane shall be permitted to be installed throughout in accordance with NFPA 13R.

The number of stories of Group R occupancies constructed in accordance with Sections 510.2 and 510.4 of the International Building Code shall be measured from the horizontal assembly creating separate buildings.

903.3.1.2.1 Balconies and decks. Sprinkler protection shall be provided for exterior balconies, decks and ground floor patios of dwelling units and sleeping units where the building is of Type V construction, provided there is a roof or deck above. Sidewall sprinklers that are used to protect such areas shall be permitted to be located such that their deflectors are within 1 inch (25 mm) to 6 inches (152 mm) below the structural members and a maximum distance of 14 inches (356 mm) below the deck of the exterior balconies and decks that are constructed of open wood joist construction.

903.3.1.2.2 Open-ended corridors. Sprinkler protection shall be provided in open-ended corridors and associated exterior stairways and ramps as specified in Section 1027.6, Exception 3.

Add new text as follows:

903.3.1.2.3 Attics that are concealed combustible spaces. Attics constructed in a manner creating a concealed combustible space shall be protected in accordance with NFPA 13. Section 8.15.1.1 Concealed Spaces Requiring Sprinkler Protection if the roof assembly is located more than more than 30 feet (9144 mm) above the lowest level of the fire department vehicle access.

The height of the roof assembly shall be determined by measuring the distance from the lowest level of the fire department vehicle access adjacent to the building vertically to the height of the eave of the highest pitched roof, the intersection of the highest roof to the exterior wall, or the top of the highest parapet, whichever yields the greatest distance.

Reason: The spread of fire into and throughout the concealed combustible spaces including attics of NFPA 13R protected buildings is because unlike NFPA 13, NFPA 13R does not require any protection of those spaces. Even the NFPA "Automatic Sprinkler Systems for Residential Occupancies Handbook, 2013 edition" recognizes this is occurring on a more frequent basis.

"... although recently an increasing number of fires have spread through unsprinklered 13R attics. Although these fires have not resulted in loss of life, on several occasions they have resulted in a “total” property loss."

A simple solution other than eliminating the application of the NFPA 13R system altogether is to require that the concealed combustible spaces be protected as required by NFPA 13. There are a number of options to protect the spaces in NFPA 13 in addition to the option of an extension of the sprinkler system into the spaces.

The proposed modification to the code for the application of NFPA 13R systems when attics are constructed in a manner creating a concealed combustible space would require that attic to be protected in accordance with the
NFPA 13 requirements for concealed combustible spaces. There are numerous options within NFPA 13 for addressing this hazard in addition to installing sprinkler protection in the space offering designers and builders choices. The trigger for the application of this requirements is taken from Section 905.3.1 of the code addressing standpipes installations. This is the height at which the code traditionally recognizes an impact on the use of hose lines directly off a fire engine and that concept would be the same in the case of the attics, i.e., a height beyond which another level of fire protection is needed due to impacts on application of water from hose lines hand stretched from responding apparatus.

Based upon the recent fire history this modification is warranted. The sprinkler design advantages of NFPA 13R are maintained with the exception of the attic spaces at the higher level which would now be protected against the rapid and uncontrolled spread of fire.

**Cost Impact:** Will increase the cost of construction

This proposed change will increase the cost of construction by requiring additional protection for certain buildings with concealed combustible space constructed attics.
903.3.1.2.3 (New) (IBC [F] 903.3.1.2.3 (New)), 903.2.8.3 ([F] 903.2.8.3),
903.2.8.3.1 (IBC [F] 903.2.8.3.1), 903.2.8.3.2 (IBC [F] 903.2.8.3.2)

Proponent: Jeffrey Shapiro, representing National Multifamily Housing Council
((jeff.shapiro@intlcodeconsultants.com); Michael O’Brien representing the Fire Code Action Committee
(FCAC@icc.org)

2015 International Fire Code

903.3.1.2 NFPA 13R sprinkler systems. Automatic sprinkler systems in Group R occupancies up to and including four stories in height in buildings not exceeding 60 feet (18 288 mm) in height above grade plane shall be permitted to be installed throughout in accordance with NFPA 13R.

The number of stories of Group R occupancies constructed in accordance with Sections 510.2 and 510.4 of the International Building Code shall be measured from the horizontal assembly creating separate buildings.

Add new text as follows:

903.3.1.2.1 Balconies and decks. Sprinkler protection shall be provided for exterior balconies, decks and ground floor patios of dwelling units and sleeping units where the building is of Type V construction, provided there is a roof or deck above. Sidewall sprinklers that are used to protect such areas shall be permitted to be located such that their deflectors are within 1 inch (25 mm) to 6 inches (152 mm) below the structural members and a maximum distance of 14 inches (356 mm) below the deck of the exterior balconies and decks that are constructed of open wood joist construction.

903.3.1.2.2 Open-ended corridors. Sprinkler protection shall be provided in open-ended corridors and associated exterior stairways and ramps as specified in Section 1027.6, Exception 3.

903.3.1.2.3 Attics Attic protection shall be provided as follows:

1. Attics that are used or intended for living purposes or storage shall be protected by sprinklers.

2. Where fuel-fired equipment is installed in an unsprinklered attic, at least one quick-response intermediate temperature sprinkler shall be installed above the equipment.

3. Where located in a building of Type III or Type V construction designed in accordance with Section 510.2 or Section 510.4 of the International Building Code, attics not required by Item 1 to have sprinklers shall comply with one of the following if the roof assembly is located more than 55 feet (16 764 mm) above the lowest level of required fire department vehicle access:
   a. Provide sprinkler protection.
   b. Construct the attic using noncombustible materials.
   c. Construct the attic using fire-retardant-treated wood complying with Section 2303.2 of the International Building Code.
   d. Fill the attic with noncombustible insulation.

The height of the roof assembly shall be determined by measuring the distance from the lowest required fire vehicle access road surface adjacent to the building to the eave of the highest pitched roof, the intersection of the highest roof to the exterior wall, or the top of the
highest parapet, whichever yields the greatest distance. For the purpose of this measurement, required fire vehicle access roads shall include only those roads that are necessary for compliance with Section 503.

4. Group R-4 Condition 2 occupancy attics not required by Item 1 to have sprinklers shall comply with one of the following:
   a. Provide sprinkler protection.
   b. Provide a heat detector system throughout the attic that is arranged to activate the building fire alarm system in accordance with Section 907.2.10.
   c. Construct the attic using noncombustible materials.
   d. Construct the attic using fire-retardant-treated wood complying with Section 2303.2 of the International Building Code.
   e. Fill the attic with noncombustible insulation.

Revise as follows:

[F] 903.2.8.3 Group R-4 Condition 2. An automatic sprinkler system installed in accordance with Section 903.3.1.2 shall be permitted in Group R-4 Condition 2 occupancies. Attics shall be protected in accordance with Section 903.2.8.3.1 or 903.2.8.3.2.

Delete without substitution:

[F] 903.2.8.3.1 Attics used for living purposes, storage or fuel-fired equipment. Attics used for living purposes, storage or fuel-fired equipment shall be protected throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.2.

[F] 903.2.8.3.2 Attics not used for living purposes, storage or fuel-fired equipment. Attics not used for living purposes, storage or fuel-fired equipment shall be protected in accordance with one of the following:

1. Attics protected throughout by a heat detector system arranged to activate the building fire alarm system in accordance with Section 907.2.10.
2. Attics constructed of noncombustible materials.
3. Attics constructed of fire-retardant treated wood framing complying with Section 2303.2 of the International Building Code.
4. The automatic sprinkler system shall be extended to provide protection throughout the attic space.

Reason: This proposal is recommended as a response to fire-service concerns about suppressing a fire involving a tall pedestal building attic. Such attic or attics will be required to have increased fire protection. The proposed threshold is modeled after a combination of two existing code sections, Appendix D Section 105.1 (which establishes requirements for aerial ladder access based on attic height) and Section 903.2.11.3 (which uses 55 feet as a building height threshold related to sprinklers). Pedestal buildings that exceed 4 stories above grade plane, including the pedestal, are anticipated to be affected by this proposal, as would be some pedestal buildings with fewer stories that are located on sloped lots with fire department vehicle access roads required along a lower-elevation portion of the perimeter. The intent of stating "required" fire vehicle access is to make it clear that, simply because access is available on an adjacent road or parking lot, that road need not be considered in the height measurement unless it is required as part of satisfying the code requirement for vehicle access to the building. The permissible attic protection options for pedestal buildings are generally modeled after existing Section 903.2.8.3, which was added to the 2015 code for R-4 Condition 2 occupancies. However, based on feedback received during the drafting/review process for this proposal, it was decided to exclude the R-4's heat-detection option for pedestal building attic protection because numerous stakeholders did not consider heat detection as equivalent in safety to the other listed options.

Note that allowances to use noncombustible construction materials, fire-retardant treated wood, and filling with
noncombustible insulation are already permitted by NFPA 13 as an alternative to installing sprinklers in concealed spaces in otherwise fully-sprinklered buildings. These allowances are duplicated in the proposed IBC/IFC text so that an architect or developer can identify the attic protection concern and permissible solutions early in the design process, as opposed to expecting building designers to know of these allowances buried deep in the text of NFPA 13. Having the exceptions in the IBC/IFC will make it clear that these NFPA 13 exceptions are appropriate for NFPA 13R attic protection as well, even though they are not included in NFPA 13R (because NFPA 13R doesn't ordinarily require attics to be protected).

Finally, the proposal relocates the existing requirements in 903.2.8.3 for enhanced attic protection in Group R-4 Condition 2 occupancies to the new Section 903.3.1.2.3 so that all IBC/IFC supplemental protection requirements for NFPA 13R sprinkler systems are consolidated in one location. The existing requirements for R-4 Condition 2 were also revised with respect to fuel-fired equipment in attics to clarify that, in an otherwise unsprinklered attic, the entire attic wouldn't be required to be sprinklered based on the presence of fuel-fired equipment. Instead, NFPA 13R (Section 6.6.6.1 of the 2013 edition) only requires that a sprinkler be installed over the equipment in such cases.

Cost Impact: Will increase the cost of construction
The added requirement for attic protection will increase the cost of construction for affected buildings.
F173-16
903.3.3 (IBC [F] 903.3.3)

Proponent: William Hall, Portland Cement Association (jhall@cement.org)

2015 International Fire Code

Revise as follows:

903.3.3 Obstructed locations. Automatic sprinklers shall be installed with due regard to obstructions that will delay activation or obstruct the water distribution pattern and shall be in accordance with applicable sprinkler standard being used. Automatic sprinklers shall be installed in or under covered kiosks, displays, booths, concession stands or equipment that exceeds 4 feet (1219 mm) in width. Not less than a 3-foot (914 mm) clearance shall be maintained between automatic sprinklers and the top of piles of combustible fibers.

Exception: Kitchen equipment under exhaust hoods protected with a fire-extinguishing system in accordance with Section 904.

Reason: NFPA sprinkler standards have sections dealing with obstructions and what the minimum distance to obstructions are. The code section currently tells the user to have due regard for obstructions but then remains silent as to what due regard means. This proposal points the user to the applicable standard to get obstruction requirements.

Cost Impact: Will not increase the cost of construction
Will not increase cost of construction. Clarification only
Proponent : Lori Jessell, Novato Fire Protection District, representing California Fire Chiefs Association

2015 International Fire Code

Revise as follows:

904.12 Commercial cooking systems. The automatic fire-extinguishing system for commercial cooking systems shall be of a type recognized for protection of commercial cooking equipment and exhaust systems of the type and arrangement protected. Preengineered automatic dry and wet chemical extinguishing systems shall be tested in accordance with UL 300 and listed and labeled for the intended application. Other types of automatic fire extinguishing systems shall be listed and labeled for specific use as protection for commercial cooking operations. The system shall be installed in accordance with this code, NFPA 96, its listing and the manufacturer's installation instructions. Automatic fire extinguishing systems of the following types shall be installed in accordance with the referenced standard indicated, as follows:

1. Carbon dioxide extinguishing systems, NFPA 12.
3. Foam-water sprinkler system or foam-water spray systems, NFPA 16.
4. Dry-chemical extinguishing systems, NFPA 17.
5. Wet-chemical extinguishing systems, NFPA 17A.

Exception: Factory-built commercial cooking recirculating systems that are tested in accordance with UL 710B and listed, labeled and installed in accordance with Section 304.1 of the International Mechanical Code.

Reference standards type: This is an update to reference standard(s) already in the ICC Code Books

Add new standard(s) as follows:

Reason: IFC Chapter 9 scope is for the design, installation, inspection, operation, testing and maintenance of all fire protection systems. Section 904.12 is the logical location to provide guidance to the fire protection system designer and Code Official as to where to locate pertinent language to the design, installation, inspection, operation, testing and maintenance for fire protection systems for commercial cooking operations. Having a direct reference from the International Fire Code to NFPA 96 standard, similar to the references to NFPA standards for specific system types found in items 1-5 of the Section 904.12, provides for a more efficient reference to applicable standards than sending the system designer or Code Official through the Mechanical Code. The purpose of NFPA 96, the standard for ventilation control and fire protection of commercial cooking operations, is to reduce the potential fire hazard of cooking operations and is relevant to the International Fire Code, Chapter 9, Section 904.12 Commercial Cooking Systems section.

The standard can be viewed here:

Cost Impact: Will not increase the cost of construction

This language is editorial in nature to clarify the use of the appropriate NFPA Standard.

ANalysis: NFPA 96 is already referenced in the IMC. This is simply a new occurrence of the reference in
the I-Codes.
F175-16
904.12 (IBC [F] 904.12)

Proponent: Christopher Moran, Jensen Hughes, representing United Technologies Corporation/Marioff (cmoran@jensenhughes.com)

2015 International Fire Code

Add new text as follows:

904.12 Commercial cooking systems. The automatic fire-extinguishing system for commercial cooking systems shall be of a type recognized for protection of commercial cooking equipment and exhaust systems of the type and arrangement protected. Preengineered automatic dry and wet chemical extinguishing systems shall be tested in accordance with UL 300 and listed and labeled for the intended application. Other types of automatic fire extinguishing systems shall be listed and labeled for specific use as protection for commercial cooking operations. The system shall be installed in accordance with this code, its listing and the manufacturer's installation instructions. Automatic fire extinguishing systems of the following types shall be installed in accordance with the referenced standard indicated, as follows:

1. Carbon dioxide extinguishing systems, NFPA 12.
3. Automatic water mist systems, NFPA 750.
4. Foam-water sprinkler system or foam-water spray systems, NFPA 16.
5. Dry-chemical extinguishing systems, NFPA 17.
6. Wet-chemical extinguishing systems, NFPA 17A.

Exception: Factory-built commercial cooking recirculating systems that are tested in accordance with UL 710B and listed, labeled and installed in accordance with Section 304.1 of the International Mechanical Code.

Reason: Water mist systems from multiple companies are approved by FM Global for use in industrial oil cookers and should be included in this section with the other suppression alternatives for commercial cooking systems. This will give owners another option that has been shown to be effective. A list of the systems approved by FM Global are attached.

Cost Impact: Will not increase the cost of construction
This only provides another suppression option and would not increase the cost of construction.
904.12.5 Portable fire extinguishers for commercial cooking equipment. Portable fire extinguishers shall be provided within a 30-foot (9144 mm) distance of travel from commercial-type cooking equipment. Cooking equipment involving solid fuels or vegetable or animal oils and fats shall be protected by a Class K rated portable extinguisher in accordance with Section 904.12.5.1 or 904.12.5.2, as applicable.

904.13.2 Portable fire extinguishers for domestic cooking equipment in Group I-2 Condition 1. A portable fire extinguisher complying with Section 906 shall be installed within a 30-foot (9144 mm) distance of travel from domestic cooking appliances.

Add new text as follows:

906.1 Where required. Portable fire extinguishers shall be installed in all of the following locations:

1. In new and existing Group A, B, E, F, H, I, M, R-1, R-2, R-4 and S occupancies. **Exception:** In Group R-2 occupancies, portable fire extinguishers shall be required only in locations specified in Items 2 through 6 where each dwelling unit is provided with a portable fire extinguisher having a minimum rating of 1-A:10-B:C.
2. Within 30 feet (9144 mm) distance of travel from commercial cooking equipment, and from domestic cooking equipment in Group I-2 Condition 1.
3. In areas where flammable or combustible liquids are stored, used or dispensed.
4. On each floor of structures under construction, except Group R-3 occupancies, in accordance with Section 3315.1.
5. Where required by the sections indicated in Table 906.1.
6. Special-hazard areas, including but not limited to laboratories, computer rooms and generator rooms, where required by the fire code official.

906.4 Cooking grease equipment fires. Fire extinguishers provided for the protection of cooking grease equipment shall be of an approved type compatible with the automatic fire-extinguishing system agent. Cooking equipment involving solid fuels or vegetable or animal oils and fats shall be protected by a Class K rated portable extinguisher in accordance with Section 904.12.5 906.1, item 2, 906.4.1 and 906.4.2 as applicable.

Revise as follows:

904.12.5.1 906.4.1 Portable fire extinguishers for solid fuel cooking appliances. No change to text.

904.12.5.2 906.4.2 Class K portable fire extinguishers for deep fat fryers. Where hazard areas include deep fat fryers, listed Class K portable fire extinguishers shall be provided as follows:
1. For up to four fryers having a maximum cooking medium capacity of 80 pounds (36.3 kg) each: one Class K portable fire extinguisher of a minimum 1.5-gallon (6 L) capacity.

2. For every additional group of four fryers having a maximum cooking medium capacity of 80 pounds (36.3 kg) each: one additional Class K portable fire extinguisher of a minimum 1.5-gallon (6 L) capacity shall be provided.

3. For individual fryers exceeding 6 square feet (0.55 m²) in surface area: Class K portable fire extinguishers shall be installed in accordance with the extinguisher manufacturer's recommendations.

**Reason:** The portable fire extinguishers requirements are not in the correct section, which is section 906 entitled Portable Fire Extinguishers. This proposal corrects the problem as follows:

- The requirements in 904.13.2 were moved to 906.1 and Section 904.13.2 was deleted.
- 904.12.5 contained the requirements for travel distance which were already covered by section 906.1 and the cooking equipment requirements were moved to 906.4.
- 904.12.5.1 and 904.12.5.2 were simply renumbered and will become sections 906.4.1. and 906.4.2

**Cost Impact:** Will not increase the cost of construction

This simply moves the already existing requirements from one code section to another no substantive changes were made.
2015 International Fire Code

Revise as follows:

904.13 Domestic cooking systems in Group Groups I-1 or I-2 Condition 1. In Group Groups I-1 or I-2 Condition 1 occupancies where cooking facilities are installed in accordance with Section 407.2.6 of the International Building Code, the domestic cooking hood provided over the cooktop or range shall be equipped with an automatic fire-extinguishing system of a type recognized for protection of domestic cooking equipment. Preengineered automatic extinguishing systems shall be tested in accordance with UL 300A and listed and labeled for the intended application. The system shall be installed in accordance with this code, its listing and the manufacturer's instructions.

904.13.1 Manual system operation and interconnection. Manual actuation and system interconnection for the hood suppression system shall be in accordance with Sections 904.12.1 and 904.12.2, respectively.

904.13.2 Portable fire extinguishers for domestic cooking equipment in Group I-2 Condition 1. No change to text.

Reason: This is coordination with G123-15(AS) and M45-15(AS). G123-15 added criteria for domestic cooking in Group I-1 areas with a limited number of residents. M45-15 added a reference to this section for hoods in both Group I-1 and I-2.

Section 904.13.2 is a subsection of 904.13, so the group does not have to be in the title. In addition, the group is not in the text.

This proposal is submitted by the ICC Code Technology Committee (CTC). The ICC Board has decided to sunset the CTC. The sunset plan includes re-assigning many of the CTC Areas of Study to the applicable Code Action Committee (CAC). The two remaining CTC Areas of Study are Care Facilities and Elevator Lobbies/WTC Elevator issues. This proposal falls under the Care Facilities Area of Study. In 2014 and 2015 ICC CTC Committee has held 4 open meetings and numerous Work Group meetings and conference calls for the current code development cycle which included members of the committees as well as any interested party to discuss and debate the proposed changes. Information on the CTC, including: the sunset plan; meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the CTC website CTC.

Cost Impact: Will not increase the cost of construction
This clarification that will most likely reduce the cost of the hoods required.
F178-16
904.13 (IBC [F] 904.13)

Proponent: Carl Baldassarra, P.E., FSFPE, representing the Code Technology Committee (CTC@icc-safe.org)

2015 International Fire Code

Revise as follows:

904.13 Domestic cooking systems in Group I-2 Condition 1. In Group I-2 Condition 1 occupancies where cooking facilities are installed in accordance with Section 407.2.6 of the International Building Code, the domestic recirculating or exterior vented cooking hood provided over the cooktop or range shall be equipped with an automatic fire-extinguishing system of a type recognized for protection of domestic cooking equipment. Preengineered automatic extinguishing systems shall be tested in accordance with UL 300A and listed and labeled for the intended application. The system shall be installed in accordance with this code, its listing and the manufacturer’s instructions.

Reason: NFPA 96 allows for recirculating hoods in commercial kitchens. These kitchens are not commercial cooking, but are limited to domestic cooking for a limited number of residents. This will not be a health issue for residents, but is needed to allow for flexibility in design of these spaces. The aromas of cooking are one of the primary benefits for allowing kitchens in these home-like environments.

This proposal is submitted by the ICC Code Technology Committee (CTC). The ICC Board has decided to sunset the CTC. The sunset plan includes re-assigning many of the CTC Areas of Study to the applicable Code Action Committee (CAC). The two remaining CTC Areas of Study are Care Facilities and Elevator Lobbies/WTC Elevator issues. This proposal falls under the Care Facilities Area of Study. In 2014 and 2015 ICC CTC Committee has held 4 open meetings and numerous Work Group meetings and conference calls for the current code development cycle which included members of the committees as well as any interested party to discuss and debate the proposed changes. Information on the CTC, including: the sunset plan; meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the CTC website CTC.

Cost Impact: Will not increase the cost of construction
This will be either a reduction or no change to construction requirements for venting.
Proponent: Michael O'Brian representing the Fire Code Action Committee (FCAC@iccsafe.org)

2015 International Fire Code

Delete and substitute as follows:

904.13 Domestic cooking systems in Group I-2 Condition 1. In Group I-2 Condition 1 occupancies where cooking facilities are installed in accordance with Section 407.2.6 of the International Building Code, the domestic cooking hood provided over the cooktop or range shall be equipped with an automatic fire-extinguishing system of a type recognized for protection of domestic cooking equipment. Preengineered automatic extinguishing systems shall be tested in accordance with UL 300A and listed and labeled for the intended application. The system shall be installed in accordance with this code, its listing and the manufacturer’s instructions.

Cooktops and ranges installed in the following occupancies shall be protected in accordance with Sections 904.13.1 through 904.13.2:

1. In Group I-2 Condition 1 occupancies where domestic cooking facilities are installed in accordance with Section 407.2.6 of the International Building Code.

2. In Group R-2 college dormitories where domestic cooking facilities are installed in accordance with Section 420.7 of the International Building Code.

904.13.1 Manual system operation and interconnection Protection from fire. Manual actuation and system interconnection for the hood suppression system shall be in accordance with Sections 904.12.1 and 904.12.2, respectively.

Cooktops and ranges shall be protected in accordance with Section 904.13.1.1 or 904.13.1.2.

Add new text as follows:

904.13.1.1 Automatic fire-extinguishing system. The domestic cooking hood provided over the cooktop or range shall be equipped with an approved automatic fire-extinguishing system complying with the following:

1. The automatic fire-extinguishing system shall be of a type recognized for protection of domestic cooking equipment. Pre-engineered automatic fire-extinguishing systems shall be listed and labeled in accordance with UL 300A and installed in accordance with the manufacturer’s instructions.

2. Manual actuation of the fire-extinguishing system shall be provided in accordance with Section 904.12.1.

3. Interconnection of the fuel and electric power supply shall be in accordance with Section 904.12.2.

904.13.1.2 Ignition prevention. Cooktops and ranges shall include burners that have been tested and listed to prevent ignition of cooking oil with burners turned on to their maximum heat settings and allowed to operate for 30 minutes.

Revise as follows:
904.13.2 Portable fire extinguishers for domestic cooking equipment in Group I-2 Condition 1. No change to text.

Reason: This proposal was developed by a Fire Code Action Committee working group consisting of FCAC, industry and fire service representatives. Group A code proposals G 105-15 and G 121-15 were approved as submitted. These proposals covered the use of domestic cooking systems in Group I-2, Condition 1 occupancies and Group R-2 college dormitories. The reason statements for both proposals reference that changes were needed to IBC/IFC Section 904.13 to provide correlation. This proposal provides this correlation, and makes no substantive changes to the existing Section 904.13 requirements, which are shown below. Section 904.13.1.1 includes some of the automatic fire-extinguishing requirements that were previously located in IBC Section 407.2.6.

904.13.1.2 allows an option for cooktops and ranges with listed ignition resistant burners that do not allow cooking oils to ignite during testing to be provided in lieu of an automatic fire-extinguishing system. Recent work by the Fire Protection Research Foundation confirms that burners meeting these specifications are highly unlikely to ignite cooking materials. See: http://www.nfpa.org/research/fire-protection-research-foundation/reports-and-proceedings/other-research-topics/analytical-modeling-of-pan-and-oil-heating-on-an-electric-coil-cooktop. The UL 858 Standard for Safety for Household Electric Ranges was recently revised to include a new Section 60A Abnormal Operation - Coil Surface Unit Cooking Oil Ignition Test that evaluates the ability of burners to not ignite cooking oil.

Existing 2015 IFC text (for reference only):

904.13 Domestic cooking systems in Group I-2 Condition 1. In Group I-2 Condition 1 occupancies where cooking facilities are installed in accordance with Section 407.2.6 of the International Building Code, the domestic cooking hood provided over the cooktop or range shall be equipped with an automatic fire-extinguishing system of a type recognized for protection of domestic cooking equipment. Pre-engineered automatic extinguishing systems shall be tested in accordance with UL 300A and listed and labeled for the intended application. The system shall be installed in accordance with this code, its listing and the manufacturer's instructions.

904.13.1 Manual system operation and interconnection. Manual actuation and system interconnection for the hood suppression system shall be in accordance with Sections 904.12.1 and 904.12.2, respectively.

904.13.2 Portable fire extinguishers for domestic cooking equipment in Group I-2 Condition 1. A portable fire extinguisher complying with Section 906 shall be installed within a 30-foot (9144 mm) distance of travel from domestic cooking appliances.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire safety and hazardous materials in new and existing buildings and facilities and the protection of life and property in wildland urban interface areas. In 2014 and 2015 the Fire-CAC has held 5 open meetings. In addition, there were numerous conference calls, Regional Work Group and Task Group meetings for the current code development cycle, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC

Cost Impact: Will not increase the cost of construction

This proposal provides correlation with new IBC requirements for the domestic cooktops used in non-household occupancies. The option to use cooktops with ignition resistant burners in lieu of an automatic extinguishing system has the potential to actually reduce the cost of construction in these occupancies.

F179-16 : 904.13-O'BRIAN10471
TABLE 901.6.1
FIRE PROTECTION SYSTEM MAINTENANCE STANDARDS

<table>
<thead>
<tr>
<th>SYSTEM</th>
<th>STANDARD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Portable fire extinguishers</td>
<td>NFPA 10</td>
</tr>
<tr>
<td>Carbon dioxide fire-extinguishing system</td>
<td>NFPA 12</td>
</tr>
<tr>
<td>Halon 1301 fire-extinguishing systems</td>
<td>NFPA 12A</td>
</tr>
<tr>
<td>Dry-chemical extinguishing systems</td>
<td>NFPA 17</td>
</tr>
<tr>
<td>Wet-chemical extinguishing systems</td>
<td>NFPA 17A</td>
</tr>
<tr>
<td>Water-based fire protection systems</td>
<td>NFPA 25</td>
</tr>
<tr>
<td>Fire alarm systems</td>
<td>NFPA 72</td>
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<tr>
<td>Smoke and heat vents</td>
<td>NFPA 204</td>
</tr>
<tr>
<td>Water-mist systems</td>
<td>NFPA 750</td>
</tr>
<tr>
<td>Clean-agent extinguishing systems</td>
<td>NFPA 2001</td>
</tr>
<tr>
<td>Aerosol fire extinguishing systems</td>
<td>NFPA 2010</td>
</tr>
</tbody>
</table>

Add new text as follows:

**904.13 Aerosol Fire Extinguishing Systems.** Aerosol fire extinguishing systems shall be installed, periodically inspected, tested and maintained in accordance with sections 901 and 904.4, NFPA 2010, and in accordance with their listing.

Such devices and appurtenances shall be listed and installed in conformance with manufacturer's instructions.

**904.13.1 Maintenance.** Not less than semi-annually, an inspection shall be conducted by a trained person to assess whether the system is in working order. A certified fire suppression
contractor trained and having knowledge of the installation, operation and maintenance of the specific fire extinguishing system shall inspect, test, service and maintain such system in accordance with this section and the manufacturer's specifications and servicing manuals not less than annually.

**Analysis:** A review of the standard(s) proposed for inclusion in the code, NFPA 2010, Edition 2015, Standard for Fixed Aerosol Fire-Extinguishing Systems with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1, 2016.

**Reference standards type:** This reference standard is new to the ICC Code Books

**Add new standard(s) as follows:**

It can be viewed here:


**Reason:** In 2006, the NFPA 2010 (Edition 2006) Standard for Fixed Aerosol Fire Extinguishing Systems was first published.


In 2013, the New York City Fire Code was amended to modify Section FC 904 FIRE EXTINGUISHING SYSTEMS to include a new subsection 904.13 Aerosol Fire Extinguishing Systems that comply with NFPA 2010 (current Edition 2015).

In 2014, the ICC-ES published its first Division: 21000 Fire Suppression, Section 21022 18 Fixed Condensed Aerosol Extinguishing System Units evaluation report ESR-3230 for an aerosol fire suppression system in compliance with IFC 2009 and IFC 2012 as an alternative to IFC 904.9 Halon Fire Extinguishing Systems.

In 2014, ANSI approved UL standard UL 2775 Standard for Fixed Condensed Aerosol Extinguishing System Units.

**Cost Impact:** Will not increase the cost of construction

Condensed aerosol fire suppression systems used as total flooding systems for the protection of Class A (surface), Class B, and Class C hazards can reduce construction, installation, and maintenance costs compared with existing fire suppression systems.

This technology does not use compressed gas cylinders nor pressure rated piping. Generally these systems are electrically operated when integrated with ICC IFC approved fire alarm and releasing control systems and approved/listed releasing panels, or are deployed as automatic stand-alone fire extinguishing units. Typically these extinguishing units are designed as disposable devices with a minimum 10 year shelf life.

As there are no piping distribution systems required, no special storage requirements for compressed gas bottles, and the ability of the flooding agent to protect areas with limited leakage, the construction costs involving these systems are typically lower than conventional chemical and gas fire extinguishing systems requiring gas pressure.

Furthermore the technology remains effective even with leakage in the space, and therefore offers an alternative fire suppression technology for existing installations involving reconstruction or new construction of areas with special hazards, and where total room integrity construction is problematic.
As the units are designed to be disposable, generally they require very little maintenance and consequently offer low long term life cycle costs to facility operators.
F181-16
904.14 (New) (IBC [F] 904.14)

Proponent: Kevin Kelly, representing Victaulic (kevin.kelly@victaulic.com)

2015 International Fire Code

Add new text as follows:

904.14 Hybrid Systems Hybrid fire extinguishing systems shall be installed, maintained, periodically inspected and tested in accordance with NFPA 770 and their listing. Records of inspections and testing shall be maintained.

Reference standards type: This reference standard is new to the ICC Code Books

Add new standard(s) as follows:

NFPA 770, Standard on Hybrid (Water and Inert Gas) Fire Extinguishing Systems
It can be viewed here:

Reason: Users of the code will need guidance on Hybrid fire extinguishing systems. The Technical Committee on Hybrid (Water and Inert Gas) Fire Extinguishing Systems (NFPA 770) will create the new standard on Hybrid systems.

Cost Impact: Will not increase the cost of construction
This will not increase cost. It will be a referenced document if the users are installing a Hybrid system.
SECTION 905 AUTOMATIC WATER MIST SYSTEMS

905.1 General. Automatic water mist systems shall comply with this section.

905.1.1 Restriction on using automatic water mist system exceptions or reductions. Automatic water mist systems shall not be considered alternatives for the purposes of exceptions or reductions allowed for automatic sprinkler systems unless noted otherwise.

905.2 Listing. Approved automatic water mist systems in new buildings and structures shall be installed in locations consistent with the systems listing.

905.3 Installation requirements. Automatic water mist systems shall be designed and installed in accordance with Sections 905.3.1 through 905.3.6.

905.3.1 Design. Automatic water mist systems shall be designed and installed in accordance with NFPA 750 and manufacturer's instructions.

905.3.1.1 Exempt locations. Automatic water mist system protection shall not be required in the following rooms or areas where such rooms or areas are protected with an approved automatic fire detection system in accordance with Section 907.2 that will respond to visible or invisible particles of combustion. Nozzles shall not be omitted from a room merely because it is damp, of fire-resistance-rated construction or contains electrical equipment.

1. A room where the application of water, or flame and water, constitutes a serious life or fire hazard.
2. A room or space where nozzles are considered undesirable because of the nature of the contents, where approved by the fire code official.
3. Generator and transformer rooms separated from the remainder of the building by walls and floor/ceiling or roof/ceiling assemblies having a fire-resistance rating of not less than 2 hours.
4. Rooms or areas that are of noncombustible construction with wholly noncombustible contents.
5. Fire service access elevator machine rooms and machinery spaces.

905.3.2 Actuation. Automatic water mist systems shall be automatically actuated unless specifically provided for in this code.

905.3.3 Water supplies. Water supplies for automatic water mist systems shall comply with this section and the standards referenced in Section 905.3.1. The potable water supply shall be
protected against backflow in accordance with the requirements of this section and the International Plumbing Code. For connections to public waterworks systems, the water supply test used for design of fire protection systems shall be adjusted to account for seasonal and daily pressure fluctuations based on information from the water supply authority and as approved by the fire code official.

905.3.3.1 Secondary water supply. Where a secondary water supply is required for an automatic sprinkler system, an automatic water mist system shall be provided with an approved secondary water supply.

905.3.3.2 Domestic Services. Where the domestic service provides the water supply for the automatic water mist system, the supply shall be in accordance with this section.

905.3.3.3 Residential combination services. A single combination water supply shall include the domestic demand in addition to the water mist demand.

905.3.4 Hose threads. Fire hose threads and fittings used in connection with automatic water mist systems shall be as prescribed by the fire code official.

905.3.5 Fire department connections. Fire department connections for automatic water mist systems shall be installed in accordance with Section 912.

905.3.6 Limited area water mist systems. Limited area water mist systems shall be in accordance with the standards listed in Section 905.3.1 except as provided in Sections 905.3.6.1 through 905.3.6.4.

905.3.6.1 Number of nozzles. Limited area water mist systems shall not exceed six nozzles in any single fire area.

905.3.6.2 Occupancy hazard classification. Limited area water mist systems shall only be installed in areas classified by NFPA 750 as Light Hazard or Ordinary Hazard Group 1.

905.3.6.3 Supervision. Control valves shall not be installed between the water supply and nozzles unless the valves are of an approved indicating type that are supervised or secured in the open position.

905.3.6.4 Calculations. Hydraulic calculations shall be provided to demonstrate that the available water flow and pressure are adequate to supply all nozzles installed in any single fire area.

905.4 Water mist system supervision and alarms. Water mist system supervision and alarms. Valves controlling the water supply for automatic water mist systems, pumps, tanks, water levels and temperatures, critical air pressures and waterflow switches on all water mist systems shall be electrically supervised by a listed fire alarm control unit.

Exceptions:

1. Automatic water mist systems protecting one- and two-family dwellings.
2. Limited area water mist systems in accordance with Section 905.3.6.
3. Control valves to commercial kitchen hoods, paint spray booths or dip tanks that are sealed or locked in the open position.
4. Valves controlling the fuel supply to water mist pump engines that are sealed or locked in the open position.
5. Trim valves to pressure switches in dry, preaction and deluge water mist systems.
that are sealed or locked in the open position.

905.4.1 Monitoring. Alarm, supervisory and trouble signals shall be distinctly different and shall be automatically transmitted to an approved supervising station or, where approved by the fire code official, shall sound an audible signal at a constantly attended location.

Exceptions:

1. Underground key or hub valves in roadway boxes provided by the municipality or public utility are not required to be monitored.
2. Backflow prevention device test valves located in limited area water mist systems supply piping shall be locked in the open position. In occupancies required to be equipped with a fire alarm system, the backflow preventer valves shall be electrically supervised by a tamper switch installed in accordance with NFPA 72 and separately annunciated.

905.4.2 Alarms. An approved audible device, located on the exterior of the building in an approved location, shall be connected to each automatic water mist system. Such waterflow alarm devices shall be activated by water flow equivalent to the flow of a single nozzle of the smallest orifice size installed in the system. Where a fire alarm system is installed, actuation of the automatic water mist system shall actuate the building fire alarm system.

905.4.3 Floor control valves. Approved supervised indicating control valves shall be provided at the point of connection to the riser on each floor in high-rise buildings.

905.5 Testing and maintenance. Water mist systems shall be tested and maintained in accordance with Section 901.

Delete without substitution:

904.11 Automatic water mist systems. Automatic water mist systems shall be permitted in applications that are consistent with the applicable listing or approvals and shall comply with Sections 904.11.1 through 904.11.3.

904.11.1 Design and installation requirements. Automatic water mist systems shall be designed and installed in accordance with Sections 904.11.1.1 through 904.11.1.4.

904.11.1.1 General. Automatic water mist systems shall be designed and installed in accordance with NFPA 750 and the manufacturer's instructions.

904.11.1.2 Actuation. Automatic water mist systems shall be automatically actuated.

904.11.1.3 Water supply protection. Connections to a potable water supply shall be protected against backflow in accordance with the International Plumbing Code.

904.11.1.4 Secondary water supply. Where a secondary water supply is required for an automatic sprinkler system, an automatic water mist system shall be provided with an approved secondary water supply.

904.11.2 Water mist system supervision and alarms. Supervision and alarms shall be provided as required for automatic sprinkler systems in accordance with Section 903.4.

904.11.2.1 Monitoring. Monitoring shall be provided as required for automatic sprinkler systems in accordance with Section 903.4.1.
904.11.2.2 Alarms. Alarms shall be provided as required for automatic sprinkler systems in accordance with Section 903.4.2.

904.11.2.3 Floor control valves. Floor control valves shall be provided as required for automatic sprinkler systems in accordance with Section 903.4.3.

904.11.3 Testing and maintenance. Automatic water mist systems shall be tested and maintained in accordance with Section 901.6.

Reason: This proposed change brings the water mist requirements to a section of their own as suggested by the IFC committee in the previous code cycle. Due to the similarities between sprinkler and water mist systems, Section 903 was used as the basis for the water mist section.

Section 905.2 adds the concept of using an automatic water mist system for protection of structures in lieu of sprinkler systems only when the water mist systems are used within the systems’ listed applications. The proposed section recognizes that based on performance, listings and field experience water mist is a viable alternative to the protection provided by automatic sprinklers. Water mist systems have been approved by FM Approvals for occupancies similar to light hazard as defined by NFPA 13. The test criteria for these listings are found in FM 5560. Water mist systems have been listed by UL for Ordinary Hazard, Group I occupancies as defined by NFPA 13. Water mist systems are also listed for machinery spaces (FM), flammable liquid storage and parking garages (VdS). These listings would permit water mist to be installed as the primary suppression system in the majority of spaces within commercial and residential buildings. Additionally, NFPA 750 [2015] recognizes that water mist systems can protect light, ordinary hazard and residential occupancies as defined by NFPA 13 and NFPA 13R and has included design requirements for occupancy hazard design into the latest edition.

The proposed section 905.1.1 allows exceptions and reductions only when the listings identify the protection as appropriate and specifically permitted by the individual code section.

Automatic water mist systems provide a water efficient alternative to sprinkler systems. Water mist systems reduce the water supply demand which can be of significance in areas where municipal water supplies may be marginal or inadequate for conventional sprinklers. Reducing the water demand for automatic fire protection systems that are tested in the same manner by recognized laboratories to conventional sprinklers, will encourage the installation of fire protection systems in cities and towns where water shortages due to drought may be a problem. Furthermore, the reduced discharge from water mist systems, compared to conventional sprinklers, in turn reduces the potential water damage.

Water mist systems have been used for years in buildings and on passenger ships specifically as a “sprinkler equivalent system” per Resolution A.800(19), November 1995 (IMO A800). A.800 details the testing criteria to establish water mist sprinkler equivalency for passenger ships. These passenger ships are similar to small cities in terms of the occupancies located on board, including assembly, business, mercantile, residential, and storage. The wide variety of occupancies located on passenger ships and history of use provides strong support for the equivalency of water mist systems to sprinkler systems. Water mist systems have been used in lieu of automatic sprinklers in buildings and on passenger ships for years due to water efficient design. The listings of the systems have been used as design guidance in buildings.

The acceptance of protecting buildings entirely by water-mist is appropriate and is being done today in countries across the world, particularly Europe. Water mist works to extinguish, suppress or control fires in fully open or enclosed compartments. The performance of these systems depends on pre-wetting of combustibles and cooling of hot gases, the same as conventional sprinklers, and they do not require sealed enclosures. Water-mist systems tested in environments identical to automatic sprinkler testing and have been found to achieve at least equal performance using less water than conventional sprinklers.


Cost Impact: Will not increase the cost of construction
This does not replace any required systems but provides additional options and flexibility. Water mist systems on original installation can be lower cost than traditional sprinkler system. For example, automatic water mist systems in locations with marginal water supplies would potentially provide cost savings as water tanks would not be required.
Add new text as follows:

**2015 International Fire Code**

Add new text as follows:

**905.12  Locking Standpipe Outlet Caps**  The fire code official is authorized to require locking caps on the outlets on dry standpipe connections where the responding fire department carries key wrenches for the removal that are compatible with locking FDC connection caps.

**Reason:** Standpipe connection caps are vulnerable to theft. Vandalism is a concern when trash and debris are introduced into the outlet. The debris will flow directly to the fire fighters nozzle creating a life safety issue for fire fighters. The other problem that exists is with dry systems. When one or more valves are open within the system, and the fire department pumps to the system, the correct flow and pressure will not reach the fire fighters, causing a delay in the application of water. This delay can create increased property damage and life safety issues. This provision, when applied, will require the protected FDC and protected standpipe caps to have a compatible and standard opening mechanism.

**Cost Impact:** Will increase the cost of construction  
The cost is $103.00 per outlet protected. In a normal highrise with two stairs the cost would be $206.00 per floor.
905.3.1 Height. Class III standpipe systems shall be installed throughout buildings where any one of the following conditions exist:

1. Four or more stories above or below grade plane.
2. The floor level of the highest story is located more than 30 feet (9144 mm) above the lowest level of the fire department vehicle access, or where the
3. The floor level of the lowest story is located more than 30 feet (9144 mm) below the highest level of fire department vehicle access.

Exceptions:

1. Class I standpipes are allowed in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2.
2. Class I manual standpipes are allowed in open parking garages where the highest floor is located not more than 150 feet (45 720 mm) above the lowest level of fire department vehicle access.
3. Class I manual dry standpipes are allowed in open parking garages that are subject to freezing temperatures, provided that the hose connections are located as required for Class II standpipes in accordance with Section 905.5.
4. Class I standpipes are allowed in basements equipped throughout with an automatic sprinkler system.
5. In determining the lowest level of fire department vehicle access, it shall not be required to consider either of the following:
   5.1. Recessed loading docks for four vehicles or less.
   5.2. Conditions where topography makes access from the fire department vehicle to the building impractical or impossible.

Exceptions:

1. Class I standpipes are allowed in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2.
2. Class I manual standpipes are allowed in open parking garages where the highest floor is located not more than 150 feet (45 720 mm) above the lowest level of fire department vehicle access.
3. Class I manual dry standpipes are allowed in open parking garages that are subject to freezing temperatures, provided that the hose connections are located as required for Class II standpipes in accordance with Section 905.5.
4. Class I standpipes are allowed in basements equipped throughout with an automatic sprinkler system.
5. In determining the lowest level of fire department vehicle access, it shall not be required to consider either of the following:
   5.1. Recessed loading docks for four vehicles or less.
   5.2. Conditions where topography makes access from the fire department vehicle to the building impractical or impossible.
**Reason:** The current requirements for the need for standpipes is based upon the distance from the lowest level of FD vehicle access to the floor level of the highest story or the converse condition. For a building with 10 foot story heights and the FD vehicle access at the same datum as the first story, this would make a four story building meeting these requirements the minimum height where standpipes are required. Seldom does this exact condition exist. However, the arrangement of stairways inside of the buildings where standpipes are normally located doesn't substantially change based on whether the FD vehicle access is 1 foot higher or the story height is a few inches lower. Since the fire department is the primary user of standpipes, the ability to stretch hoselines should be the priority in developing requirements based on height. For every landing that the FD needs to stretch a hoseline around when advancing it from the ground level, it delays deployment for firefighting operations and requires additional personnel to complete it effectively. Furthermore, having a more consistent requirement based on the building rather than differences in height measurement is beneficial to firefighters during initial building size-up.

From a practical standpoint, a four story building with a stretch from the ground level requires the distance from the fire apparatus access road to the exit stairway, up the stairway, and to all portions of the upper story. In an unsprinklered 4-story Group B occupancy, this could be 150ft (IFC 503) + 200 feet (50ft. per story) + 200 feet (Table 1017.2) = 550 feet of attack hose. With a standpipe, this would be 150 feet (905.4 #6) and would not require the need to stretch hoselines up stairways.

The original requirements of 30 feet above or below the FD vehicle access is maintained to deal with buildings with large story heights and to address buildings built with significant grade changes.

**Cost Impact:** Will increase the cost of construction
This proposal will increase the cost of construction for unsprinklered buildings that are four stories and previously were arranged to stay below the 30 foot requirement since a Class III standpipe will need to be installed. This proposal will increase the cost of construction for sprinklered buildings that are four stories and previously were arranged to stay below the 30 foot requirement since Class I FD hose outlets and larger riser piping will be to be installed.
F185-16
905.3.1 (IBC [F] 905.3.1)

Proponent: Daniel Nichols, representing New York State Division of Building Standards and Codes (dnichols@dos.state.ny.us)

2015 International Fire Code

Add new text as follows:

905.3.1 Height. Class III standpipe systems shall be installed throughout buildings where the floor level of the highest story is located more than 30 feet (9144 mm) above the lowest level of the fire department vehicle access, or where the floor level of the lowest story is located more than 30 feet (9144 mm) below the highest level of fire department vehicle access.

Exceptions:

1. Class I standpipes are allowed in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2.
2. Class I standpipes are allowed in Group B and E occupancies.
3. Class I manual standpipes are allowed in open parking garages where the highest floor is located not more than 150 feet (45 720 mm) above the lowest level of fire department vehicle access.
4. Class I manual dry standpipes are allowed in open parking garages that are subject to freezing temperatures, provided that the hose connections are located as required for Class II standpipes in accordance with Section 905.5.
5. Class I standpipes are allowed in basements equipped throughout with an automatic sprinkler system.
6. In determining the lowest level of fire department vehicle access, it shall not be required to consider either of the following:
   6.1. Recessed loading docks for four vehicles or less.
   6.2. Conditions where topography makes access from the fire department vehicle to the building impractical or impossible.

Reason: The purpose of this code change proposal is to have a discussion on the need for occupant-use hose in Group B and E occupancies. The proposal is written to remove the occupant-use hose from these occupancies by switching from a Class III to a Class I standpipe system in these occupancies. Occupant-use hose stations are a legacy method of fire protection, going back for decades in model code requirements. In the past 20 years, many fire safety and evacuation plans have all but abandoned the use of occupant-use hose in their training to building occupants; relying on fire extinguisher training (which are required in all new and existing Group B and E occupancies) and the primary focus of evacuation. Also, fire behavior has changed dramatically in the past 30 years due to changes in compartment fire loading. This has created fires that develop faster, create more heat in most situations, and produce greater amount of toxic smoke. Collectively, the ability for occupants to safety and effectively utilize occupant-use hoses without the protection of firefighting gear and respiratory protection has been greatly minimized.

Occupant-use hose is already permitted to not be installed in sprinkler protected buildings that otherwise require standpipes. Even though this seems to be a trade-off by replacing a manual method with an automatic one, the determination of whether occupant-use hose should be based on the occupants ability to suppress a fire rather than the consideration of it as a trade-off.

The Division of Building Standards and Codes regularly receives requests from building owners to remove existing occupant-use hose based on modern fire safety plans. All of these requests are supported by local fire officials as they do not see the benefit of the continued maintenance of such systems. Since the 1990’s, the Division has supported the removal of occupant hoses in existing buildings either by code interpretation or variance.

The change is specific to Group B and E as these occupancies do not have a "3 story height" trigger for automatic sprinkler systems like other occupancies or address a specific condition like stages. Further, Group F and S
occupancies have not been added as they may have a recognized fire brigade that utilize occupant-use hose for
first response operations and are trained under OSHA 29 CFR 1910.156.

**Cost Impact:** Will not increase the cost of construction
The removal of the requirements for occupant-use hose will save on the cost of construction and maintenance of
the hose systems.
2015 International Fire Code

905.3.8 Rooftop gardens and landscaped Vegetative roofs. Buildings or structures that have rooftop gardens or landscaped roofs and that are equipped with a standpipe system shall have the standpipe system extended to the roof level on which the rooftop garden or landscaped roof is located.

2015 International Building Code

Revise as follows:

[BF] 1505.10 Roof gardens and landscaped Vegetative roofs. Roof gardens and landscaped roofs shall comply with Section 1507.16 and shall be installed in accordance with ANSI/SPRI VF-1.

1507.16 Vegetative roofs, roof gardens and landscaped roofs. Vegetative roofs, roof gardens and landscaped roofs shall comply with the requirements of this chapter, Sections 1607.12.3 and 1607.12.3.1 and the International Fire Code.

[BF] 1507.16.1 Structural fire resistance. The structural frame and roof construction supporting the load imposed upon the roof by the vegetative roof roofs shall comply with the requirements of Table 601.

<table>
<thead>
<tr>
<th>OCCUPANCY OR USE</th>
<th>UNIFORM (psf)</th>
<th>CONCENTRATED (pounds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Apartments (see residential)</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>2. Access floor systems</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Office use</td>
<td>50</td>
<td>2000</td>
</tr>
<tr>
<td>Computer use</td>
<td>100</td>
<td>2000</td>
</tr>
<tr>
<td>3. Armories and drill rooms</td>
<td>150^m</td>
<td>—</td>
</tr>
<tr>
<td>4. Assembly areas</td>
<td></td>
<td>—</td>
</tr>
<tr>
<td>Fixed seats (fastened to floor)</td>
<td>60m</td>
<td>—</td>
</tr>
<tr>
<td>Area</td>
<td>Square Feet</td>
<td></td>
</tr>
<tr>
<td>-----------------------------------------------</td>
<td>-------------</td>
<td></td>
</tr>
<tr>
<td>Follow spot, projections and control rooms</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>Lobbies</td>
<td>100m</td>
<td></td>
</tr>
<tr>
<td>Movable seats</td>
<td>100m</td>
<td></td>
</tr>
<tr>
<td>Stage floors</td>
<td>150m</td>
<td></td>
</tr>
<tr>
<td>Platforms (assembly)</td>
<td>100m</td>
<td></td>
</tr>
<tr>
<td>Other assembly areas</td>
<td>100m</td>
<td></td>
</tr>
<tr>
<td>5. Balconies and decks $^h$</td>
<td>Same as occupancy served</td>
<td></td>
</tr>
<tr>
<td>6. Catwalks</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>7. Cornices</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>8. Corridors</td>
<td>100 Same as occupancy served except as indicated</td>
<td></td>
</tr>
<tr>
<td>First floor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other floors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Dining rooms and restaurants</td>
<td>100$^m$</td>
<td></td>
</tr>
<tr>
<td>10. Dwellings (see residential)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Elevator machine room and control room grating (on area of 2 inches by 2 inches)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. Finish light floor plate construction (on area of 1 inch by 1 inch)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. Fire escapes</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>On single-family dwellings only</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>14. Garages (passenger vehicles only)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Category</td>
<td>Minimum Load (lbs)</td>
<td>Maximum Load (lbs)</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------</td>
<td>--------------------</td>
<td>--------------------</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>40m</td>
<td></td>
</tr>
<tr>
<td>15. Handrails, guards and grab bars</td>
<td>See Section 1607.7</td>
<td></td>
</tr>
<tr>
<td>16. Helipads</td>
<td>See Section 1607.6</td>
<td></td>
</tr>
<tr>
<td>17. Hospitals</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corridors above first floor</td>
<td>80</td>
<td>1,000</td>
</tr>
<tr>
<td>Operating rooms, laboratories</td>
<td>60</td>
<td>1,000</td>
</tr>
<tr>
<td>Patient rooms</td>
<td>40</td>
<td>1,000</td>
</tr>
<tr>
<td>18. Hotels (see residential)</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>19. Libraries</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corridors above first floor</td>
<td>80</td>
<td>1,000</td>
</tr>
<tr>
<td>Reading rooms</td>
<td>60</td>
<td>1,000</td>
</tr>
<tr>
<td>Stack rooms</td>
<td>150^b, m</td>
<td>1,000</td>
</tr>
<tr>
<td>20. Manufacturing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heavy</td>
<td>250^m</td>
<td>3,000</td>
</tr>
<tr>
<td>Light</td>
<td>125^m</td>
<td>2,000</td>
</tr>
<tr>
<td>21. Marquees, except one-and two-family dwellings</td>
<td>75</td>
<td>—</td>
</tr>
<tr>
<td>22. Office buildings</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corridors above first floor</td>
<td>80</td>
<td>2,000</td>
</tr>
<tr>
<td>File and computer rooms shall be designed for heavier loads based on anticipated occupancy</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>OCCUPANCY OR USE</td>
<td>UNIFORM (psf)</td>
<td>CONCENTRATED (pounds)</td>
</tr>
<tr>
<td>------------------------------------------------------</td>
<td>---------------</td>
<td>-----------------------</td>
</tr>
<tr>
<td>23. Penal institutions</td>
<td></td>
<td>—</td>
</tr>
<tr>
<td>Cell blocks</td>
<td>40</td>
<td>—</td>
</tr>
<tr>
<td>Corridors</td>
<td>100</td>
<td>—</td>
</tr>
<tr>
<td>24. Recreational uses:</td>
<td></td>
<td>—</td>
</tr>
<tr>
<td>Bowling alleys, poolrooms and similar uses</td>
<td>75 m</td>
<td>—</td>
</tr>
<tr>
<td>Dance halls and ballrooms</td>
<td>100 m</td>
<td>—</td>
</tr>
<tr>
<td>Gymnasiums</td>
<td>100 m</td>
<td>—</td>
</tr>
<tr>
<td>Ice skating rink</td>
<td>250 m</td>
<td>—</td>
</tr>
<tr>
<td>Reviewing stands, grandstands and bleachers</td>
<td>100 c, m</td>
<td>—</td>
</tr>
<tr>
<td>Roller skating rink</td>
<td>100 m</td>
<td>—</td>
</tr>
<tr>
<td>Stadiums and arenas with fixed seats (fastened to floor)</td>
<td>60 c, m</td>
<td>—</td>
</tr>
<tr>
<td>25. Residential</td>
<td></td>
<td>—</td>
</tr>
<tr>
<td>One- and two-family dwellings</td>
<td></td>
<td>—</td>
</tr>
<tr>
<td>Uninhabitable attics without storage</td>
<td>10</td>
<td>—</td>
</tr>
<tr>
<td>Category</td>
<td>Value</td>
<td></td>
</tr>
<tr>
<td>-------------------------------------------------------------------------</td>
<td>-------</td>
<td></td>
</tr>
<tr>
<td>Uninhabitable attics with storage i, j, k</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Habitable attics and sleeping areas k</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>Canopies, including marquees</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>All other areas</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>Hotels and multifamily dwellings</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Private rooms and corridors serving them</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>Public rooms m and corridors serving them</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>26. Roof</td>
<td></td>
<td></td>
</tr>
<tr>
<td>All roof surfaces subject to maintenance workers</td>
<td>300</td>
<td></td>
</tr>
<tr>
<td>Awnings and canopies:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fabric construction supported by a skeleton structure</td>
<td>5 Nonreducible</td>
<td></td>
</tr>
<tr>
<td>All other construction, except one-and two-family dwellings</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Ordinary flat, pitched, and curved roofs (that are not occupiable)</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Primary roof members exposed to a work floor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single panel point of lower chord of roof trusses or any point</td>
<td>2,000</td>
<td></td>
</tr>
<tr>
<td>All other primary roof members</td>
<td>300</td>
<td></td>
</tr>
<tr>
<td>OCCUPANCY OR USE</td>
<td>UNIFORM (psf)</td>
<td>CONCENTRATED (pounds)</td>
</tr>
<tr>
<td>--------------------------------------------------------------------------------</td>
<td>---------------</td>
<td>-----------------------</td>
</tr>
<tr>
<td>30. Stairs and exits</td>
<td></td>
<td></td>
</tr>
<tr>
<td>One- and two-family dwellings</td>
<td>40</td>
<td>300f</td>
</tr>
<tr>
<td>All other</td>
<td>100</td>
<td>300f</td>
</tr>
<tr>
<td>31. Storage warehouses (shall be designed for heavier loads if required for anticipated storage)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stores</td>
<td>First floor</td>
<td>Upper floors</td>
</tr>
<tr>
<td>--------------------------</td>
<td>-------------</td>
<td>--------------</td>
</tr>
<tr>
<td>Heavy</td>
<td>250m</td>
<td></td>
</tr>
<tr>
<td>Light</td>
<td>125m</td>
<td></td>
</tr>
</tbody>
</table>

32. Retail

First floor: 100 m²
Upper floors: 75 m²
Whole sale, all floors: 125 m²

33. Vehicle barriers

See Section 1607.8.3

34. Walkways and elevated platforms (other than exitways)

60 m²

35. Yards and terraces, pedestrians

100 m²

For SI: 1 inch = 25.4 mm, 1 square inch = 645.16 mm²,
1 square foot = 0.0929 m²,
1 pound per square foot = 0.0479 kN/m², 1 pound = 0.004448 kN,
1 pound per cubic foot = 16 kg/m³.

a. Floors in garages or portions of buildings used for the storage of motor vehicles shall be designed for the uniformly distributed live loads of this Table or the following concentrated loads: (1) for garages restricted to passenger vehicles accommodating not more than nine passengers, 3,000 pounds acting on an area of 4 1/2 inches by 4 1/2 inches; (2) for mechanical parking structures without slab or deck that are used for storing passenger vehicles only, 2,250 pounds per wheel.

b. The loading applies to stack room floors that support nonmobile, double-faceted library book stacks, subject to the following limitations:
   1. The nominal book stack unit height shall not exceed 90 inches;
   2. The nominal shelf depth shall not exceed 12 inches for each face; and
   3. Parallel rows of double-faceted book stacks shall be separated by aisles not less than 36 inches wide.

c. Design in accordance with ICC 300.

d. Other uniform loads in accordance with an approved method containing provisions for truck loadings shall be considered where appropriate.

e. The concentrated wheel load shall be applied on an area of 4.5 inches by 4.5 inches.

f. The minimum concentrated load on stair treads shall be applied on an area of 2 inches by 2 inches. This load need not be assumed to act concurrently with the uniform load.

g. Where snow loads occur that are in excess of the design conditions, the structure shall be designed to support the loads due to the increased loads caused by drift buildup or a greater snow design determined by the building official (see Section 1608).

h. See Section 1604.8.3 for decks attached to exterior walls.
i. Uninhabitable attics without storage are those where the maximum clear height between the joists and rafters is less than 42 inches, or where there are not two or more adjacent trusses with web configurations capable of accommodating an assumed rectangle 42 inches in height by 24 inches in width, or greater, within the plane of the trusses. This live load need not be assumed to act concurrently with any other live load requirements.

j. Uninhabitable attics with storage are those where the maximum clear height between the joists and rafters is 42 inches or greater, or where there are two or more adjacent trusses with web configurations capable of accommodating an assumed rectangle 42 inches in height by 24 inches in width, or greater, within the plane of the trusses.

The live load need only be applied to those portions of the joists or truss bottom chords where both of the following conditions are met:

i. The attic area is accessible from an opening not less than 20 inches in width by 30 inches in length that is located where the clear height in the attic is a minimum of 30 inches; and

ii. The slopes of the joists or truss bottom chords are no greater than two units vertical in 12 units horizontal.

The remaining portions of the joists or truss bottom chords shall be designed for a uniformly distributed concurrent live load of not less than 10 pounds per square foot.

k. Attic spaces served by stairways other than the pull-down type shall be designed to support the minimum live load specified for habitable attics and sleeping rooms.

l. Areas of occupiable roofs, other than roof gardens, vegetative roofs, and assembly areas, shall be designed for appropriate loads as approved by the building official. Unoccupied landscaped areas of roofs vegetative roofs shall be designed in accordance with Section 1607.12.3.

m. Live load reduction is not permitted unless specific exceptions of Section 1607.10 apply.

1607.12.3 Occupiable roofs. Areas of roofs that are occupiable, such as vegetative roofs, roof gardens or for assembly or other similar purposes, and marquees are permitted to have their uniformly distributed live loads reduced in accordance with Section 1607.10.

1607.12.3.1 Vegetative and landscaped roofs. The weight of all landscaping materials shall be considered as dead load and shall be computed on the basis of saturation of the soil as determined in accordance with ASTM E 2397. The uniform design live load in unoccupied landscaped areas on roofs shall be 20 psf (0.958 kN/m²). The uniform design live load for occupied landscaped areas on roofs vegetative roofs shall be determined in accordance with Table 1607.1.

Reason: The purpose of this change is to use terminology consistently throughout the I-Codes. The term "vegetative roof" is often used within the I-Codes and is defined in Chapter 2 of IBC. Other undefined terms are used in the I-Codes such as: "roof garden", "vegetated roof" and "landscaped roof". This change is one of three (the other two address IECC and IFC) and will remove undefined terms in IBC where "vegetative roof" is appropriate. Additionally, for 1505.10, the referenced document uses the term "vegetative roof" so the change will align terminology in IBC with the referenced document.

Cost Impact: Will not increase the cost of construction
The proposed change is a clarification and does not change the stringency of existing code requirements so the cost of construction will be unchanged.
F187-16
905.4 (IBC [F] 905.4)
Proponent: Raymond Grill, Arup, representing self (ray.grill@arup.com)

2015 International Fire Code

Revise as follows:

905.4 Location of Class I standpipe hose connections. Class I standpipe hose connections shall be provided in all of the following locations:

1. In every required interior exit stairway, a hose connection shall be provided for each story above and below grade plane. Hose connections shall be located at an intermediate the main floor landing between stories, unless otherwise approved by the fire code official.

2. On each side of the wall adjacent to the exit opening of a horizontal exit.
   Exception: Where floor areas adjacent to a horizontal exit are reachable from an interior exit stairway hose connection by a 30-foot (9144 mm) hose stream from a nozzle attached to 100 feet (30 480 mm) of hose, a hose connection shall not be required at the horizontal exit.

3. In every exit passageway, at the entrance from the exit passageway to other areas of a building.
   Exception: Where floor areas adjacent to an exit passageway are reachable from an interior exit stairway hose connection by a 30-foot (9144 mm) hose stream from a nozzle attached to 100 feet (30 480 mm) of hose, a hose connection shall not be required at the entrance from the exit passageway to other areas of the building.

4. In covered mall buildings, adjacent to each exterior public entrance to the mall and adjacent to each entrance from an exit passageway or exit corridor to the mall. In open mall buildings, adjacent to each public entrance to the mall at the perimeter line and adjacent to each entrance from an exit passageway or exit corridor to the mall.

5. Where the roof has a slope less than four units vertical in 12 units horizontal (33.3-percent slope), a hose connection shall be located to serve the roof or at the highest landing of an interior exit stairway with access to the roof provided in accordance with Section 1011.12.

6. Where the most remote portion of a nonsprinklered floor or story is more than 150 feet (45 720 mm) from a hose connection or the most remote portion of a sprinklered floor or story is more than 200 feet (60 960 mm) from a hose connection, the fire code official is authorized to require that additional hose connections be provided in approved locations.

Reason: This change is proposed in order to make the hose valve location requirements consistent with current requirements in NFPA 14. NFPA 14 requires hose valves to be located at the main floor landing. Installation of hose valves at intermediate landings typically requires separate risers to be run for sprinklers and standpipes. This increases the cost and requires significantly more materials to achieve code compliance.

Cost Impact: Will not increase the cost of construction
This change will reduce the cost by not requiring the additional risers necessary to install hose outlets at intermediate landings.
Proponent: Jeffrey Shapiro, representing National Multifamily Housing Council
(jeff.shapiro@intlcodeconsultants.com)

2015 International Fire Code

905.4 Location of Class I standpipe hose connections. Class I standpipe hose connections shall be provided in all of the following locations:

1. In every required interior exit stairway, a hose connection shall be provided for each story above and below grade plane. Hose connections shall be located at an intermediate landing between stories, unless otherwise approved by the fire code official.

   Exception: A single hose connection shall be permitted to be installed in the open corridor or open breezeway between open stairs that are not greater than 75 ft (22,860 mm) apart.

2. On each side of the wall adjacent to the exit opening of a horizontal exit.

   Exception: Where floor areas adjacent to a horizontal exit are reachable from an interior exit stairway hose connection by a 30-foot (9144 mm) hose stream from a nozzle attached to 100 feet (30 480 mm) of hose, a hose connection shall not be required at the horizontal exit.

3. In every exit passageway, at the entrance from the exit passageway to other areas of a building.

   Exception: Where floor areas adjacent to an exit passageway are reachable from an interior exit stairway hose connection by a 30-foot (9144 mm) hose stream from a nozzle attached to 100 feet (30 480 mm) of hose, a hose connection shall not be required at the entrance from the exit passageway to other areas of the building.

4. In covered mall buildings, adjacent to each exterior public entrance to the mall and adjacent to each entrance from an exit passageway or exit corridor to the mall. In open mall buildings, adjacent to each public entrance to the mall at the perimeter line and adjacent to each entrance from an exit passageway or exit corridor to the mall.

5. Where the roof has a slope less than four units vertical in 12 units horizontal (33.3-percent slope), a hose connection shall be located to serve the roof or at the highest landing of an interior exit stairway with access to the roof provided in accordance with Section 1011.12.

6. Where the most remote portion of a nonsprinklered floor or story is more than 150 feet (45 720 mm) from a hose connection or the most remote portion of a sprinklered floor or story is more than 200 feet (60 960 mm) from a hose connection, the fire code official is authorized to require that additional hose connections be provided in approved locations.

Reason: Correlation with NFPA 14-2016 Section 7.3.2.5. The provision recognizes that there is no significant value to having two standpipes located at opposite ends of an open breezeway or corridor that connects to open stairs since both standpipes are essentially sharing the same environmental space.

Cost Impact: Will not increase the cost of construction
The proposal will not increase the cost of construction. This is a clarification of the requirements of the current code.
906.1 Where required. Portable fire extinguishers shall be installed in all of the following locations:

1. In new and existing Group A, B, E, F, H, I, M, R-1, R-2, R-4 and S occupancies. **Exception:** In Group R-2 occupancies, portable fire extinguishers shall be required only in locations specified in Items 2 through 6 where each dwelling unit is provided with a portable fire extinguisher having a minimum rating of 1-A:10-B:C.
   1. In Group R-2 occupancies, portable fire extinguishers shall be required only in locations specified in Items 2 through 6 where each dwelling unit is provided with a portable fire extinguisher having a minimum rating of 1-A:10-B:C.
   2. In other than ambulatory care facilities and clinic outpatient facilities, Group B occupancies that are equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 and equipped with quick-response sprinklers in accordance with Section 903.3.2 and has a building fire alarm system installed in accordance with this Code, portable fire extinguishers shall be required only in locations specified in Items 2 through 6.

4. Within 30 feet (9144 mm) of commercial cooking equipment.
5. In areas where flammable or combustible liquids are stored, used or dispensed.
6. On each floor of structures under construction, except Group R-3 occupancies, in accordance with Section 3315.1.
7. Where required by the sections indicated in Table 906.1.
8. Special-hazard areas, including but not limited to laboratories, computer rooms and generator rooms, where required by the fire code official.

**Reason:** The intent of this code change is to re-introduce an exception to the base requirement that was previously an IFC code requirement (i.e., see IFC editions 2000 to 2009). However, in the 2012 edition of the IFC, the subject exception was removed. New Exception #2 acknowledges the reliable advantages of an automatic sprinkler system designed to comply with NFPA 13. Group B occupancies (e.g., commercial office buildings) are considered light hazard occupancies and must be protected by quick response sprinklers (see Section 903.3.2). The faster acting sprinklers and the lower fuel load associated with Group B occupancies alleviate the need for portable fire extinguishers to be installed throughout non-hazardous areas within this occupancy. In addition, a building fire alarm system is also required which will initiate occupant notification for which the typical evacuation strategy for this type of occupancy is for occupants to evacuate the building or relocate to a safe area within the building in lieu of delaying evacuation/relocation and having occupants attempt to utilize a portable fire extinguisher to try to extinguish a fire.

Please note that building occupants and employees in Group B occupancies typically are not assigned firefighting duties and therefore are not required to be trained in the use of portable fire extinguishers nor is there a requirement in the IFC stating that portable fire extinguishers have been installed in the building for occupant use. In addition, fire department personnel typically will not use portable fire extinguishers which have been installed within a building due to the uncertainty they have regarding the subject extinguisher operating when needed. Therefore, the
installation of portable fire extinguishers throughout these Group B occupancies which are equipped with an operational sprinkler system utilizing quick-response sprinklers and a code compliant fire alarm system is questionable and definitely not cost effective (e.g., installation costs, maintenance costs, etc.) over the life of a building.

Cost Impact: Will not increase the cost of construction
This code change will reduce the costs of construction, installation, and maintenance over the life of a building by not requiring the installation of portable fire extinguishers in commercial office buildings that are equipped throughout with an automatic sprinkler system utilizing quick-response sprinklers and having a building fire alarm system.
Proponent: Jim Tidwell, Tidwell Code Consulting, representing Fire Equipment Manufacturers’ Association (jimtidwell@tccfire.com)

2015 International Fire Code

Revise as follows:

906.1 Where required. Portable fire extinguishers shall be installed in all of the following locations:

1. In new and existing Group A, B, E, F, H, I, M, R-1, R-2, R-4 and S occupancies.
   Exception: In Group R-2 occupancies, portable fire extinguishers shall be required only in locations specified in Items 2 through 6 where each dwelling unit is provided with a portable fire extinguisher having a minimum rating of 1-A:10-B:C.
   1. In Group R-2 occupancies, portable fire extinguishers shall be required only in locations specified in Items 2 through 6 where each dwelling unit is provided with a portable fire extinguisher having a minimum rating of 1-A:10-B:C.
   2. In Group E occupancies, portable fire extinguishers shall be required only in locations specified in items 2 through 6 where each classroom is provided with a portable fire extinguisher having a minimum rating of 2-A:20-B:C.
4. Within 30 feet (9144 mm) of commercial cooking equipment.
5. In areas where flammable or combustible liquids are stored, used or dispensed.
6. On each floor of structures under construction, except Group R-3 occupancies, in accordance with Section 3315.1.
7. Where required by the sections indicated in Table 906.1.
8. Special-hazard areas, including but not limited to laboratories, computer rooms and generator rooms, where required by the fire code official.

Reason: Schools are now required to develop lockdown plans to protect students and faculty from intruders. The plans effectively prevent access to portable extinguishers normally located in hallways during lockdown situations. Locating extinguishers in classrooms provides accessibility during normal conditions as well as when a school is forced into lockdown. This change provides an option for schools implementing lockdown plans to relocate extinguishers from hallways to classrooms. This is an option, not a requirement.

Cost Impact: Will not increase the cost of construction
This change will provide an option to schools, and is not a requirement; as such, the school management is empowered to make the best decision based upon their individual needs.
Part I
2015 International Fire Code

Revise as follows:

906.2 General requirements. Portable fire extinguishers shall be selected, installed and maintained in accordance with this section and NFPA 10.

Exceptions:

1. The distance of travel to reach an extinguisher shall not apply to the spectator seating portions of Group A-5 occupancies or the indoor practice facilities of Group A-4.
2. Thirty-day inspections shall not be required and maintenance shall be allowed to be once every 3 years for dry-chemical or halogenated agent portable fire extinguishers that are supervised by a listed and approved electronic monitoring device, provided that all of the following conditions are met:
   2.1. Electronic monitoring shall confirm that extinguishers are properly positioned, properly charged and unobstructed.
   2.2. Loss of power or circuit continuity to the electronic monitoring device shall initiate a trouble signal.
   2.3. The extinguishers shall be installed inside of a building or cabinet in a noncorrosive environment.
   2.4. Electronic monitoring devices and supervisory circuits shall be tested every 3 years when extinguisher maintenance is performed.
   2.5. A written log of required hydrostatic test dates for extinguishers shall be maintained by the owner to verify that hydrostatic tests are conducted at the frequency required by NFPA 10.
3. In Group I-3, portable fire extinguishers shall be permitted to be located at staff locations.

Part II
2015 International Building Code

Revise as follows:

[F] 906.2 General requirements. Portable fire extinguishers shall be selected and installed in accordance with this section and NFPA 10.

Exceptions:
1. The distance of travel to reach an extinguisher shall not apply to the spectator seating portions of Group A-5 occupancies or the indoor practice facilities of Group A-4.

2. In Group I-3, portable fire extinguishers shall be permitted to be located at staff locations.

Reason: These indoor practice facilities are not quite spectator facilities; though they may be and, because they are large enclosed spaced, they are also used for events. Nominally they are built for the training of the football and/or soccer teams. The attachment shows how the Architect-Engineer in a recent project asked for a variance to place the portable extinguishers along the perimeter -- common sense; but not tracked explicitly in the IBC. This proposal is submitted to see if some clarity on how to design the fire protection systems for these facilities might help others.

Cost Impact: Will not increase the cost of construction
Clarity on this topic may help other AE’s, thereby reducing design and administrative and enforcement cost. The co-proponent of this proposal is Scott Wood and Steve Donoghue for the University of Michigan Plant Extension Department.
2015 International Fire Code

Revise as follows:

907.1.2 Fire alarm shop drawings. Shop drawings for fire alarm systems shall be prepared in accordance with NFPA 72 and submitted for review and approval prior to system installation, and shall include, but not be limited to, all of the following where applicable to the system being installed:

1. A floor plan that indicates the use of all rooms.
2. Locations of alarm-initiating devices.
3. Locations of alarm notification appliances, including candela ratings for visible alarm notification appliances.
4. Design minimum audibility level for occupant notification.
5. Location of fire alarm control unit, transponders and notification power supplies.
6. Annunciators.
7. Power connection.
8. Battery calculations.
9. Conductor type and sizes.
10. Voltage drop calculations.
11. Manufacturers' data sheets indicating model numbers and listing information for equipment, devices and materials.
12. Details of ceiling height and construction.
13. The interface of fire safety control functions.

Add new text as follows:

907.1.3 Document Access In accordance with NFPA 72, Operating, testing and maintenance instructions, record drawings ("as-builts"), equipment specifications, and a copy of site-specific software shall be provided in a document cabinet labeled "System Record Documents" at an approved location. The document cabinet shall be available for access only to authorized personnel.

Reason: NFPA 72 has enhanced the requirements for documentation and drawings/submittals. This code change will eliminate any conflicts and confusion by the referenced standard (NFPA 72) and IFC. This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire safety and hazardous materials in new and existing buildings and facilities and the protection of life and property in wildland urban interface areas. In 2014 and 2015 the Fire-CAC has held 5 open meetings. In addition, there were numerous conference calls, Regional Work Group and Task Group meetings for the current code development cycle, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC
Cost Impact: Will not increase the cost of construction
There are no cost increases as this is what is already required in NFPA 72.
F193-16
907.2.1 (IBC [F] 907.2.1)

Proponent: Stephen DiGiovanni, Clark County Department of Building and Fire Prevention, representing Southern Nevada Chapter of ICC (sdigiovanni@clarkcountynv.gov)

2015 International Fire Code

Revise as follows:

907.2.1 Group A. A manual fire alarm system that activates the occupant notification system in accordance with Section 907.5 shall be installed in Group A occupancies where the occupant load due to the assembly occupancy is 300 or more or is more than 100 persons above or below the lowest level of exit discharge. Group A occupancies not separated from one another in accordance with Section 707.3.10 of the International Building Code shall be considered as a single occupancy for the purposes of applying this section. Portions of Group E occupancies occupied for assembly purposes shall be provided with a fire alarm system as required for the Group E occupancy.

Exception: Manual fire alarm boxes are not required where the building is equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 and the occupant notification appliances will activate throughout the notification zones upon sprinkler water flow.

Reason: The Fire Code requires both Group B and Group M having an occupant load of over 100 persons above or below the lowest level of exit discharge to be provided with a manual fire alarm system that activates the occupant notification system in accordance with Section 907.5. However, the current code for Group A does not have this requirement. It seems inconsistent that a Group B or M occupancy have a higher level of protection than an A occupancy. Historically Group A occupancies have had greater loss of life and injuries than Group B and Group M occupancies, and should be provided, at a minimum, the same level of protection. Exiting from a level of a building other than the level of exit discharge takes additional time, and early activation of an alarm will provide more time for evacuation.

Cost Impact: Will increase the cost of construction
For Group A occupancies that have an occupant load of 101 to 299 and are located on a level other than the level of exit discharge, this proposal will increase the cost of construction due to the requirement for a fire alarm system.
F194-16
907.2.1 (IBC [F] 907.2.1)

Proponent: Bob Morgan, representing Fort Worth Fire Department

2015 International Fire Code

907.2.1 Group A. A manual fire alarm system that activates the occupant notification system in accordance with Section 907.5 shall be installed in Group A occupancies where the occupant load due to the assembly occupancy is 300 or more, or where the Group A occupant load is more than 100 persons above or below the lowest level of exit discharge. Group A occupancies not separated from one another in accordance with Section 707.3.10 of the International Building Code shall be considered as a single occupancy for the purposes of applying this section. Portions of Group E occupancies occupied for assembly purposes shall be provided with a fire alarm system as required for the Group E occupancy.

Exception: Manual fire alarm boxes are not required where the building is equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 and the occupant notification appliances will activate throughout the notification zones upon sprinkler water flow.

Reason: This change would serve to increase the fire alarm requirement where the A occupancy is located on a level other than that of exit discharge to be at least as strenuous as that of a B occupancy, which has the same 100 occupant load criteria for such.

Cost Impact: Will increase the cost of construction
This will increase the cost of construction where A occupancies meet the criteria established by the change.
F195-16
907.2.1 (IBC [F] 907.2.1)

Proponent: Michael O'Brian representing the Fire Code Action Committee (FCAC@iccsafe.org)

2015 International Fire Code

Add new text as follows:

907.2.1 Group A. A manual fire alarm system that activates the occupant notification system in accordance with Section 907.5 shall be installed in Group A occupancies where a required automatic sprinkler system is installed or where the occupant load due to the assembly occupancy is 300 or more. Group A occupancies not separated from one another in accordance with Section 707.3.10 of the International Building Code shall be considered as a single occupancy for the purposes of applying this section. Portions of Group E occupancies occupied for assembly purposes shall be provided with a fire alarm system as required for the Group E occupancy.

   Exception: Manual fire alarm boxes are not required where the building is equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 and the occupant notification appliances will activate throughout the notification zones upon sprinkler water flow.

Reason: The intent of this proposal is to provide a means to alert occupants in the event of a sprinkler activation. It is intended to provide notification so that occupants are aware of the sprinkler activation and can safely egress from the building. The code already requires a means to monitor the sprinkler system and generally this is done using a fire alarm panel so that is already installed. So the only additional cost would be the installation of the notification devices.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire safety and hazardous materials in new and existing buildings and facilities and the protection of life and property in wildland urban interface areas. In 2014 and 2015 the Fire-CAC has held 5 open meetings. In addition, there were numerous conference calls, Regional Work Group and Task Group meetings for the current code development cycle, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC

Cost Impact: Will increase the cost of construction
This may increase the cost if notification devices were not already being installed.
Delete without substitution:

907.2.10.1 Manual fire alarm system. A manual fire alarm system that activates the occupant notification system in accordance with Section 907.5 shall be installed in Group R-4 occupancies.

Exceptions:
1. A manual fire alarm system is not required in buildings not more than two stories in height where all individual sleeping units and contiguous attic and crawl spaces to those units are separated from each other and public or common areas by not less than 1-hour fire partitions and each individual sleeping unit has an exit directly to a public way, egress court or yard.
2. Manual fire alarm boxes are not required throughout the building where all of the following conditions are met:
   2.1. The building is equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2.
   2.2. The notification appliances will activate upon sprinkler water flow.
   2.3. Not fewer than one manual fire alarm box is installed at an approved location.
   2.4. Manual fire alarm boxes in resident or patient sleeping areas shall not be required at exits where located at all nurses' control stations or other constantly attended staff locations, provided such stations are visible and continuously accessible and that the distances of travel required in Section 907.4.2.1 are not exceeded.

907.2.10.2 Automatic smoke detection system. An automatic smoke detection system that activates the occupant notification system in accordance with Section 907.5 shall be installed in corridors, waiting areas open to corridors and habitable spaces other than sleeping units and kitchens.

Exceptions:
1. Smoke detection in habitable spaces is not required where the facility is equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1.
2. An automatic smoke detection system is not required in buildings that do not have interior corridors serving sleeping units and where each sleeping unit has a means of egress door opening directly to an exit or to an exterior exit access that leads directly to an exit.
**TABLE 1103.1**  
**OCCUPANCY AND USE REQUIREMENTS**

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**SECTION**  
**USE OCCUPANCY CLASSIFICATION**

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1103.7.7 - Group R-4. A manual fire alarm system that activates the occupant notification system in accordance with Section 907.5 shall be installed in existing Group R-4 residential care/assisted living facilities in accordance with Section 907.2.10.1.

Exceptions:

1. Where there are interconnected smoke alarms meeting the requirements of Section 907.2.11 and there is not less than one manual fire alarm box per floor arranged to continuously sound the smoke alarms.

2. Other manually activated, continuously sounding alarms approved by the fire code official.

2015 International Building Code

Revise as follows:

[F] 420.6 Fire alarm systems and smoke alarms. Fire alarm systems and smoke alarms shall be provided in Group I-1, R-1, and R-2 and R-4 occupancies in accordance with Sections 907.2.6, 907.2.8, and 907.2.9 and 907.2.10, respectively. Single- or multiple-station smoke alarms shall be provided in Groups I-1, R-2, R-3 and R-4 in accordance with Section 907.2.11.

2015 International Existing Building Code

Delete without substitution:

804.4.1.7 - Group R-4. A fire alarm system shall be installed in work areas of Group R-4 residential care/assisted living facilities as required by the International Fire Code for existing Group R-4 occupancies.

Reason: The requirements for a manual fire alarm system and an automatic smoke detection system in a facility with 16 or fewer residents is unwarranted. Such a system would not be required in an apartment building until there were at least 16 apartments — which is potentially many more people. Group R-4 is required to have single- and multiple-smoke alarms. Some of the language ‘nurse’s control stations’ and ‘constantly attended staff locations’ is not applicable to group homes of this small size.
This is not an attempt to remove the requirement for single- and multiple-station smoke alarms in Section 907.2.11.2. For correlation, the mandatory retrofit requirement for this system should also be deleted from the IFC Chapter 11 Construction Requirements for Existing Buildings and the reference to the same in the IIEBC.

This proposal is submitted by the ICC Code Technology Committee (CTC). The ICC Board has decided to sunset the CTC. The sunset plan includes re-assigning many of the CTC Areas of Study to the applicable Code Action Committee (CAC). The two remaining CTC Areas of Study are Care Facilities and Elevator Lobbies/WTC Elevator issues. This proposal falls under the Care Facilities Area of Study. In 2014 and 2015 ICC CTC Committee has held 4 open meetings and numerous Work Group meetings and conference calls for the current code development cycle which included members of the committees as well as any interested party to discuss and debate the proposed changes. Information on the CTC, including: the sunset plan; meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the CTC website CTC.

**Cost Impact:** Will not increase the cost of construction
This is a logical reduction in requirements.
Add new text as follows:

907.2.13.3 **Multi-channel voice evacuation** Voice evacuation systems for high-rise buildings shall be multi-channel systems.

**Reason:** It’s common policy within jurisdictions for high-rise buildings to evacuate the floor of alarm, the floor above and the floor or floors below the alarm floor. A fire alarm system that has multiple channels allows one area of the building to receive an evacuation message, while other areas of the building can be given other instructions.

**Cost Impact:** Will increase the cost of construction
For those fire alarm notification systems that previously would have been allowed to be installed in high-rise buildings as a single-channel system, this code proposal will increase the cost of the fire alarm notification system.
Proponent: John Williams, CBO, representing Adhoc Healthcare Committee (AHC@iccsafe.org)

2015 International Fire Code

Revise as follows:

907.2.2 Group B. A manual fire alarm system shall be installed in Group B occupancies where one of the following conditions exists:

1. The combined Group B occupant load of all floors is 500 or more.
2. The Group B occupant load is more than 100 persons above or below the lowest level of exit discharge.
3. The fire area contains

   Exception: Manual fire alarm boxes are not required where the building is equipped throughout with an ambulatory care facility automatic sprinkler system installed in accordance with Section 903.3.1.1 and the occupant notification appliances will activate throughout the notification zones upon sprinkler water flow.

Exception: Manual fire alarm boxes are not required where the building is equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 and the occupant notification appliances will activate throughout the notification zones upon sprinkler water flow.

907.2.2.1 Ambulatory care facilities. Fire areas containing ambulatory care facilities shall be provided with a manual fire alarm system. Fire areas containing ambulatory care facilities shall be provided with an electronically supervised automatic smoke detection system installed within the ambulatory care facility and in public use areas outside of tenant spaces, including public corridors and elevator lobbies.

   Exception: Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 provided the occupant notification appliances will activate throughout the notification zones upon sprinkler water flow.

Add new text as follows:

K102.4 Manual fire alarm system. Fire areas containing an ambulatory care facility shall have a manual fire alarm system installed throughout the fire area.

Reason: The AHC is proposing a revision to address some of the oversights in the I-Codes of long-standing and operational requirements for hospitals and healthcare facilities that has not been specifically addressed. The requirements being proposed in this code change have been long-standing provisions of the construction and operational requirements for healthcare facilities.

In the last code cycle, the requirement for a manual fire alarm system was correlated with the IBC for consistency with CMS requirements for ambulatory healthcare facilities and was passed. Although Ambulatory Healthcare Facilities may be classified as a B-Business Occupancy, the intent was not to allow an exception for an Ambulatory Healthcare Facility’s provision of a manual fire alarm system when the occupant load is under 100 persons. Since there have been questions presented to staff and the ICC Adhoc Healthcare Committee, we are proposing this reorganization to IFC/IBC Section 907.2.2 to provide additional clarification for the specific requirements for Ambulatory Healthcare Facilities. IBC Section 907.2.2.1 is the new subsection with the same requirements provided for under the previous code; it is being proposed to clearly identify where manual fire alarms are required and when any exception to this requirement would be applicable to the Ambulatory Healthcare Facility.
This proposal is submitted by the ICC Ad Hoc Committee on Healthcare (AHC). The AHC was established by the ICC Board to evaluate and assess contemporary code issues relating to hospitals and ambulatory healthcare facilities. This is a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. In 2014 and 2015 the ICC Ad Hoc Committee has held 4 open meetings and numerous Work Group meetings and conference calls for the current code development cycle which included members of the committees as well as any interested party to discuss and debate the proposed changes. Information on the AHC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the AHC effort can be downloaded from the AHC website at: AHC.

**Cost Impact:** Will not increase the cost of construction
This is already a requirement in the code and the intent was never to have the ambulatory healthcare facility utilize the exception for an occupant load of less than one hundred persons.
2015 International Fire Code

Revise as follows:

907.2.6 Group I. A manual fire alarm system that activates the occupant notification system in accordance with Section 907.5 shall be installed in Group I occupancies. An automatic smoke detection system that activates the occupant notification system in accordance with Section 907.5 shall be provided in accordance with Sections 907.2.6.1, 907.2.6.2 and 907.2.6.3.3.

Activation of the fire alarm system in Group I-2 or I-3 occupancies with more than two smoke compartments shall initiate a signal using an emergency voice/alarm communications system in accordance with Section 907.5.2.2.

Exceptions:

1. Manual fire alarm boxes in sleeping units of Group I-1 and I-2 occupancies shall not be required at exits if located at all care providers' control stations or other constantly attended staff locations, provided such stations are visible and continuously accessible and that the distances of travel required in Section 907.4.2.1 are not exceeded.

2. Occupant notification systems are not required to be activated where private mode signaling installed in accordance with NFPA 72 is approved by the fire code official and staff evacuation responsibilities are included in the fire safety and evacuation plan required by Section 404.

Reason: Group I-2 and I-3 occupancies that have more than two smoke compartments are using a defend in place approach. These occupancies need to have information on what to do during an event. Having only horn/storbes does not provide the required information. The use of an emergency voice/alarm communications system will provide the information needed for each smoke compartment. Please note that this code change will effect only non high-rise buildings with more than two smoke compartments.

Cost Impact: Will increase the cost of construction

Currently these non high-rise buildings may install only horn/strobe notification devices, with the installation of an emergency voice/alarm communications system, the fire department can now provide information and instructions to each smoke compartment.
F200-16
907.2.8.1 (IBC [F] 907.2.8.1), 907.2.9.1 (IBC [F] 907.2.9.1)

Proponent: William Hall, Portland Cement Association (jhall@cement.org)

2015 International Fire Code

Revise as follows:

907.2.8.1 Manual fire alarm system. A manual fire alarm system that activates the occupant notification system in accordance with Section 907.5 shall be installed in Group R-1 occupancies.

Exceptions:
1. A manual fire alarm system is not required in buildings not more than two stories in height where all individual sleeping units and contiguous attic and crawl spaces to those units are separated from each other and public or common areas by not less than 1-hour fire partitions and each individual sleeping unit has an exit directly to a public way, egress court or yard.
2. Manual fire alarm boxes are not required throughout the building where all of the following conditions are met:
   2.1. The building is equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2.
   2.2. The notification appliances will activate upon sprinkler water flow.
   2.3. Not fewer than one manual fire alarm box is installed at an approved location.

907.2.9.1 Manual fire alarm system. A manual fire alarm system that activates the occupant notification system in accordance with Section 907.5 shall be installed in Group R-2 occupancies where any of the following conditions apply:

1. Any dwelling unit or sleeping unit is located three or more stories above the lowest level of exit discharge.
2. Any dwelling unit or sleeping unit is located more than one story below the highest level of exit discharge of exits serving the dwelling unit or sleeping unit.
3. The building contains more than 16 dwelling units or sleeping units.

Exceptions:
1. A fire alarm system is not required in buildings not more than two stories in height where all dwelling units or sleeping units and contiguous attic and crawl spaces are separated from each other and public or common areas by not less than 1-hour fire partitions and each dwelling unit or sleeping unit has an exit directly to a public way, egress court or yard.
2. Manual fire alarm boxes are not required where the building is equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2 and the occupant notification appliances will automatically activate throughout the notification zones upon a sprinkler water flow.
3. A fire alarm system is not required in buildings that do not have interior corridors serving dwelling units and are protected by an approved automatic sprinkler system installed in accordance with
Section 903.3.1.1 or 903.3.1.2, provided that *dwelling units* either have a *means of egress* door opening directly to an exterior *exit* access that leads directly to the *exits* or are served by open-ended *corridors* designed in accordance with Section 1027.6, Exception 3.

**Reason:** Currently manual pull stations are not required at exits in R-1 and R-2 occupancies when an NFPA 13R fire sprinkler system is installed. The exception for 907.2.8.1 permits one manual pull station at an approved location, which many times is located in the main riser room away from public access. While this exception may be appropriate for NFPA 13 systems where all combustible concealed areas are either sprinkled or dealt with by other approved means, NFPA 13R systems do have NOT the benefit of providing automatic alarm annunciation via the water flow alarm as well as offsite communication (or other) to emergency responders. Fire located in the attic or other combustible concealed spaces will go undetected until observed by someone or possibly a smoke detector on the top occupied floor after the fire has burned through and smoke fills the areas. An observer may very well spot the fire and call it in, however, that action will not trip the alarm system alerting the occupants. Manual pull stations are an effective way to trip the fire alarm and provide the earliest warning possible to other occupants. How else would the alarm be tripped if fire is in the attic area, unless the person spotting the fire knows where the one and only pull station is? This proposal removes NFPA 13R from the exception and will require manual pull stations at exits in R-1 and R-2 occupancies using NFPA 13R systems.

**Cost Impact:** Will increase the cost of construction
This proposal will increase the cost of construction negligibly by requiring manual pull stations at the exits for an already required alarm system.
2015 International Fire Code

Revise as follows:

907.2.9.1 Manual fire alarm system. A manual fire alarm system that activates the occupant notification system in accordance with Section 907.5 shall be installed in Group R-2 occupancies where any of the following conditions apply:

1. Any dwelling unit or sleeping unit is located three or more stories above the lowest level of exit discharge.
2. Any dwelling unit or sleeping unit is located more than one story below the highest level of exit discharge of exits serving the dwelling unit or sleeping unit.
3. The building contains more than 16 dwelling units or sleeping units.

Exceptions:

1. A fire alarm system is not required in buildings not more than two stories in height where all dwelling units or sleeping units and contiguous attic and crawl spaces are separated from each other and public or common areas by not less than 1-hour fire partitions and each dwelling unit or sleeping unit has an exit directly to a public way, egress court or yard.
2. Manual fire alarm boxes are not required where the building is equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2 and the occupant notification appliances will automatically activate throughout the notification zones upon a sprinkler water flow.
3. A fire alarm system is not required in buildings that do not have interior corridors serving dwelling units and are protected by an approved automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2, provided that dwelling units either have a means of egress door opening directly to an exterior exit access that leads directly to the exits or are served by open-ended corridors designed in accordance with Section 1027.6, Exception 3.

Reason: This code change is necessary due to the unintended consequences of an editorial code change that was approved and published since the 2009 IBC/IFC as a result of code change E5-06/07. The code change revised the definition "EXIT DISCHARGE, LEVEL OF" for consistency with NFPA 101 the Life Safety Code. The reason statement in the code change or a subsequent code change in the following cycle EB-07/08 clearly state the proponent's intent to not change code requirements. The change in the definition has had ripple effects affecting triggers for fire alarm in Group R-2, triggers for accessible means of egress etc. Many Code Officials still enforce the requirements based on the prior definition so there has been no change in code application.

Prior to 2009, the level of exit discharge was "The horizontal plane located at the point at which an exit terminates and an exit discharge begins." Based on that definition, the ground floor was the first story above the level of exit discharge. Therefore, the requirement for a manual fire alarm system was triggered at by a three story building.

Since the 2009 IBC/IFC, the level of exit discharge is defined as "The story at the point at which an exit terminates and an exit discharge begins." This means that the ground floor is the level of exit discharge and the floor above would be the story above the level of exit discharge. Based on that definition, the three stories above the level of exit discharge would be the 4th story.
This proposal will clarify that when the R-2 consists of the level of exit discharge and 2 stories above, then the manual fire alarm system is required.

**Cost Impact:** Will not increase the cost of construction

Most building and fire officials have triggered fire alarms based on the old definition when enforcing the 2009 IBC/IFC to the present.
2015 International Fire Code

SECTION 202 DEFINITIONS

FIRE SAFETY EMERGENCY CONTROL FUNCTIONS. Building, fire and fire emergency control functions—elements or systems that are intended to initiate by the fire alarm or signaling system and either increase the level of life safety for occupants or to control the spread of the harmful effects of fire or other dangerous products.

907.3 Fire safety Emergency control functions. Automatic fire detectors utilized for the purpose of performing fire safety emergency control functions shall be connected to the building's fire alarm control unit where a fire alarm system is required by Section 907.2. Detectors shall, upon actuation, perform the intended function and activate the alarm notification appliances or activate a visible and audible supervisory signal at a constantly attended location. In buildings not equipped with a fire alarm system, the automatic fire detector shall be powered by normal electrical service and, upon actuation, perform the intended function. The detectors shall be located in accordance with NFPA 72.

907.3.4 Wiring. The wiring to the auxiliary devices and equipment used to accomplish the fire safety emergency control functions shall be monitored for integrity in accordance with NFPA 72.

907.4.3.1 Automatic sprinkler system. For conditions other than specific fire safety emergency control functions noted in Section 907.3, in areas where ambient conditions prohibit the installation of smoke detectors, an automatic sprinkler system installed in such areas in accordance with Section 903.3.1.1 or 903.3.1.2 and that is connected to the fire alarm system shall be approved as automatic heat detection.

Reason: This change updates this terminology to match the current terminology in NFPA 72. Since 2010, NFPA 72 has been titled National Fire Alarm and Signaling Code, and emergency control functions is now used because some functions may not strictly be for fire situations, such as interfacing with a Mass Notification System.

Cost Impact: Will not increase the cost of construction
This is a simple change in terminology and will not impact the cost of construction.
F203-16
IFC: 907.3.2 (IBC: [F] 907.3.2)

Proponent: Michael O'Brian, representing FCAC (email protected)

2015 International Fire Code

Revise as follows:

907.3.2 Delayed egress locks Special locking systems. Where delayed egress locks special locking systems are installed on means of egress doors in accordance with Section Sections 1010.1.9.6, 1010.1.9.7 or 1010.1.9.8, an automatic smoke or heat detection system shall be installed as required by that section.

Reason: Revising this section for correlation to "special locking systems" of Sections 1010.1.9.6 (Controlled egress doors in Groups I-1 and I-2), 1010.1.9.7 (Delayed egress), or 1010.1.9.8 (Sensor release of electrically locked egress doors) as each of these three sections for special locking systems require subsequent action by their locking system upon actuation of the automatic sprinkler system or automatic fire detection system. Also, deleting "smoke or heat" in this sentence as the specifics of the detection system does not need to be specified in this sentence.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire safety and hazardous materials in new and existing buildings and facilities and the protection of life and property in wildland urban interface areas. In 2014 and 2015 the Fire-CAC has held 5 open meetings. In addition, there were numerous conference calls, Regional Work Group and Task Group meetings for the current code development cycle, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC

Cost Impact: Will not increase the cost of construction
The revisions are correlative. No technical revisions intended.
2015 International Fire Code

Revise as follows:

907.4.2.1 Location. Manual fire alarm boxes shall be located not more than 5 feet (1524 mm) from the entrance to each exit. In buildings not protected by an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2, additional manual fire alarm boxes shall be located so that the exit access distance of travel distance to the nearest box does not exceed 200 feet (60 960 mm).

Reason: This is a correction in terminology. While fire alarm boxes may be located along the egress path, in the route measured as the exit access travel distance, the distance to the manual fire alarm boxes is not the "exit access travel distance".

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire safety and hazardous materials in new and existing buildings and facilities and the protection of life and property in wildland urban interface areas. In 2014 and 2015 the Fire-CAC has held 5 open meetings. In addition, there were numerous conference calls, Regional Work Group and Task Group meetings for the current code development cycle, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC

Cost Impact: Will not increase the cost of construction
This is only a clarification issue and will not affect the cost of construction.
Add new text as follows:

**907.5.2.1 Audible alarms.** Audible alarm notification appliances shall be provided and emit a distinctive sound that is not to be used for any purpose other than that of a fire alarm.

**Exceptions:**

1. Audible alarm notification appliances are not required in critical care areas of Group I-2 Condition 2 occupancies that are in compliance with Section 907.2.6, Exception 2.
2. A visible alarm notification appliance installed in a nurses' control station or other continuously attended staff location in a Group I-2 Condition 2 suite shall be an acceptable alternative to the installation of audible alarm notification appliances throughout the suite in Group I-2 Condition 2 occupancies that are in compliance with Section 907.2.6, Exception 2.
3. Where provided, audible notification appliances located in each occupant evacuation elevator lobby in accordance with Section 3008.9.1 of the International Building Code shall be connected to a separate notification zone for manual paging only.
4. In areas of buildings serving persons with developmental disabilities, occupant notification systems are not required to be activated where private mode signaling installed in accordance with NFPA 72 is approved by the fire code official and staff evacuation responsibilities are included in the fire safety and evacuation plan required by Section 404.

**907.5.2.3 Visible alarms.** Visible alarm notification appliances shall be provided in accordance with Sections 907.5.2.3.1 through 907.5.2.3.3.

**Exceptions:**

1. Visible alarm notification appliances are not required in alterations, except where an existing fire alarm system is upgraded or replaced, or a new fire alarm system is installed.
2. Visible alarm notification appliances shall not be required in exits as defined in Chapter 2.
3. Visible alarm notification appliances shall not be required in elevator cars.
4. Visual alarm notification appliances are not required in critical care areas of Group I-2 Condition 2 occupancies that are in compliance with Section 907.2.6, Exception 2.
5. In areas of buildings serving persons with developmental disabilities, occupant notification systems are not required to be activated where private mode signaling installed in accordance with NFPA 72 is approved by the fire code official and staff evacuation responsibilities are included in the fire safety and evacuation plan required by Section 404.

**Reason:** Persons with developmental disabilities addresses a variety of conditions including cerebral palsy, autism, and other neurological impairments that cause mental and/or physical conditions. The elevated sound pressure of audible notification devices and the strobing visual notification devices can cause
sensory overload to persons with developmental disabilities; causing such persons to become incapacitated or to be diminished in their ability to rationally respond to the activation. Many persons with developmental disabilities are able to self-evacuate or make decisions regarding their safety as long as their impairments are not adversely effected. The purpose of this code change proposal is to permit private mode signaling similar to that permitted in the healthcare requirements to address this need.

NFPA 72 18.4.4 permits the audible requirements to be reduced or eliminated when approved by the AHJ and visible notification is provided by Section 18.5. Section 18.5 also permits a private mode for visual notification that is based on an evaluation that is approved by the AHJ. Collectively, this proposal would require that any use of private mode signaling for either audible or visual notification is approved by the AHJ.

The proposal also adds the requirement for incorporation of the specific population served by the private mode signaling to be incorporated into the fire safety and evacuation plans.

The scope of the proposal is not to address one specific occupancy since persons with developmental disabilities reside in a variety of residential and institutional settings, as well as educational and work environments.

In our experience, a fire alarm notification system that does not take into account the needs of persons with developmental disabilities has a higher probability of further complicating the evacuation of occupants. The startling of patients can cause either physical incapacitation, hiding behavior, or irrational actions that make the increases the burden on staff in charge of building evacuation. Since the fire safety and evacuation plan is part of this proposal, staffing levels and responsibilities should be part of such plan.

**Cost Impact:** Will not increase the cost of construction

This proposal changes the sequence of operation of fire alarm systems in most cases.
F206-16
907.5.2.2.4 (IBC [F] 907.5.2.2.4)

Proponent: Adria Reinertson, Riverside County Fire Department, representing California Fire Chiefs Association (adriar@moval.org)

2015 International Fire Code

Revise as follows:

907.5.2.2.4 Emergency voice/alarm communication captions. Where stadiums, arenas and grandstands are required to caption have 15,000 fixed seats or more and provide audible public announcements in accordance with Section 1108.2.7.3 of the International Building Code, the emergency/voice alarm communication system shall also provide pre-recorded or real-time captions. Prerecorded or live emergency captions shall be from an approved location constantly attended by personnel trained to respond to an emergency.

Reason: This modification is proposing to add existing language from IBC Section 1108.2.7.3 to this section. This proposal correlates the access provisions with Chapter 9 by adding the scoping language. This proposal further affords the fire official, building official and other users of the code to design and enforce in accordance with Chapter 9 where both fire alarm and emergency voice alarm communication systems provisions are found. Additionally, the provisions that are contained in IBC 1108.2.7.3 have not been found in the US DOJ access guidelines. Jurisdictions that do not adopt IBC Chapter 11 and rely on the US DOJ access guidelines for accessibility are missing provisions as referenced in IBC/IFC 907.5.2.2.4. This proposal would correct this issue for those jurisdictions.

Cost Impact: Will not increase the cost of construction
This is a correlation of codes for better user design and enforcement.
2015 International Fire Code

Add new text as follows:

907.5.2.2.6 **Intelligibility.** Intelligibility design and testing shall comply with this section.

907.5.2.2.6.1 **Intelligibility Design Documentation.** Emergency voice/alarm communication system plan submittals shall be provided to the fire code official.

907.5.2.2.6.1.1 **Plan Submittal.** As required by the fire code official, plan submittals shall indicate graphically and in tabular form each acoustically distinguishable space (ADS) in accordance with NFPA 72. The submittal shall designate where intelligibility is required and where intelligibility testing is required.

907.5.2.2.6.2 **Intelligibility Testing.** Intelligibility test methods shall be approved to the fire code official.

907.5.2.2.6.2.1 **Quantitative Measurements.** Where intelligibility testing is performed through quantitative measurements the minimum measured Speech Transmission Index (STI) shall not be less than 0.50 (0.70 Common Intelligibility Scale (CIS)) and an average STI shall not be less than 0.55 (0.74 CIS) throughout each acoustically distinguishable space.

907.5.2.2.6.2.2 **Quantitative Measurement Signal Source.** Where intelligibility testing is performed through quantitative measurements the test signal source shall use pink noise or a signal source approved by the fire code official.

907.5.2.2.6.2.3 **Quantitative Measurement Prohibited Signal Source.** Where intelligibility testing is performed through quantitative measurements use of a prerecorded voice alarm emergency evacuation message is prohibited.

**Reference standards type:** This is an update to reference standard(s) already in the ICC Code Books

**Add new standard(s) as follows:**

NFPA 72 is already a referenced standard. No new referenced standards are required as a result of this proposal.

It can be viewed here:


**Reason:** This code proposal seeks to close a gap between the International Fire Code and NFPA 72 with respect to intelligibility. The gap is the lack of requirements in the IFC for design submittals and direction for those using quantitative measurement to determine compliance. The IFC requires voice evacuation systems in certain A and E occupancies. The IFC does not stipulate any intelligibility criteria for these systems. An emergency voice alarm/alarms communication system is only effective when those hearing the alarm understand and comprehend the instruction being provided. Voice instructions must be capable of being understood, clear and comprehensible. The acoustic environment must be addressed during design and construction. Intelligibility focuses on being able to understand what is being said over the voice alarm system. Intelligibility design considers three main characteristics of the space under consideration: The spatial acoustics, ambient environment, occupant uses.

Through the design review process the system designer designates where intelligibility testing is required. The designer will also designate where intelligibility testing is required. The exact testing method to be used could be any of the methods described in NFPA 72. The fire code official will approve the testing method to be used.
**Bibliography:** The following is a link to NFPA Fire Research Foundation report related to Emergency Communication Systems and Intelligibility:

**Cost Impact:** Will increase the cost of construction
For entities not already enforcing the intelligibility requirements found in NFPA 72 this code change proposal will increase the cost of construction. This code change proposal will be cost neutral for entities enforcing intelligibility plan submittal and inspection requirements found in NFPA 72.
F208-16
907.5.2.3.2 (IBC [F] 907.5.2.3.2)

Proponent: Thomas Daly, On behalf of the American Hotel & Lodging Association, representing American Hotel & Lodging Association (tom.daly@thehscg.com)

2015 International Fire Code

Revise as follows:

907.5.2.3.2 Groups I-1, R-1 and R-1 R-2 dormitories. Group I-1, R-1 and R-1 R-2 dormitories accessing dwelling units or sleeping units in accordance with Table 907.5.2.3.2 shall be provided with a visible alarm notification appliance, activated by both the in-room smoke alarm and the building fire alarm system. Visible alarm notification appliances shall be installed to cover all habitable spaces.

Reason: The proposed code change clarifies the intent of the code to require a visible alarm notification appliance in each room of multi-room accessible accommodations in Group I-1, R-1 and R-2 dormitory facilities. The change would have a minor impact on newly constructed facilities in these occupancy groups.

Cost Impact: Will increase the cost of construction
The change would impose a minor increase on newly constructed facilities in these occupancy groups.
2015 International Fire Code

Add new text as follows:

907.5.2.3.2 Groups I-1 and R-1. Group I-1 and R-1 dwelling units or sleeping units in accordance with Table 907.5.2.3.2 shall be provided with a visible alarm notification appliance, activated by both the in-room smoke alarm and the building fire alarm system. Such units shall be dispersed among the various classes of units. At least one unit is required to be an Accessible unit in accordance with Sections 1107.5.1.1 or 1107.6.1.1 of the International Building Code and shall also include a visible notification appliance. Not more than 10 percent of units required to be an Accessible unit shall be used to satisfy the minimum number of units required to provide visible alarm notification appliances.

<table>
<thead>
<tr>
<th>NUMBER OF SLEEPING UNITS</th>
<th>SLEEPING ACCOMMODATIONS WITH VISIBLE ALARMS</th>
</tr>
</thead>
<tbody>
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</tr>
<tr>
<td>26 to 50</td>
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<td>76 to 100</td>
<td>9</td>
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<td>5% of total</td>
</tr>
<tr>
<td>1,001 and over</td>
<td>50 plus 3 for each 100 over 1,000</td>
</tr>
</tbody>
</table>
**Reason:** The intent is coordination with 2010 ADA Section 224.5.

1) Dispersion - The rooms with visible alarms are required to be dispersed by the classes of units. The proposed language for dispersion matches that used in Section IBC 1107.5.1.1.

2) Overlap - The current language would allow all the Accessible rooms to meet the requirements for both wheelchair access and visible alarms. With the number required for Accessible rooms, this means that with the current language, approximately 50% of the visible alarm rooms could also be Accessible rooms. Since the visible alarms are intended to address the need of persons with hearing impairments, there should not be such an overlap. The proposed language is has the intent of the 2010 ADA, but using IBC terminology and references.

Below is the language from the 2010 ADA Standard.

**F224.4/224.4 Guest Rooms with Communication Features.** In transient lodging facilities, guest rooms with communication features complying with 806.3 shall be provided in accordance with Table F224.4.

**F224.5/224.5 Dispersion.** Guest rooms required to provide mobility features complying with 806.2 and guest rooms required to provide communication features complying with 806.3 shall be dispersed among the various classes of guest rooms, and shall provide choices of types of guest rooms, number of beds, and other amenities comparable to the choices provided to other guests. Where the minimum number of guest rooms required to comply with 806 is not sufficient to allow for complete dispersion, guest rooms shall be dispersed in the following priority: guest room type, number of beds, and amenities. At least one guest room required to provide mobility features complying with 806.2 shall also provide communication features complying with 806.3. Not more than 10 percent of guest rooms required to provide mobility features complying with 806.2 shall be used to satisfy the minimum number of guest rooms required to provide communication features complying with 806.3.

**Table F224.4/224.4 Guest Rooms with Communication Features**

<table>
<thead>
<tr>
<th>Total number of Guest rooms provided</th>
<th>Minimum Number of Required Guest Rooms with Communication features</th>
</tr>
</thead>
<tbody>
<tr>
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</tr>
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<td>151 to 200</td>
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<td>22</td>
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<tr>
<td>501 to 1000</td>
<td>5 percent of total</td>
</tr>
<tr>
<td>1001 and over</td>
<td>50, plus 3 for each 100 over 1000</td>
</tr>
</tbody>
</table>

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire safety and hazardous materials in new and existing buildings and facilities and the protection of life and property in wildland urban interface areas. In 2014 and 2015 the Fire-CAC has held 5 open meetings. In addition, there were numerous conference calls, Regional Work Group and Task Group meetings for the current code development cycle, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: [FCAC](http://www.iccsafe.org)
**Cost Impact:** Will not increase the cost of construction
This is already required by the 2010 ADA Standard for Accessible Design.
Visible alarm notification appliances shall be provided in accordance with Sections 907.5.2.3.1 through 907.5.2.3.3.

Exceptions:
1. Visible alarm notification appliances are not required in alterations, except where an existing fire alarm system is upgraded or replaced, or a new fire alarm system is installed.
2. Visible alarm notification appliances shall not be required in exits as defined in Chapter 2.
3. Visible alarm notification appliances shall not be required in elevator cars.
4. Visual alarm notification appliances are not required in critical care areas of Group I-2 Condition 2 occupancies that are in compliance with Section 907.2.6, Exception 2.

Add new text as follows:

907.5.2.3.2 Groups I-1 and R-1. Group I-1 and R-1 dwelling units or sleeping units in accordance with Table 907.5.2.3.2 shall be provided with a visible alarm notification appliance, activated by both the in-room smoke alarm and the building fire alarm system. Such units shall be dispersed among the various classes of units. At least one unit required to be an Accessible unit in accordance with Sections 1107.5.1.1 or 1107.6.1.1 shall also include a visible notification appliance. Not more than 10 percent of units required to be an Accessible unit shall be used to satisfy the minimum number of units required to provide visible alarm notification appliances.

Revise as follows:

<table>
<thead>
<tr>
<th>NUMBER OF SLEEPING UNITS</th>
<th>SLEEPING ACCOMMODATIONS WITH VISIBLE ALARMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>26 to 25</td>
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<td>151 to 200</td>
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### Table

<table>
<thead>
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<th>Category</th>
<th>Requirement</th>
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<tr>
<td>501 to 1,000</td>
<td>5% of total</td>
</tr>
<tr>
<td>1,001 and over</td>
<td>50 plus 3 for each 100 over 1,000</td>
</tr>
</tbody>
</table>

**Reason:** The intent of this proposal is coordination with 2010 ADA Section 224.5.

1) Dispersion - The rooms with visible alarms are required to be dispersed by the classes of units. The proposed language for dispersion matches that used in Section IBC 1107.5.1.1.

2) Overlap - The current language would allow all the Accessible rooms to meet the requirements for both wheelchair access and visible alarms. With the number required for Accessible rooms, this means that with the current language, approximately 50% of the visible alarm rooms could also be Accessible rooms. Since the visible alarms are intended to address the need of person with hearing impairments, there should not be such an overlap. The proposed language is has the intent of the 2010 ADA, but using IBC terminology and references.

**Cost Impact:** Will not increase the cost of construction

This is not a change in requirements, just a change in dispersion. Therefore there are not changes to construction costs. In addition, this is coordination with federal regulations.
907.5.2.3 Visible alarms. Visible alarm notification appliances shall be provided in accordance with Sections 907.5.2.3.1 through 907.5.2.3.3.

Exceptions:
1. Visible alarm notification appliances are not required in alterations, except where an existing fire alarm system is upgraded or replaced, or a new fire alarm system is installed.
2. Visible alarm notification appliances shall not be required in exits as defined in Chapter 2.
3. Visible alarm notification appliances shall not be required in elevator cars.
4. Visual alarm notification appliances are not required in critical care areas of Group I-2 Condition 2 occupancies that are in compliance with Section 907.2.6, Exception 2.

Revise as follows:

907.5.2.3.2 Groups I-1, R-1 and R-2. Dwelling units and sleeping units in Group I-1, R-1 and R-2 dormitory housing provided in accordance with Table 907.5.2.3.2 places of education shall be provided with a visible alarm notification appliance in accordance with Table 907.5.2.3.2. Such visible alarm notification appliances shall be activated by both the in-room smoke alarm and the building fire alarm system.

Reason: The 2010 ADA standard considers dormitories in places of education as transient lodging, therefore, the ADA would require visible alarms and Accessible units within dormitories. Dormitories are required to have Accessible units in accordance with IBC Section 1107.6.2.3.1. The terminology used here for dorms is what is used in 2010 ADA and IBC Section 1107.4, Exception 4.

Cost Impact: Will not increase the cost of construction
This is a coordination with federal requirements, therefore there is no change in construction requirements.
F212-16
907.5.2.3.2 (IBC [F] 907.5.2.3.2)

Proponent: Michael O’Brien representing the Fire Code Action Committee (FCAC@iccsafe.org)

2015 International Fire Code

Revise as follows:

907.5.2.3.2 Groups I-1 and R-1. Habitable spaces in dwelling units and sleeping units in Group I-1 and R-1 dwelling units or sleeping units occupancies in accordance with Table 907.5.2.3.2 shall be provided with a visible alarm notification appliance. Visible alarms shall be activated by both the in-room smoke alarm and the building fire alarm system.

Reason: This proposal is an attempt to clarify specifically where the visible notification appliances shall be located in newly constructed Group R-1 and I-1 dwelling and sleeping units and make sure that visible alarm notification is provided such that timely notification to guests with hearing impairments will occur. This requirement will only affect those rooms identified as accessible. Table 907.5.2 already identifies the number of rooms which must be provided with visual notification. This proposal does not affect that number, but rather clarifies that the habitable space must be covered when installing the notification appliances.

Neither the 2010 ADA nor the 2016 NFPA 72 standard specify where visible notification appliances are to be located. The current IFC/IBC text could be interpreted to require only one device in a unit that has multiple habitable rooms. This code change provides a specific requirement that all habitable spaces shall be provided with visible notification so that there is no time delay in notifying guests with hearing impairments of a fire threat. To clarify this the term “appliance” was removed which is sometimes interpreted as only needing one appliance where more than one may be necessary. The term “habitable space” is defined in the IBC as follows:

“A space in a building for living, sleeping, eating or cooking. Bathrooms, toilet rooms, closets, halls, storage or utility spaces and similar areas are not considered habitable spaces.”

This definition specifically excludes toilet rooms, closets, halls, and storage and utility spaces from the required areas. This proposal clarifies that the visible alarm notification devices must cover habitable areas. In some cases, this could be accomplished with one visible notification device depending on the floor plan of the sleeping unit. It should be noted that the intent of this requirement is that the visible alarm notification device have the ability to independently be initiated based upon the smoke alarm operation in the sleeping or dwelling unit or the building fire alarm.

Last code cycle a similar proposal (F172-13) was proposed but used the more ambiguous language “throughout the unit” instead of the specific language habitable spaces. This caused concern that all spaces including closets, halls and storage rooms could be considered required locations for installation of visible appliances. In response to that concern this revised language is proposed.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire safety and hazardous materials in new and existing buildings and facilities and the protection of life and property in wildland urban interface areas. In 2014 and 2015 the Fire-CAC has held 5 open meetings. In addition, there were numerous conference calls, Regional Work Group and Task Group meetings for the current code development cycle, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC’s website at: FCAC

Cost Impact: Will increase the cost of construction

This provision has the potential to add an additional notification appliance however the intent was full visibility within the unit.
F213-16
907.5.2.3.3 (IBC [F] 907.5.2.3.3)

Proponent: Thomas Hammerberg, Automatic Fire Alarm Association, representing Automatic Fire Alarm Association (tomhammerberg@afaa.org)

2015 International Fire Code

Revise as follows:

907.5.2.3.3 Group R-2. In Group R-2 occupancies required by Section 907 to have a fire alarm system, all floors that contain dwelling units and sleeping units shall be provided with the future capability in fire alarm system power supply and circuits on each floor riser to support visible alarm notification appliances in accordance with Chapter 10 of ICC A117.1. Such capability shall be permitted to include the potential for future interconnection of the building fire alarm system with the unit smoke alarms, replacement of audible appliances with combination audible/visible appliances, or future extension of the existing wiring from the unit smoke alarm locations to required locations for visible appliances.

Reason: This proposed change will save construction costs and provide clear direction for designers, owners and installers in R-2 buildings.

The code intent has not changed. There needs to be a capability to support visible fire alarm notification appliances in R-2 buildings when needed as the building evolves. What has been happening with the current language for “capability” is that some designers/code authorities took this to mean that you need to install conduit and wiring throughout a new building (into each dwelling unit) for possible future use. The identified intention was that the fire alarm system head end (power supplies, circuits, etc.) have a “capability” to support an additional visual appliances, not to have conduit and circuits run into each dwelling unit for some possible future use.

With this code change, the building will have the capability on EACH FLOOR to support additional visible appliances and will clarify the design.

Cost Impact: Will not increase the cost of construction
NONE. It will have an impact on saving construction costs as described above.
F214-16
907.5.2.3.3 (IBC [F] 907.5.2.3.3)

Proponent: Adria Reinertson, Riverside County Fire Department, representing California Fire Chiefs Association (adriar@moval.org)

2015 International Fire Code

Revise as follows:

907.5.2.3.3 Group R-2. In Group R-2 occupancies required by Section 907 to have a fire alarm system, all dwelling units and sleeping units shall be provided with the capability to support visible alarm notification appliances in accordance with Chapter 10 of ICC A117.1. Such capability shall be permitted to include the potential for future interconnection of the building fire alarm system with the unit smoke alarms, additional relays and/or smoke detectors; installation of wiring or raceways from the building future fire alarm equipment locations to the dwelling and sleeping units; and replacement of audible appliances with combination audible/visible appliances, or future extension of the existing wiring from the unit smoke alarm locations to required locations for and additional visible appliances as required. Plans for future design capability shall be submitted to the enforcing agency and shown on the approved fire alarm system plans.

Reason: The revised language clears up misapplication of the section. Currently, installations are varying from a notification circuit in the corridor with junction boxes at each unit's front door to wiring each unit and installing power supplies for future use. The proposed language requires the fire alarm plans to identify the method used to provide for future expansion and the method to be approved by the fire code official.

Cost Impact: Will not increase the cost of construction
This proposal will not increase the cost of construction. It only serves to clarify the intent of the original section.
IFC: 907.10 (New).

Proponent: Michael O'Brien representing the Fire Code Action Committee (FCAC@iccsafe.org)

2015 International Fire Code

Add new text as follows:

907.10 Smoke alarm maintenance. Smoke alarms shall be tested and maintained in accordance with the manufacturer's instructions. Smoke alarms shall be replaced when they fail to respond to operability tests, or when they exceed 10 years from the date of manufacture, unless otherwise provided by the manufacturer's published instructions.

Reason: Section 907.8 covers the inspection, testing and maintenance of fire alarm and fire detection systems, but does not include specific requirements for testing and maintaining smoke alarms since they are not a fire alarm or fire detection system. This proposal includes requirements for testing, maintaining and replacing inoperative smoke alarms that are consistent with NFPA 72 requirements, including the following:

NFPA 72, Section 14.4.5.4 Smoke alarms shall be replaced when they fail to respond to operability tests.

NFPA 72, Section 14.4.5.4.1 Smoke alarms shall not remain in service longer than 10 years from the date of manufacture, unless otherwise provided by the manufacturer's published instructions.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire safety and hazardous materials in new and existing buildings and facilities and the protection of life and property in wildland urban interface areas. In 2014 and 2015 the Fire-CAC has held 5 open meetings. In addition, there were numerous conference calls, Regional Work Group and Task Group meetings for the current code development cycle, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC

Cost Impact: Will not increase the cost of construction

The proposal does not introduce new construction requirements, but there will be expenses associated with replacing inoperable or obsolete smoke alarms.
F216-16
909.1 (IBC [F] 909.1, IMC [F] 513.1)

Proponent: Michael O'Brian representing the Fire Code Action Committee (FCAC@iccsafe.org)

2015 International Fire Code

Revise as follows:

909.1 Scope and purpose. This section applies to mechanical or passive smoke control systems where they are required for new buildings or portions thereof by provisions of the International Building Code or this code. The purpose of this section is to establish minimum requirements for the design, installation and acceptance testing of smoke control systems that are intended to provide a tenable environment for the evacuation or relocation of occupants. These provisions are not intended for the preservation of contents, the timely restoration of operations or for assistance in fire suppression or overhaul activities. Smoke control systems regulated by this section serve a different purpose than the smoke and heat venting provisions found in Section 910. Mechanical smoke control systems shall not be considered exhaust systems under Chapter 5 of the International Mechanical Code.

Reason: This is strictly editorial. This code change provides correlation with the revision in IFC/IBC 910 where the terminology was revised in the 2015 edition.

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Cost Impact: Will not increase the cost of construction
The revision is purely editorial and has no affect on the cost of construction. It will merely be consistent with the current language in Section 910.
Part I:
IFC: 909.5.3, 909.5.3.1, 1103.3.2 (IBC [F] 909.5.3, [F] 909.5.3.1)  
Part II:  
IECC: C402.5.4.

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE FIRE CODE COMMITTEE. PART II WILL BE HEARD BY THE IECC-COMMERCIAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDERS FOR THESE COMMITTEES.

Proponent: John Woestman, Kellen, representing Builders Hardware Manufacturers Association (jwoestman@kellencompany.com)

Part I

2015 International Fire Code

909.5.3 Opening protection. Openings in smoke barriers shall be protected by automatic-closing devices actuated by the required controls for the mechanical smoke control system. Door openings shall be protected by fire door assemblies complying with Section 716.5.3 716 of the International Building Code.

Exceptions:

1. Passive smoke control systems with automatic-closing devices actuated by spot-type smoke detectors listed for releasing service installed in accordance with Section 907.3.
2. Fixed openings between smoke zones that are protected utilizing the airflow method.
3. In Group I-1 Condition 2, Group I-2 and ambulatory care facilities, where a pair of opposite-swinging doors are installed across a corridor in accordance with Section 909.5.3.1, the doors shall not be required to be protected in accordance with Section 716 of the International Building Code. The doors shall be close-fitting within operational tolerances and shall not have a center mullion or undercuts in excess of $\frac{3}{4}$ inch (19.1 mm) louvers or grilles. The doors shall have head and jamb stops and astragals or rabbits at meeting edges and, where permitted by the door manufacturer's listing, positive-latching devices are not required.
4. In Group I-2 and ambulatory care facilities, where such doors are special-purpose horizontal sliding, accordion or folding door assemblies installed in accordance with Section 1010.1.4.3 and are automatic closing by smoke detection in accordance with Section 716.5.9.3 716.2.6.5 of the International Building Code.
5. Group I-3.
6. Openings between smoke zones with clear ceiling heights of 14 feet (4267 mm) or greater and bank-down capacity of greater than 20 minutes as determined by the design fire size.

909.5.3.1 Group I-1 Condition 2, Group I-2 and ambulatory care facilities. In Group I-1 Condition 2, Group I-2 and ambulatory care facilities, where doors are installed across a corridor, the doors shall be automatic closing by smoke detection in accordance with Section 716.5.9.3 716.2.6.5 of the International Building Code and shall have a vision panel with fire protection rated glazing materials in fire protection rated frames, the area of which shall not exceed that tested.
1103.3.2 Elevator emergency operation. Existing elevators with a travel distance of 25 feet (7620 mm) or more above or below the main floor or other level of a building and intended to serve the needs of emergency personnel for fire-fighting or rescue purposes shall be provided with emergency operation in accordance with ASME A17.3.

Exceptions:

1. Buildings without occupied floors located more than 55 feet (16 764 mm) above or 25 feet (7620 mm) below the lowest level of fire department vehicle access where protected at the elevator shaft openings with additional fire doors in accordance with Section 716.5 of the International Building Code and where all of the following conditions are met:
   1.1. The doors shall be provided with vision panels of approved fire protection-rated glazing so located as to furnish clear vision of the approach to the elevator. Such glazing shall not exceed 100 square inches (0.065 m²) in area.
   1.2. The doors shall be held open but be automatic-closing by activation of a fire alarm initiating device installed in accordance with the requirements of NFPA 72 as for Phase I Emergency Recall Operation, and shall be located at each floor served by the elevator; in the associated elevator machine room, control space, or control room; and in the elevator hoistway, where sprinklers are located in those hoistways.
   1.3. The doors, when closed, shall have signs visible from the approach area stating: WHEN THESE DOORS ARE CLOSED OR IN FIRE EMERGENCY, DO NOT USE ELEVATOR. USE EXIT STAIRWAYS.

2. Buildings without occupied floors located more than 55 feet (16 764 mm) above or 25 feet (7620 mm) below the lowest level of fire department vehicle access where provided with automatic sprinkler systems installed in accordance with Section 903.3.1.1 or 903.3.1.2.

3. Freight elevators in buildings provided with both automatic sprinkler systems installed in accordance with Section 903.3.1.1 or 903.3.1.2 and not less than one ASME 17.3-compliant elevator serving the same floors.

Elimination of previously installed Phase I emergency recall or Phase II emergency in-car systems shall not be permitted.

Part II

2015 International Energy Conservation Code

C402.5.4 Doors and access openings to shafts, chutes, stairways and elevator lobbies. Doors and access openings from conditioned space to shafts, chutes stairways and elevator lobbies not within the scope of the fenestration assemblies covered by Section C402.5.2 shall be gasketed, weatherstripped or sealed.

Exceptions:

1. Door openings required to comply with Section 716 or 716.5 of the International Building Code.

2. Doors and door openings required to comply with UL 1784 by the International Building Code.
Reason: This proposal complements FS74-15 approved in 2015 which reviewed all Group A I-Code references that "point" to IBC Section 716 and/or to subsection(s) of IBC 716, and revised several of the pointers. With proposal FS101-15 approved last year which completely reorganized IBC Section 716, the pointers in Group B code sections need to be reviewed and several revised. In most locations, the references to a subsection of IBC 716 may need only an editorial update to the new location of the references requirements based on the reorganized text.

Cost Impact: Will not increase the cost of construction
There should be no cost increase. The proposed revisions should be consistent with the intent of the code.
F218-16
IFC: 909.6.1 (IBC: [F] 909.6.1)

Proponent: Victor Cuevas, representing City of Los Angeles

2015 International Fire Code

Revise as follows:

909.6.1 Minimum pressure difference. The minimum pressure difference across a smoke barrier used to separate smoke zones shall be not less than 0.05-inch water gage (0.0124 kPa) in fully sprinklered buildings.

In buildings allowed permitted to be other than fully sprinklered, the smoke control system shall be designed to achieve pressure differences not less than two times the maximum calculated pressure difference produced by the design fire.

Reason: This change is intended to address the fact that smoke barriers can exist within a single smoke zone, which may be comprised of active and passive sub-zones. A 0.05 inch pressure differential is intended to contain smoke within the smoke zone of origin when that smoke zone is pressurized or depressurized. When a smoke barrier is provided within a smoke zone to separate passive areas from actively pressurized (or depressurized) areas, the intent is not to maintain a 0.05 inch pressure differential across those barriers. This is not always possible, due to impacts on door opening forces.

Cost Impact: Will not increase the cost of construction
The code change proposal will not increase the cost of construction. This is a clarification of the requirements of the current code.
2015 International Fire Code

Add new text as follows:

909.22 Stairway or ramp pressurization Where the building is provided with stairway or ramp pressurization for compliance with the International Building Code requirements for a smokeproof enclosure, interior exit stairways or ramps shall be pressurized to not less than 0.10 inches of water (25 Pa) and not more than 0.35 inches of water (87 Pa) in the shaft relative to the building measured with all interior exit stairway and ramp doors closed under maximum anticipated conditions of stack effect and wind effect. Such systems shall comply with Section 909, including, but not limited to, the installation of a control panel as per Section 909.16.

909.22.1 Ventilating equipment. The activation of ventilating equipment for the stair or ramp pressurization system shall be by smoke detectors installed at each floor level at an approved location at the entrance to the smokeproof enclosure. When the closing device for the stairway or ramp shaft and vestibule doors is activated by smoke detection or power failure, the mechanical equipment shall activate and operate at the required performance levels. Smoke detectors shall be installed in accordance with Section 907.3.

909.22.1.1 Ventilation systems. Smokeproof enclosure ventilation systems shall be independent of other building ventilation systems. The equipment, control wiring, power wiring and ductwork shall comply with one of the following:

1. Equipment, control wiring, power wiring and ductwork shall be located exterior to the building and directly connected to the smokeproof enclosure or connected to the smokeproof enclosure by ductwork enclosed by not less than 2-hour fire barriers constructed in accordance with Section 707 of the International Building Code or horizontal assemblies constructed in accordance with Section 711 of the International Building Code, or both.

2. Equipment, control wiring, power wiring and ductwork shall be located within the smokeproof enclosure with intake or exhaust directly from and to the outside or through ductwork enclosed by not less than 2-hour barriers constructed in accordance with Section 707 of the Building Code or horizontal assemblies constructed in accordance with Section 711 of the Building Code, or both.

3. Equipment, control wiring, power wiring and ductwork shall be located within the building if separated from the remainder of the building, including other mechanical equipment, by not less than 2-hour fire barriers constructed in accordance with Section 707 of the International Building Code or horizontal assemblies constructed in accordance with Section 711 of the International Building Code, or both.

Exceptions:

1. Control wiring and power wiring utilizing a 2-hour rated cable or cable system.
2. Where encased with not less than 2 inches (51 mm) of concrete.
3. Control wiring and power wiring protected by a listed electrical circuit protective systems with a fire-resistance rating of not less than 2 hours.
909.22.1.2 **Standby power.** Mechanical vestibule and stairway and ramp shaft ventilation systems and automatic fire detection systems shall be provided with standby power in accordance with Section 2702 of the *International Building Code*.

909.22.1.3 **Acceptance and testing.** Before the mechanical equipment is approved, the system shall be tested in the presence of the fire code official to confirm that the system is operating in compliance with these requirements.

**Reason:** The intent with this change is to simply duplicate the requirements for a stairwell pressurization system from the International Building Code to the International Fire Code. This change is not intended to make substantive changes to the requirements, but rather to provide the fire code official with the requirements for such systems in the Fire Code for enforcement purposes relative to the Smoke Control Permit required for such systems by 105.7.14 and 909.6.3, both of which were introduced to the code in the 2015 edition. The elevator pressurization requirements were duplicated in a similar fashion in the 2015 edition of the code, but the stairwell pressurization requirements were not, resulting in some confusion.

**Cost Impact:** Will not increase the cost of construction
This is simply a duplication of the requirements from the International Building Code into the International Fire Code, so there should be no increase in the cost of construction, as such.
F220-16
IFC: 910.5, 910.5.1, 910.5.1.1, 910.5.2, 910.5.2.1, 910.5.2.2, 910.5.2.3, 910.5.2.4.

Proponent: Michael O'Brian representing the Fire Code Action Committee (FCAC@iccsafe.org)

2015 International Fire Code

Revise as follows:

910.5 Maintenance and testing. Smoke
Maintenance and testing of smoke and heat vents and mechanical smoke removal systems shall be maintained in an operative condition in accordance with Sections 910.5.1 or and 910.5.2. A written record of inspection, respectively testing and maintenance which includes the date, identification of personnel involved, unsatisfactory result, corrective action taken and replaced parts shall be maintained on the premises.

910.5.1 Smoke and heat vents. Smoke and heat vents shall be maintained in an operative condition. Inspection, testing and maintenance shall be in accordance with NFPA 204 except as follows:

1. Mechanically operated smoke and Section 910.5.1.1 heat vents shall be inspected annually and operationally tested not less than every five years.
2. Gravity drop-out smoke and heat vents shall be inspected annually.
3. Fused, damaged or painted fusible links shall be replaced.

Delete without substitution:

910.5.1.1 Fusible links. Fusible links for smoke and heat vents shall be replaced whenever fused, damaged or painted.

Revise as follows:

910.5.2 Mechanical smoke removal systems. Mechanical smoke removal systems shall be maintained in accordance with NFPA 204 and the equipment manufacturer's maintenance instructions except as follows:

1. Systems shall be inspected and Sections 910.5.2.1 through 910.5.2.4 operationally tested annually.
2. Testing shall include the operation of all system components, controls and ancillary equipment, such as make-up air openings.
3. A written schedule for routine maintenance and operational testing shall be established and testing shall be conducted in accordance with the schedule.

Delete without substitution:

910.5.2.1 Frequency. Systems shall be operationally tested not less than once per year. Testing shall include the operation of all system components, including control elements.
910.5.2.2 Testing. Operational testing of the mechanical smoke removal system shall include all equipment such as fans, controls and make-up air openings.

910.5.2.3 Schedule. A routine maintenance and operational testing program shall be initiated and a written schedule for routine maintenance and operational testing shall be established.

910.5.2.4 Written record. A written record of mechanical smoke exhaust system testing and maintenance shall be maintained on the premises. The written record shall include the date of the maintenance, identification of the servicing personnel and notification of any unsatisfactory condition and the corrective action taken, including parts replaced.

Reason: Smoke and heat vents, like other fire protection devices, need to be inspected, maintained and tested on a regular basis to ensure proper operation. NFPA 204 is referenced and contains requirements for inspection and testing. NFPA 204 requires annual inspection of mechanically operated smoke and heat vents and gravity drop out smoke and heat vents. Further, NFPA 204 requires annual testing of mechanically operated smoke and heat vents.

The requirements for inspection and testing are proposed to be included in the IFC to provide the inspector with the needed information to require the inspection, testing and maintenance of these devices. However, rather than testing all smoke and heat vents annually, this proposal revises that testing requirement to once every 5 years.

Section 910.5.3 is added as the typical requirement in the IFC for retention of the inspection, maintenance and testing records.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire safety and hazardous materials in new and existing buildings and facilities and the protection of life and property in wildland urban interface areas. In 2014 and 2015 the Fire-CAC has held 5 open meetings. In addition, there were numerous conference calls, Regional Work Group and Task Group meetings for the current code development cycle, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC

Cost Impact: Will not increase the cost of construction
Will not increase the cost of construction, but will increase the cost of maintenance where smoke and heat vents are installed.
F221-16
912.2 (IBC [F] 912.2), 912.2.1 (IBC [F] 912.2.1)

Proponent: Michael O’Brian representing the Fire Code Action Committee (FCAC@iccsafe.org)

2015 International Fire Code

912.2 Location. With respect to hydrants, driveways, buildings and landscaping, fire department connections shall be so located, installed in an approved location that is adjacent to and clearly visible from a street or fire apparatus and access road. A position for fire apparatus supplying the fire department connection shall be identified on construction plans in accordance with Section 501.3. A direct hose connected lay path from that position to supply the fire department connection shall be provided and shall comply with both of the system will following:

1. The hose-lay path shall not be obstructed by landscaping, walls, fences or other impediments.
2. The hose-lay path shall not obstruct access to the buildings for by other fire apparatus. The location of fire department connections shall be approved by the fire chief.

Delete without substitution:

912.2.1 Visible location. Fire department connections shall be located on the street side of buildings, fully visible and recognizable from the street or nearest point of fire department vehicle access or as otherwise approved by the fire chief.

Reason: This proposal is simply meant as a clarification and enhancement of the existing requirement.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire safety and hazardous materials in new and existing buildings and facilities and the protection of life and property in wildland urban interface areas. In 2014 and 2015 the Fire-CAC has held 5 open meetings. In addition, there were numerous conference calls, Regional Work Group and Task Group meetings for the current code development cycle, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC

Bibliography: This provides flexibility for designers.

Cost Impact: Will increase the cost of construction

May increase the cost of construction due to clarification of the requirement to provide an unobstructed pathway between fire apparatus and a fire department connection. Although this was implicit in the prior code text, the clarifications provided by this change eliminate the chance for subjective interpretation of the provisions.

F221-16 : 912.2-O’BRIAN10644
2015 International Fire Code

Revise as follows:

915.1 General. Carbon monoxide detection shall be installed in new buildings in accordance with Sections 915.1.1 through 915.6. Carbon monoxide detection shall be installed in existing buildings in accordance with Section 1103.9 Chapter 11.

915.1.1 Where required. Carbon monoxide detection shall be provided in Group A-1, A-2, E, I-1, I-2, I-4 and R occupancies and in classrooms in Group E occupancies in the locations specified in Section 915.2 where any of the conditions in Sections 915.1.2 through 915.1.6 exist.

915.1.2 Fuel-burning appliances and fuel-burning fireplaces. Carbon monoxide detection shall be provided in dwelling units, sleeping units and classrooms and rooms or spaces used for assembly purposes that contain a fuel-burning appliance or a fuel-burning fireplace.

915.1.3 Forced-air furnaces. Carbon monoxide detection shall be provided in dwelling units, sleeping units and classrooms and rooms or spaces used for assembly purposes served by a fuel-burning, forced-air furnace.

Exception: Carbon monoxide detection shall not be required in dwelling units, sleeping units and classrooms where and rooms or spaces used for assembly purposes if carbon monoxide detection is provided in the first room or area served by each main duct leaving the furnace, and the carbon monoxide alarm signals are automatically transmitted to an approved location.

915.1.4 Fuel-burning appliances outside of dwelling units, sleeping units and classrooms. Carbon monoxide detection shall be provided in dwelling units, sleeping units and classrooms and rooms or spaces used for assembly purposes located in buildings that contain fuel-burning appliances or fuel-burning fireplaces.

Exceptions:

1. Carbon monoxide detection shall not be required in dwelling units, sleeping units and classrooms and rooms or spaces used for assembly purposes where there are no communicating openings between the fuel-burning appliance or fuel-burning fireplace and the dwelling unit, sleeping unit or classroom.

2. Carbon monoxide detection shall not be required in dwelling units, sleeping units and classrooms and spaces used for assembly purposes where carbon monoxide detection is provided in one of the following locations:

   2.1. In an approved location between the fuel-burning appliance or fuel-burning fireplace and the dwelling unit, sleeping unit or classroom and rooms for spaces used for assembly purposes.

   2.2. On the ceiling of the room containing the fuel-burning appliance or fuel-burning fireplace.
915.1.5 Private garages. Carbon monoxide detection shall be provided in dwelling units, sleeping units and classrooms and rooms or spaces used for assembly purposes in buildings with attached private garages.

Exceptions:

1. Carbon monoxide detection shall not be required where there are no communicating openings between the private garage and the dwelling unit, sleeping unit or classroom and rooms or spaces used for assembly purposes.

2. Carbon monoxide detection shall not be required in dwelling units, sleeping units and classrooms and rooms or spaces used for assembly purposes located more than one story above or below a private garage.

3. Carbon monoxide detection shall not be required where the private garage connects to the building through an open-ended corridor.

4. Where carbon monoxide detection is provided in an approved location between openings to a private garage and dwelling units, sleeping units or classrooms or rooms and spaces used for assembly purposes, carbon monoxide detection shall not be required in the dwelling units, sleeping units or classrooms or rooms or spaces used for assembly purposes.

915.2 Locations. Where required by Section 915.1.1, carbon monoxide detection shall be installed in the locations specified in Sections 915.2.1 through 915.2.3.

915.3 Detection equipment. Carbon monoxide detection required by Sections 915.1 through 915.2.3 shall be provided by carbon monoxide alarms complying with Section 915.4 or carbon monoxide detection systems complying with Section 915.5.

Add new text as follows:

915.2.4 Group A occupancies. Carbon Monoxide detectors in accordance with Section 915.5.1 shall be installed in rooms or spaces used for assembly purposes in Group A-1, A-2 and small assembly occupancies in accordance with Section 303.1.2 of the International Building Code. The carbon monoxide alarm signals shall be automatically transmitted to an onsite location that is staffed by management personnel.

Reason: This proposal seeks to protect the public from serious injury or possibly death from unintentional non-fire related carbon monoxide (CO) exposure by mandating the installation of CO detection devices in A-1 and A-2 assembly occupancies. In the absence of a model fire code for the installation of CO detection in assembly occupancies, many jurisdictions are developing their own regulations with varying installation requirements. For example, as a result of the national publicity generated from an incident at a Long Island New York restaurant that sent 26 to the hospital and tragically killed the restaurant manager,

- New York Governor Cuomo signed AB 8963 into law expanding the state’s regulations to include the installation of CO detection in restaurants and other commercial buildings.
- New Jersey Governor Christie signed A 4073 into law requiring the installation of CO detection devices in all commercial structures not currently required to have such protection. The measure applies to structures having a potential for a CO hazard. At present CO detection is required in hotels, one- and two-family dwellings and apartment buildings upon initial occupancy or change of occupancy.
- The NFPA 101/5000 Assembly Technical Committee created First Revision #10 that requires CO detection in assembly occupancies with permanently installed fuel-burning appliances or attached garages.
- The Town of North Hempstead New York enacted an ordinance 271-2014 requiring CO detection in places of assembly.
- Nassau County New York approved ordinance Article VII requiring CO detection in commercial occupancies.

The following states introduced legislation requiring CO detection in commercial occupancies:
A-2 occupancies may require 4 to 5 CO detectors. This number is based on providing CO detection in each room. The estimated number of CO detectors for small to medium sized A-1 and A-2 occupancies is 2 to 3. Large A-1 and intrusion (security) control unit.

Cost Impact: Will increase the cost of construction
The estimated installed cost for each CO detector is $325 per unit. This number includes the detector, conduit, junction box, wire and labor. It does not include the control unit because assembly occupancies typically have either a fire alarm or intrusion (security) control unit and NFPA 720 permits CO detectors to be connected to a fire alarm or intrusion (security) control unit.

The estimated number of CO detectors for small to medium sized A-1 and A-2 occupancies is 2 to 3. Large A-1 and A-2 occupancies may require 4 to 5 CO detectors. This number is based on providing CO detection in each room.

MA HB 2097: Requires carbon monoxide detection in all residential, commercial and governmental buildings.
CT 5532: Amends part ll of chapter 541 of the general statutes to require any person doing business in the state to equip the place of business physically located in this state with carbon monoxide detection and warning equipment.

This proposal models the location requirements after the current requirements in the 2015 edition of the IFC for CO detection in hotels, dormitories, apartment buildings and schools as a basis. The efficacy of voluntary national consensus codes, such as the IFC, ensures a collaborative, balanced, and consensus-based process.

Bibliography:

VA Staunton 08/23/07 Restaurant Fire officials shut down the Staunton Applebee's after several people became sick. Medical crews c
MD Baltimore 02/02/08 Restaurant The restaurant was evacuated after employees began to feel faint, dizzy and nauseous. The Fire
OK Tulsa 12/10/08 Restaurant After complaining of feeling ill, officials say four employees were sent home from Charlestone's Ture
NY Plainview 11/10/09 Restaurant Emergency workers transported eight people to area hospitals, Nassau University Medical Center a
MA Newton 09/28/10 Restaurant Six people were transported to Massachusetts General Hospital in Boston this afternoon for bre
PA Hermitage 11/12/10 Restaurant The Golden Corral restaurant was evacuated this afternoon as a result of a carbon monoxide leak,
CA San Francisco 01/08/11 Restaurant Four guests at the neighboring Marriott Marquis fell ill Thursday night after a water heater in Ambe
GA Pooler 09/14/11 Restaurant Carbon monoxide leaking into the walls of a Pooler McDonald's caused an 80-year-old woman to die
KS Olathe 11/07/11 Restaurant Medical crews were called to Noodles & Company, 15208 W. 119th St., in Olathe, shortly after 11 scene.

NY Great Neck 01/26/12 Restaurant More than 40 employees and patrons were evacuated from Bruce's Restaurant and Bakery in Green.
VA Hampton 08/28/12 Restaurant Hampton HAZMAT crews responded to a report of a carbon monoxide leak at Sam Rust Seafood
TN Germantown 09/05/12 Restaurant Employees from 9 businesses at a shopping center evacuated due to CO leak coming from a Chil
TN Johnson City 12/28/12 Restaurant Emergency crews rushed to the Golden Corral after two children passed out. Once they arrived, 5
IA Storm Lake 03/28/13 Restaurant The Storm Lake Fire Department, police and Alliant Energy responded to a Burger King outlet on T
NY Garden City 04/25/13 Restaurant Seven people were taken to the hospital, four with “dangerously high” carbon monoxide levels in the Par
WI Sheboygan 06/15/13 Restaurant Hardee's, located at 4409 Highway 42, was evacuated shortly after 9 AM due to a gaseous smell ir
OR Portland 07/06/13 Restaurant A Southwest Portland restaurant was evacuated after a cooling unit began leaking carbon monoxide
NC Greensboro 01/04/14 Restaurant CO level up to 400 ppm in a restaurant
NY Long Island 02/24/14 Restaurant A leaky flue killed manager, Steven Nelson, 55, who was overcome in the basement of the Legal S
WI Cottage Grove 03/03/14 Restaurant The incident happened just before 6 a.m. at the McDonald's in the 400 block of West Cottage Gro
PA Norristown 03/04/14 Restaurant Family was asleep in their apt as CO was seeping in from the restaurant below. They woke up feel
CO Denver 03/16/14 Restaurant Multiple customers reported headaches and nausea at a Noodles & Company
MA Boston 03/25/14 Restaurant Legal Sea Foods and The Cottage in Chestnut Hill was evacuated following high carbon monoxide r
NY Long Island 06/02/14 Restaurant A Long Island medc stopped into a store in Carle Place for a quick cup of coffee early Friday morn
VA Henrico 06/14/14 Restaurant Henrico Fire units responded to the China House restaurant for a report of the smell of gas a
NY Hauppauge 08/29/14 Restaurant Two Long Island volunteer EMT's sat down to get dinner at their local Applebee's in Hauppauge whe
AL Huntsville 09/15/14 Restaurant A faulty hood vent led to a potentially dangerous carbon monoxide situation at Bruegger's. People in
NY Northampton 10/07/14 Restaurant Emergency personnel evacuated two restaurants late due to the presence of high carbon monoxide
NH Manchester 10/19/14 Restaurant The restaurant was evacuated. Manchester Fire detected high carbon monoxide readings as a res

Cost Impact: Will increase the cost of construction
The estimated installed cost for each CO detector is $325 per unit. This number includes the detector, conduit, junction box, wire and labor. It does not include the control unit because assembly occupancies typically have either a fire alarm or intrusion (security) control unit and NFPA 720 permits CO detectors to be connected to a fire alarm or intrusion (security) control unit.
containing a fuel-burning appliance, fuel-burning fireplace or in an approved location between openings to a private garage and rooms or spaces used for assembly purposes.
F223-16
915.1.1, 915.2.3 (IBC[F] 915.1.1, 915.2.3)

Proponent: Carl Baldassarra, P.E., FSFPE, representing the Code Technology Committee (CTC@iccSAFE.org)

2015 International Fire Code

Revise as follows:

915.1.1 Where required. Carbon monoxide detection shall be provided in Group I-1, I-2, I-4 and R occupancies, and in classrooms in Group E and I-4 occupancies in the locations specified in Section 915.2 where any of the conditions in Sections 915.1.2 through 915.1.6 exist.

915.2.3 Group E occupancies. Carbon monoxide detection shall be installed in classrooms in Group E or I-4 occupancies. Carbon monoxide alarm signals shall be automatically transmitted to an on-site location that is staffed by school personnel.

Exception: Carbon monoxide alarm signals shall not be required to be automatically transmitted to an on-site location that is staffed by school personnel in Group E or I-4 occupancies with an occupant load of 30 or less.

Reason: The intent of this proposal is to clarify where carbon monoxide detection is required in day care facilities. Day care facilities consist of classrooms or defined spaces, regardless if the children are over 2-1/2 years of age or under. The change of I-4 to Section 915.2.3 for locating detectors in classrooms rather than dwelling units or sleeping units (915.2.1 or 915.2.2) is clearer.

This proposal is submitted by the ICC Code Technology Committee (CTC). The ICC Board has decided to sunset the CTC. The sunset plan includes re-assigning many of the CTC Areas of Study to the applicable Code Action Committee (CAC). The two remaining CTC Areas of Study are Care Facilities and Elevator Lobbies/WTC Elevator issues. This proposal falls under the Care Facilities Area of Study. In 2014 and 2015 ICC CTC Committee has held 4 open meetings and numerous Work Group meetings and conference calls for the current code development cycle which included members of the committees as well as any interested party to discuss and debate the proposed changes. Information on the CTC, including: the sunset plan; meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the CTC website CTC.

Cost Impact: Will not increase the cost of construction
This is a clarification of requirements so no change in construction requirements.

F223-16 : 915.1.1-
BALDASSARRA12035
F224-16


Proponent: Michael O'Brian representing the Fire Code Action Committee (FCAC@iccsafe.org)

2015 International Fire Code

Revise as follows:

915.1.3 Forced-air **Fuel burning forced-air furnaces.** Carbon monoxide detection shall be provided in **dwelling units, sleeping units** and classrooms served by a fuel-burning, forced-air furnace.

   Exception: Carbon monoxide detection shall not be required in **dwelling units, sleeping units** and classrooms where a **carbon monoxide detection detector** is provided in the first room or area served by each main duct leaving the furnace, and the carbon monoxide alarm signals are automatically transmitted to an approved location.

915.1.4 *Fuel-burning appliances outside of dwelling units, sleeping units and classrooms.* Carbon monoxide detection shall be provided in **dwelling units, sleeping units** and classrooms located in buildings that contain fuel-burning appliances or fuel-burning fireplaces.

   Exceptions:
   1. Carbon monoxide detection shall not be required in **dwelling units, sleeping units** and classrooms where there are no communicating openings between the fuel-burning appliance or fuel-burning fireplace and the **dwelling unit, sleeping unit** or classroom.
   2. Carbon monoxide detection shall not be required in **dwelling units, sleeping units** and classrooms where a **carbon monoxide detection detector** is provided in one of the following locations:
      2.1. In an approved location between the fuel-burning appliance or fuel-burning fireplace and the **dwelling unit, sleeping unit** or classroom.
      2.2. On the ceiling of the room containing the fuel-burning appliance or fuel burning fireplace.

915.1.5 *Private garages.* Carbon monoxide detection shall be provided in **dwelling units, sleeping units** and classrooms in buildings with attached private garages.

   Exceptions:
   1. Carbon monoxide detection shall not be required where there are no communicating openings between the private garage and the **dwelling unit, sleeping unit** or classroom.
   2. Carbon monoxide detection shall not be required in **dwelling units, sleeping units** and classrooms located more than one story above or below a private garage.
   3. Carbon monoxide detection shall not be required where the private garage connects to the building through an open-ended corridor.
   4. Where a **carbon monoxide detection detector** is provided in an approved location between openings to a private garage and **dwelling units, sleeping units**...
units or classrooms, carbon monoxide detection shall not be required in the dwelling units, sleeping units or classrooms.

915.2.3 Group E occupancies. Carbon monoxide detection detectors shall be installed in classrooms in Group E occupancies. Carbon monoxide alarm signals shall be automatically transmitted to an on-site location that is staffed by school personnel.

Exception: Carbon monoxide alarm signals shall not be required to be automatically transmitted to an on-site location that is staffed by school personnel in Group E occupancies with an occupant load of 30 or less.

915.3 Detection equipment Carbon monoxide detection. No change to text.

Add new text as follows:

915.4.3 Locations. Carbon monoxide alarms shall only be installed in dwelling units and in sleeping units. They shall not be installed in locations where the Code requires carbon monoxide detectors to be used.

Revise as follows:

915.4.3 915.4.4 Combination alarms. No change to text.

Reason: This proposal clarifies the locations where carbon monoxide alarms can be used in accordance with their listings, which is in dwelling units and sleeping rooms. It also clarifies the applications where carbon monoxide detectors must be used, which includes locations other than dwelling units and sleeping units, and in locations where detection is required in a location that may be remote from occupied areas being protected. This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire safety and hazardous materials in new and existing buildings and facilities and the protection of life and property in wildland urban interface areas. In 2014 and 2015 the Fire-CAC has held 5 open meetings. In addition, there were numerous conference calls, Regional Work Group and Task Group meetings for the current code development cycle, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC

Cost Impact: Will not increase the cost of construction
This proposal merely clarifies the applications that require a carbon monoxide detector be provided, as part of a carbon monoxide detection system. This provides correlation with the applications for which carbon monoxide detection equipment is listed.
2015 International Fire Code

Add new text as follows:

915.6.1 Enclosed parking garages. Carbon monoxide and nitrogen dioxide detectors installed in enclosed parking garages in accordance with the International Mechanical Code Section 404.1 shall be maintained in accordance with the manufacturer's instructions and their listing. Detectors that become inoperable or begin producing end-of-life signals shall be replaced.

Reason: This proposal adds needed maintenance and replacement criteria. A point of information - NFPA 720 does not cover maintenance of these detectors.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire safety and hazardous materials in new and existing buildings and facilities and the protection of life and property in wildland urban interface areas. In 2014 and 2015 the Fire-CAC has held 5 open meetings. In addition, there were numerous conference calls, Regional Work Group and Task Group meetings for the current code development cycle, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC

Cost Impact: Will increase the cost of construction

This proposal may represent a modest increased cost for maintaining these detectors, if this is not currently being done.
Add new text as follows:

CHAPTER PART 916— GAS DETECTION SYSTEMS

916.1 Gas detection system activation. Where a gas detection system is required elsewhere in this code, a gas detection alarm shall be initiated when any sensor detects a concentration of gas exceeding the following thresholds:

1. For flammable gases, a gas concentration exceeding 25 percent of the lower flammable limit (LFL).
2. For non-flammable gases, a gas concentration exceeding 1/2 of the IDLH, unless a different threshold is specified by the section of this code requiring gas detection.

Upon activation of a gas detection alarm, alarm signals or other required responses shall be as specified by the section of this code requiring a gas detection system. Audible and visible alarm signals associated with a gas detection alarm shall be distinctive from fire alarm and carbon monoxide alarm signals.

Reason: This proposal is a companion change to the FCAC proposal that adds a new Section 916 on gas detection systems. It adds a baseline detection threshold of 1/2 IDLH for non-flammable gases that require gas detection under other code sections, should a detection threshold not otherwise be specified by such sections. IDLH is a concentration that would allow an exposed individual 30 minutes to self evacuate, so half of that concentration is a conservative threshold for initiating an evacuation alarm associated with the risk of a pending acute hazard.

Specifying this value will also make it clear that it is not the intent of the IFC to begin broadly regulating non-flammable gases that have no other IFC/IBC regulated physical or health hazard characteristics based on chronic exposures in a work environment (i.e. PEL or TLV/TWA values). That is the purview of OSHA, not the fire code.

Cost Impact: Will not increase the cost of construction
This proposal does not add additional construction requirements.
Proponent: Joe McElvaney, self, representing Self (joemcelvaney@gmail.com)

2015 International Fire Code

Add new text as follows:

105.7.19 Mass Notification System. A construction permit is required to install a Mass Notification System.

SECTION 202 DEFINITIONS

MASS NOTIFICATION SYSTEM. A system that provides information and instructions to people inside buildings, outdoors areas or other spaces.

902.1 Definitions. The following terms are defined in Chapter 2:

   ALARM NOTIFICATION APPLIANCE.
   ALARM SIGNAL.
   ALARM VERIFICATION FEATURE.
   ANNUNCIATOR.
   AUDIBLE ALARM NOTIFICATION APPLIANCE.
   AUTOMATIC.
   AUTOMATIC FIRE-EXTINGUISHING SYSTEM.
   AUTOMATIC SMOKE DETECTION SYSTEM.
   AUTOMATIC SPRINKLER SYSTEM.
   AUTOMATIC WATER MIST SYSTEM.
   AVERAGE AMBIENT SOUND LEVEL.
   CARBON DIOXIDE EXTINGUISHING SYSTEM.
   CLEAN AGENT.
   COMMERCIAL MOTOR VEHICLE.
   CONSTANTLY ATTENDED LOCATION.
   DELUGE SYSTEM.
   DETECTOR, HEAT.
   DRY-CHEMICAL EXTINGUISHING AGENT.
   ELEVATOR GROUP.
   EMERGENCY ALARM SYSTEM.
   EMERGENCY VOICE/ALARM COMMUNICATIONS.
   FIRE ALARM BOX, MANUAL.
   FIRE ALARM CONTROL UNIT.
   FIRE ALARM SIGNAL.
   FIRE ALARM SYSTEM.
   FIRE AREA.
   FIRE DETECTOR, AUTOMATIC.
   FIRE PROTECTION SYSTEM.
   FIRE SAFETY FUNCTIONS.
   FIXED BASE OPERATOR (FBO).
   FOAM-EXTINGUISHING SYSTEM.
   HALOGENATED EXTINGUISHING SYSTEM.
   IMPAIRMENT COORDINATOR.
SECTION 916 MASS NOTIFICATION SYSTEM

916.1 General. Mass notification systems shall be installed, tested and maintained per NFPA 72.

Reason: Currently these systems are being installed in large complexes like hospitals, business campuses, and colleges to name a few. At this time the IFC does not require this type of system to be reviewed or approved by the AHJ. In order to design and install these systems the AHJ needs to be part of the design. The local AHJ, Police, Fire EMS will be responding to an event when this system is being used. Please note that this new code section does not require this system it will only require them to comply with NFPA 72.

Cost Impact: Will increase the cost of construction
The cost will increase due to the fact that now when a system is being installed the local AHJ will be reviewing the system to make sure that the system is installed per NFPA 72.
2015 International Fire Code

SECTION 202 DEFINITIONS

EMERGENCY VOICE/ALARM COMMUNICATIONS. Dedicated manual or automatic facilities for originating and distributing voice instructions, as well as alert and evacuation signals pertaining to a fire emergency, to the occupants of a building.

Add new definition as follows:

EMERGENCY COMMUNICATION SYSTEM. A system for the protection of life and property by indicating the existence of an emergency situation and communicating information necessary to facilitate an appropriate response and action.

EMERGENCY RESPONSE PLAN. A documented set of actions to address the planning for, management of, and response to natural, technological, and man-made disasters and other emergencies. Examples include but not limited to fire safety, evacuation and lockdown plans.

105.7.5 Emergency communication system. A construction permit is required for installation of or modification to emergency communication systems and related equipment. Maintenance performed in accordance with this code is not considered to be a modification and does not require a construction permit.

SECTION 916 EMERGENCY COMMUNICATION SYSTEMS

916.1 Mass Notification An approved Emergency Communication System incorporating mass notification shall be provided for the following occupancies when required by a Risk Analysis prepared in accordance with 916.3. The emergency communication system shall comply with Sections 916.2 through 916.5.

Required Occupancies:

1. New Group E occupancies
2. New college-university Group B occupancies
3. New college-university Group A occupancies
4. New college-university Group R-2 occupancies operated by a college or university for student or staff housing

Exception: Occupancies with an occupant load of 100 or less.

916.2 Permit Construction permit shall be required to install emergency communication systems as set forth in Section 105.7.5.

916.3 Risk Analysis A risk analysis and the emergency communication provisions of mass notification and emergency response plan shall be in accordance with NFPA 72, Section
24.3.11.

916.3.1 Approval. A risk analysis shall be submitted to the Fire Code Official for approval.

916.4 System design. Emergency communication systems shall be selected and designed based upon the completed emergency response plan, and input provided by the school administration, law enforcement agencies responsible for the facility and the fire code official.

916.5 Installation, testing and maintenance. Emergency communication systems shall be installed, tested and maintained in accordance NFPA 72 and applicable requirements in this code.

Reason: The need for real-time effective emergency communications in the United States came into sharp focus in the 20th century in response to threats to homeland security and our educational occupancies. We have learned from the recent incidents that occurred in our college/university campuses and other buildings, and have created installation guidelines to be followed for Life Safety. [Aurora, CO. Theater 2012; Columbine 1999; Virginia Tech 2007; Sandy Hook 2012; Weather Tornadoes/Storms]]

There are no national code requirements for these systems. That is causing issues with owners that understand they need improved emergency communications to the masses, and are taking steps that they think may be of value, but in some cases are not due to lack of codes and standards enforcement.

This mission was presented to the FCAC by the CCFS Center for Campus Fire Safety; their survey and research of their national membership showed the need for codes in this area for educational/college/university applications. This is considered a very important first step in Life Safety in these areas.

This code change proposal provides a requirement that a Risk Analysis and an Emergency Response Plan be created for every new educational occupancy and every new A, B occupancy for colleges and universities and new R-2 -occupancies operated by a college or university for student or staff housing.

If the completed Risk Analysis indicates that an Emergency Communication System is warranted for the occupancy, this proposal then provides a process for obtaining a permit from the fire code official and refers to NFPA 72 for system installation and maintenance.

When a mass disaster event occurs, and they are occurring, the need for real time information communicated in a clear and concise method via various paths is very critical to Life Safety. The Risk Analysis and the Emergency Response Plan have been shown to be the needed steps to take in this complicated life safety concern today and in the future.

NFPA 72 National Fire Alarm and Signaling Code has a chapter dedicated to Emergency Communication Systems. The information/requirements for Risk Analysis and qualifications for those performing these services are within NFPA 72; they are matured and are in the 3rd cycle of revisions.

This is NOT intended to require a Mass Notification System in every educational occupancy. There are many elements contained within a Mass Notification System, the process of the Risk Analysis will outline what is needed based on Risk and engineering study for the occupancy. It will be the responsibility of the engineer/designer of the education occupancy to perform and then react to the Risk Analysis.

There are some new terms being introduced and the industry is evolving. The proposed definitions are intended to assist the reader and code enforcer. ECS-Emergency Communication Systems are the major/overall classification. It covers One Way, Two Way, Wide Area (outside) In-Building Mass Notification and Distributed Recipient (Cell phone, laptop) forms of communication. All of this is covered in detail in NFPA 72. Mass Notification is a subset of ECS for all hazards concerns. Another is EVACS which is the Em Voice Alarm Communication System which is defined for FIRE incidents, and now can be utilized for mass notification.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire safety and hazardous materials in new and existing buildings and facilities and the protection of life and property in wildland urban interface areas. In 2014 and 2015 the Fire-CAC has held 5 open meetings. In addition, there were numerous conference calls, Regional Work Group and Task Group meetings for the current code development cycle, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC
**Cost Impact:** Will increase the cost of construction
The cost for conducting a Risk Analysis would range from $5,000 to $15,000 per building depending on complexity.
F229-16
IFC: 1031.2.2 (New).

Proponent: Michael O'Brien representing the Fire Code Action Committee (FCAC@iccsafe.org)

2015 International Fire Code

Add new text as follows:

1031.2.2 Locking arrangements in educational occupancies In Group E occupancies, Group B educational occupancies and Group I-4 child day care occupancies, egress doors from classrooms, offices and other occupied rooms shall be permitted to be provided with locking arrangements designed to keep intruders from entering the room where all of the following conditions are met:

1. The door shall be capable of being unlocked from outside the room with a key or other approved means.
2. The door shall be openable from within the room in accordance with Section 1010.1.9.
3. Modifications shall not be made to existing listed panic hardware, fire door hardware or door closers.
4. Modifications to fire door assemblies shall be in accordance with NFPA 80.

Reason: This proposal replicates the amendments adding IEBC Sections 403.2 and 704.2 (see EB23-15). It is being added to the International Fire Code in order to facilitate enforcement in the maintenance of egress routes in existing buildings.

In addition to the occupancies covered in EB23-15, this committee is proposing to add Group I-4 Child Day Care occupancies. The committee felt that child day care occupancies would have similar protection needs as Group E and Group B educational occupancies, and therefore should be added to this proposal. Should this version be adopted, the committee would ask ICC staff to update IEBC 403.2 and 704.2, for consistency.

The following justification is excerpted from the justification provided for EB23-15:

"Unfortunately active shooter incidents in schools are a threat in modern society that have resulted in the need to quickly secure classrooms and other occupied areas to keep unwanted intruders from entering.

Many unlisted devices are being used to secure the doors from being opened. Many of these devices have not been evaluated to insure they operate properly and do not impair door operation. These devices are being deployed in periodic lockdown drills, and present the potential for students or unauthorized personnel to secure the doors so the rooms cannot be entered.

This proposal allows key actuated deadbolts or other locks to be provided on classroom doors, where the teacher can choose to lock the door and provide shelter-in-place in the classroom. The proposed change also requires the door to be able to be unlocked from the opposite side in cases where the school administrator or responders wish to enter the room without having to make a forcible entry.

Door hardware is currently available that allows a classroom to be provided with lockdown capabilities that comply with applicable IBC Chapter 10 requirements. However, the costs of retrofitting doors with that hardware far exceed the cost of retrofitting with a simple deadbolt lock. This is a significant issue for school systems who are continually facing budget restrictions."

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire.
safety and hazardous materials in new and existing buildings and facilities and the protection of life and property in wildland urban interface areas. In 2014 and 2015 the Fire-CAC has held 5 open meetings. In addition, there were numerous conference calls, Regional Work Group and Task Group meetings for the current code development cycle, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC

Cost Impact: Will not increase the cost of construction
This proposal allows an option for door hardware, and does not require any additional materials that are not already required in the codes.

F229-16 : 1031.2.2 (NEW)-O'BRIAN10845
F230-16
IFC: 1031.7.

Proponent: Michael O'Brien representing the Fire Code Action Committee (FCAC@iccsafe.org)

2015 International Fire Code

Revise as follows:

1031.7 Emergency escape and rescue openings. Required emergency escape and rescue openings shall be maintained in accordance with the code in effect at the time of construction, and both of the following:

1. Required emergency and escape rescue openings shall be operational from the inside of the room without the use of keys or tools.
2. Bars, grilles, grates or similar devices are allowed to be placed over emergency and escape rescue openings provided the minimum net clear opening size complies with the code that was in effect at the time of construction and such devices shall be releasable or removable from the inside without the use of a key, tool or force greater than that which is required for normal operation of the emergency and escape rescue openings.

Reason: This proposal is merely editorial and formatting. Currently, the 1st sentence refers to complying with "the following", but then there is no list of items as a code user would expect. This proposal merely reformats the section to eliminate the confusion with no change in application or intent.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire safety and hazardous materials in new and existing buildings and facilities and the protection of life and property in wildland urban interface areas. In 2014 and 2015 the Fire-CAC has held 5 open meetings. In addition, there were numerous conference calls, Regional Work Group and Task Group meetings for the current code development cycle, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC

Cost Impact: Will not increase the cost of construction
This is a reformat without change in application.
2015 International Fire Code

1101.2 Intent. The intent of this chapter is to provide a minimum degree of fire and life safety to persons occupying existing buildings by providing minimum construction requirements where such existing buildings do not comply with the minimum requirements of the International Building Code.

Add new text as follows:

1101.2.1 Coordination with building code requirements. The provisions of this chapter shall not be construed to allow an elimination or reduction of the building construction requirements in the building code in effect at the time of construction.

1101.2.2 Conflict with building codes. Where the provisions of this chapter conflict with the building code in effect at the time of construction, the most restrictive provision shall apply.

Revise as follows:

1103.1 Required construction. Existing buildings shall comply with not less than the minimum provisions specified in Table 1103.1 and as further enumerated in Sections 1103.2 through 1103.10.

The provisions of this chapter in Section 1103 shall not be construed to allow the elimination of fire protection systems or a reduction in the level of fire safety provided by requirements of the codes in buildings constructed in accordance with previously adopted codes in effect at the time of construction.

Exceptions:

1. Where a change in fire-resistance rating has been approved in accordance with Section 803.6 of the International Existing Building Code.
2. Group U occupancies.

1104.1 General. Means of egress in existing buildings shall comply with the minimum egress requirements where specified in Table 1103.1 as further enumerated in Sections 1104.2 through 1104.25, and the building code that applied at the time of construction. Where the provisions of this chapter conflict with the building code that applied at the time of construction, the most restrictive provision shall apply. Existing buildings that were not required to comply with a building code at the time of construction shall comply with the minimum egress requirements where specified in Table 1103.1 as further enumerated in Sections 1104.2 through 1104.25.

Add new text as follows:

1104.1.1 Application of construction code requirements. The provisions in Section 1104 shall not be construed to allow an elimination or reduction in the means of egress requirements of the codes in effect at the time of construction. Existing buildings that were not required to comply with a building code at the time of construction shall comply with the minimum egress requirements when specified in Table 1103.1 as further enumerated in Sections 1104.2 through 1104.25.
**Reason:** This proposal intends to clarify the application of the requirements in the IFC Chapter 11. There has been confusion as to how to apply the requirements in Chapter 11 in an existing building when the requirements in the building code that the building was constructed under are different than the requirements in Chapter 11. The exception stating that Group U occupancies do not need to comply is moved from Section 1103.1 to 1101.2 so it clearly applies to the entire chapter. Additionally in 1101.2.1, it is stated that the original code requirements cannot be lessened or eliminated simply because the building is now considered "existing". The mitigation measures in Chapter 11 are designed to provide mitigation to previously approved building design methods that are no longer allowed because they have repeatedly resulted in fatalities during fire events. The requirements in Chapter 11 provide a solution to deal with a known hazard in the building design without requiring compliance with the current code. Section 1101.2.2 is added and contains the relocated text from 1104.1. This section states that the most restrictive requirement shall apply when comparing requirements in Chapter 11 to the building code the building was constructed under.

The means of egress in existing buildings must meet BOTH of the following requirements:

1. MoE must be maintained at the minimum requirements applicable at the time of construction.
2. MoE must meet the minimum requirements in IFC Chapter 11.

The building must meet both of these requirements. For example, when a building is constructed and the minimum corridor width is 8 feet, the fact that IFC Chapter 11 only requires a minimum width of 4 feet, does not mean that the corridor width then be reduced to 4 feet after construction? The building must meet IFC Chapter 11 (minimum 4'), AND it must meet the requirement applicable at the time of construction (minimum 8'). By maintaining the 8' wide corridor, the building complies with both requirements.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire safety and hazardous materials in new and existing buildings and facilities and the protection of life and property in wildland urban interface areas. In 2014 and 2015 the Fire-CAC has held 5 open meetings. In addition, there were numerous conference calls, Regional Work Group and Task Group meetings for the current code development cycle, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: [FCAC](#)

**Cost Impact:** Will not increase the cost of construction

This proposal does not change any requirement for construction of a building.
F232-16
IFC: 1103.1.

Proponent: Steven Orlowski, representing Building Owners and Managers Association International (sorlowski@boma.org); David Collins, representing The American Institute of Architects (dcollins@preview-group.com)

2015 International Fire Code

Add new text as follows:

1103.1 Required construction. Existing buildings shall comply with not less than the minimum provisions specified in Table 1103.1 and as further enumerated in Sections 1103.2 through 1103.10.

The provisions of this chapter shall not be construed to allow the elimination of fire protection systems or a reduction in the level of fire safety provided in buildings constructed in accordance with previously adopted codes.

Exceptions:

1. Where a change in fire-resistance rating has been approved in accordance with Section 401.2.4 or 803.6 of the International Existing Building Code.

2. Group U occupancies.

Reason: This is an effort to coordinate the IFC with a code change which occurred during the Group A Cycle. Proposal EB16 added identical language from Section 803.6 and added it as a new Section 401.2.4 in the existing building code under the prescriptive work method. This proposal is a simple editorial change to include Section 401.2.4 in the exception, should the building owner choose to use the prescriptive method of the IEBC instead of the work area method.

Cost Impact: Will not increase the cost of construction

The proposal does not add any new language or requirements that do not already exist in the 2015 IFC.
# 2015 International Fire Code

## TABLE 1103.1
### OCCUPANCY AND USE REQUIREMENTS<sup>a</sup>

<table>
<thead>
<tr>
<th>SECTION</th>
<th>USE</th>
<th>OCCUPANCY CLASSIFICATION</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>High-rise</td>
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<tr>
<td>1103.4.9</td>
<td>R</td>
<td>R</td>
</tr>
</tbody>
</table>

### Additional Notes

- <sup>a</sup> Table values are subject to specific conditions and regulations outlined in the code.
- Conditions and requirements for each use category under High-rise, Atrium or covered mall, and Under-ground building are detailed in the respective sections of the code.

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**ICC COMMITTEE ACTION HEARINGS :: April, 2016**

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**F459**
| 1103.6.1 | R | — | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | — | R |
| 1103.6.2 | R | — | R | R | R | R | R | R | R | R | R | R | R | R | — | R | — | — | R |
| 1103.7.1 | — | — | — | — | — | R | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| 1103.7.2 | — | — | — | — | — | — | — | — | — | — | — | R | — | — | — | — | — | — | — | — |
| 1103.7.3 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| 1103.7.4 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| 1103.7.5 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| 1103.7.6 | — | — | — | — | — | — | — | — | — | — | — | R | — | — | — | — | — | — | — | — |
| 1103.7.7 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| 1103.7.8 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| 1103.7.9 | R | — | — | — | — | — | — | — | — | — | — | — | R | R | R | R | R | R | — |
| 1104.1 | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R |
| 1105.1 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | R | — | — | — | — |
| 1106.1 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |

a. Existing buildings shall comply with the sections identified as "Required" (R) based on occupancy classification or use, or both, whichever is applicable.

b. Only applies to Group I-2 Condition 2 as established by the adopting ordinance.

c. Only applies to Group A-2 occupancies.

R = The building is required to comply.

**Reason:** The intent of this proposal is to coordinate the table for the proper application of mandatory retrofits as applied to Groups I-1, I-2, I-4 and R-4. These are all mandatory retrofits that need to be carefully considered. Most of the changes to the tables are applicable if the changes to the sections are approved. Group I-4 and R-4 buildings should not reference provisions for buildings over 50 feet and buildings with heliports on the roof (IFC Sections 1103.6.1 and 1103.6.2). Group R-4 Condition 1 are permitted to have an NFPA13D sprinkler system. IFC Sections 1103.4.2, and 1104.3.3 are in conflicts with the current open stairway allowances in the IBC Section 1019.3 Item 4. This goes against the provisions that allow for existing facilities to remain as is.

This proposal is submitted by the ICC Code Technology Committee (CTC). The ICC Board has decided to sunset the CTC. The sunset plan includes re-assigning many of the CTC Areas of Study to the applicable Code Action Committee (CAC). The two remaining CTC Areas of Study are Care Facilities and Elevator Lobbies/WTC Elevator issues. This proposal falls under the Care Facilities Area of Study. In 2014 and 2015 ICC CTC Committee has held 4 open meetings and numerous Work Group meetings and conference calls for the current code development cycle which included members of the committees as well as any interested party to discuss and debate the proposed changes. Information on the CTC, including: the sunset plan; meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the CTC website [CTC](http://www.iccsafe.org).

**Cost Impact:** Will not increase the cost of construction

This is a clarification in the text, so there will be no change to construction costs.

F233-16 : TABLE 1103.1-
2015 International Fire Code

Revise as follows:

1103.2 Emergency responder radio coverage in existing buildings. Existing buildings with one or more basements or below-grade building levels, underground buildings or buildings more than five stories in height that do not have approved radio coverage for emergency responders within the building, based upon the existing coverage levels of the public safety communication systems of the jurisdiction at the exterior of the building, shall be equipped with such coverage according to one of the following:

1. Where an existing wired communication system cannot be repaired or is being replaced, or where not approved in accordance with Section 510.1, Exception 1.
2. Within a time frame established by the adopting authority.

**Exception:** Where it is determined by the fire code official that the radio coverage system is not needed.

**Reason:** As presently written, the requirement to provide emergency responder radio coverage applies to all existing buildings that fall within the scope of the *International Fire Code*, regardless of use, occupancy, height or area. This code change would clarify the types of buildings where building construction could attenuate emergency responder radio communications.

When the requirement for emergency responder radio coverage was added to the 2009 IFC, the stated reason was that "large buildings have historically provided barriers to radio communications within them. This is why high rise buildings are required to install hard-wired, two-way communications systems." See F87-07/08.

The IFC commentary to section 510 (IFC section 510 addresses installations in new buildings) states that "though this section does not offer specific types of buildings that should be targeted, discussions with public safety radio professionals found that based on current radio technologies these requirements should be applied in any building with one or more basements or below grade levels, underground buildings, or buildings more than five stories in height."

Installing emergency responder radio coverage systems in existing buildings is expensive. In smaller buildings, the expense does not justify the benefits. This code change would limit the requirement to install emergency responder radio coverage systems to buildings where the system would provide an actual benefit.

**Cost Impact:** Will not increase the cost of construction

This proposal would reduce the cost of construction of smaller buildings.
### TABLE 1103.1

#### OCCUPANCY AND USE REQUIREMENTS

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<th>SECTION</th>
<th>USE</th>
<th>OCCUPANCY CLASSIFICATION</th>
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**Note:**

* Table 1103.1 shows the occupancy and use requirements as per the 2015 International Fire Code. The table categorizes different uses (Atrium or covered mall, Tire Storage, etc.) and their corresponding occupancy classifications (A through S). Each entry indicates whether a particular requirement is applicable (R) or not (—).
a. Existing buildings shall comply with the sections identified as “Required” (R) based on occupancy classification or use, or both, whichever is applicable.

b. Only applies to Group I-2 Condition 2 as established by the adopting ordinance.

c. Only applies to Group A-2 occupancies.

*R* = The building is required to comply.

**Revise as follows:**

**1103.2 Emergency responder radio coverage in existing buildings.** Existing buildings, other than Group R-3, that do not have approved radio coverage for emergency responders within the building, based upon the existing coverage levels of the public safety communication systems of the jurisdiction at the exterior of the building, shall be equipped with such coverage according to one of the following:

1. Where an existing wired communication system cannot be repaired or is being replaced, or where not approved in accordance with Section 510.1, Exception 1.
2. Within a time frame established by the adopting authority.

Exception: Where it is determined by the fire code official that the radio coverage system is not needed.
**1103.3 Existing elevators.** Existing
In other than Group R-3, existing elevators, escalators and moving walks shall comply with the requirements of Sections 1103.3.1 and 1103.3.2.

**Reason:** Chapter 11 contains mandatory retroactive construction requirements that need to be carefully considered. This proposal intends to correlate Table 1103.1 with the requirements in Chapter 11 and changes that have occurred in recent code cycle and clarify its application.
Sections 1103.2 and 1103.3 are revised to specify that they do not apply to Group R-3 occupancies. Emergency responder radio coverage and Phase I elevator recall do not seem reasonable as retroactive requirements in a Group R-3.
The reference to Group R-4 is removed from Sections 1103.4.2 and 1103.4.3. IBC Section 310.6 specifies that Group R-4 occupancies can be constructed meeting the requirements for Group R-3 occupancies, with few exceptions. Group R-3 is not included in in these requirements, so Group R-4 should not be either.
Section 1103.4.10 is inserted into Table 1103.1 because it is currently not included.
Section 1103.5.3 is moved to a separate row to clarify that the footnote does not apply to Section 1103.5.2. Additionally, the footnote is moved to the cell for Group I-2 occupancies since it only applies to those facilities.
Group R-4 is removed from Sections 1103.6.1 and 1103.6.2 since the sections are not applicable to Group R-3 occupancies and standpipes are not required for the construction of a new Group R-4 based on the exception in Section 905.3.
Section 1103.10 is inserted into Table 1103.1 because it is currently not included.
Section 1106 is revised by adding a new ‘Use’ column identified as Tire Storage. The reference to Group I-2 is completely misplaced, since Section 1106 only applies to outdoor tire storage.
This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire safety and hazardous materials in new and existing buildings and facilities and the protection of life and property in wildland urban interface areas. In 2014 and 2015 the Fire-CAC has held 5 open meetings. In addition, there were numerous conference calls, Regional Work Group and Task Group meetings for the current code development cycle, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC

**Cost Impact:** Will not increase the cost of construction
This is a clarification in the text, so there will be no change to construction costs.

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F235-16 : TABLE 1103.2-O'BRIAN13185
F236-16
IFC: 1103.3.1.
Proponent: John Williams, CBO, representing Adhoc Healthcare Committee (AHC@iccsafe.org)

2015 International Fire Code

Revise as follows:

1103.3.1 Elevators, escalators and moving walks. Existing elevators, escalators and moving walks in Group I-2 Condition 2 occupancies and serving ambulatory care facilities shall comply with ASME A17.3.

Reason: The purpose of this code change is to include ambulatory care into the retroactive requirements for design and maintenance of elevators. These vertical elements are important in these facilities considering that they are useful tool in evacuation of non-ambulatory patients. Only elevators serving ambulatory care spaces should have this extra requirement. For example, if an ambulatory care facility existing only on the level of exit discharge of a building and an elevator in that building would serve no functional purpose for evacuating the ambulatory care facility - then there is no need to apply this requirement.

This proposal is submitted by the ICC Ad Hoc Committee on Healthcare (AHC). The AHC was established by the ICC Board to evaluate and assess contemporary code issues relating to hospitals and ambulatory healthcare facilities. This is a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. In 2014 and 2015 the ICC Ad Hoc Committee has held 4 open meetings and numerous Work Group meetings and conference calls for the current code development cycle which included members of the committees as well as any interested party to discuss and debate the proposed changes. Information on the AHC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the AHC effort can be downloaded from the AHC website at: AHC.

Cost Impact: Will increase the cost of construction

For those facilities that do not receive medicare funding, this would require that an elevator serving them to be upgraded if it did not comply with ASME A17.3.
IFC: 1103.4, 1103.4.1, 1103.4.10, 1103.4.2, 1103.4.3, 1103.4.4, 1103.4.5, 1103.4.6, 1103.4.7, 1103.4.8, 1103.4.9, 1103.4.9.1, 1103.4.9.2, 1103.4.9.2.1, 1103.4.9.2.2, 1103.4.9.3, 1103.4.9.4, 1103.4.9.5.

Proponent: Bryan Romney, representing self (bryan.romney@fm.utah.edu)

2015 International Fire Code

Revise as follows:

1103.4 Vertical openings. Interior vertical openings, including but not limited to stairways, elevator hoistways, service and utility shafts, that connect two or more stories of a building, shall be enclosed or protected as specified in Sections 1103.4.1 through 1103.4.10. Section 713 of the International Building Code.

Delete without substitution:

1103.4.1 Group I-2 and I-3 occupancies. In Group I-2 and I-3 occupancies, interior vertical openings connecting two or more stories shall be protected with 1-hour fire-resistance-rated construction.

Exceptions:

1. In Group I-2, unenclosed vertical openings not exceeding two connected stories and not concealed within the building construction shall be permitted as follows:
   1.1. The unenclosed vertical openings shall be separated from other unenclosed vertical openings serving other floors by a smoke barrier.
   1.2. The unenclosed vertical openings shall be separated from corridors by smoke partitions.
   1.3. The unenclosed vertical openings shall be separated from other fire or smoke compartments on the same floors by a smoke barrier.
   1.4. On other than the lowest level, the unenclosed vertical openings shall not serve as a required means of egress.

2. In Group I-2, atriums connecting three or more stories shall not require 1-hour fire-resistance-rated construction where the building is equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3, and all of the following conditions are met:
   2.1. For other than existing approved atriums with a smoke control system, where the atrium was constructed and is maintained in accordance with the code in effect at the time the atrium was created, the atrium shall have a smoke control system that is in compliance with Section 909.
   2.2. Glass walls forming a smoke partition or a glass-block wall assembly shall be permitted when in compliance with Condition 2.2.1 or 2.2.2.
   3.1. Glass walls forming a smoke partition shall be permitted where all of the following conditions are met:
   3.1.1. Automatic sprinklers are provided along both sides of the separation wall and doors, or on the room side only if there is
not a walkway or occupied space on the atrium side.

3.1.2. The sprinklers shall be not more than 12 inches (305 mm) away from the face of the glass and at intervals along the glass of not greater than 72 inches (1829 mm).

3.1.3. Windows in the glass wall shall be non-operating type.

3.1.4. The glass wall and windows shall be installed in a gasketed frame in a manner that the framing system deflects without breaking (loading) the glass before the sprinkler system operates.

3.1.5. The sprinkler system shall be designed so that the entire surface of the glass is wet upon activation of the sprinkler system without obstruction.

3.2. A fire barrier is not required where a glass block wall assembly complying with Section 2110 of the International Building Code and having a 3 3/4-hour fire protection rating is provided.

2-3. Where doors are provided in the glass wall, they shall be either self-closing or automatic-closing and shall be constructed to resist the passage of smoke.

3. In Group I-3 occupancies, exit stairways or ramps and exit access stairways or ramps constructed in accordance with Section 408 in the International Building Code.

1103.4.2 Three to five stories. In other than Group I-2 and I-3 occupancies, interior vertical openings connecting three to five stories shall be protected by either 1-hour fire-resistance-rated construction or an automatic sprinkler system shall be installed throughout the building in accordance with Section 903.3.1.1 or 903.3.1.2.

Exceptions:
1. Vertical opening protection is not required for Group R-3 occupancies.
2. Vertical opening protection is not required for open parking garages.
3. Vertical opening protection for escalators shall be in accordance with Section 1103.4.5, 1103.4.6 or 1103.4.7.
4. Exit access stairways and ramps shall be in accordance with Section 1103.4.8.

1103.4.3 More than five stories. In other than Group I-2 and I-3 occupancies, interior vertical openings connecting more than five stories shall be protected by 1-hour fire-resistance-rated construction.

Exceptions:
1. Vertical opening protection is not required for Group R-3 occupancies.
2. Vertical opening protection is not required for open parking garages.
3. Vertical opening protection for escalators shall be in accordance with Section 1103.4.5, 1103.4.6 or 1103.4.7.
4. Exit access stairways and ramps shall be in accordance with Section
1103.4.8.  

1103.4.4 - Atriums and covered malls. In other than Group I-2 and I-3 occupancies, interior vertical openings in a covered mall building or a building with an atrium shall be protected by either 1-hour fire-resistance-rated construction or an automatic sprinkler system shall be installed throughout the building in accordance with Section 903.3.1.1 or 903.3.1.2.

Exceptions:
1. Vertical opening protection is not required for Group R-3 occupancies.
2. Vertical opening protection is not required for open parking garages.
3. Exit access stairways and ramps shall be in accordance with Section 1103.4.8.

1103.4.5 - Escalators in Group B and M occupancies. In Group B and M occupancies, escalators creating vertical openings connecting any number of stories shall be protected by either 1-hour fire-resistance-rated construction or an automatic sprinkler system in accordance with Section 903.3.1.1 installed throughout the building, with a draft curtain and closely spaced sprinklers around the escalator opening.

1103.4.6 - Escalators connecting four or fewer stories. In other than Group B and M occupancies, escalators creating vertical openings connecting four or fewer stories shall be protected by either 1-hour fire-resistance-rated construction or an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 shall be installed throughout the building, and a draft curtain with closely spaced sprinklers shall be installed around the escalator opening.

1103.4.7 - Escalators connecting more than four stories. In other than Group B and M occupancies, escalators creating vertical openings connecting five or more stories shall be protected by 1-hour fire-resistance-rated construction.

1103.4.8 - Occupancies other than Group I-2 and I-3. In other than Group I-2 and I-3 occupancies, floor openings containing exit access stairways or ramps that do not comply with one of the conditions listed in this section shall be protected by 1-hour fire-resistance-rated construction:

1. Exit access stairways and ramps that serve, or atmospherically communicate between, only two stories. Such interconnected stories shall not be open to other stories.
2. In Group R-1, R-2 or R-3 occupancies, exit access stairways and ramps connecting four stories or less serving and contained within an individual dwelling unit or sleeping unit or live/work unit.
3. Exit access stairways and ramps in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, where the area of the vertical opening between stories does not exceed twice the horizontal projected area of the stairway or ramp, and the opening is protected by a draft curtain and closely spaced sprinklers in accordance with NFPA 13. In other than Group B and M occupancies, this provision is limited to openings that do not connect more than four stories.
4. Exit access stairways and ramps within an atrium complying with the provisions of Section 404 of the International Building Code.
5. Exit access stairways and ramps in open parking garages that serve only the parking garage.
6. Exit access stairways and ramps serving open-air seating complying with the exit access travel-distance requirements of Section 1029.7 of the International Building Code.
7. Exit access stairways and ramps serving the balcony, gallery or press box and the main assembly floor in occupancies such as theaters, places of religious worship, auditoriums and sports facilities.

1103.4.9 Waste and linen chutes. In Group I-2 occupancies, existing waste and linen chutes shall comply with Sections 1103.4.9.1 through 1103.4.9.5.

1103.4.9.1 Enclosure. Chutes shall be enclosed with 1-hour fire-resistance-rated construction. Opening protectives shall be in accordance with Section 716 of the International Building Code and have a fire protection rating of not less than 1 hour.

1103.4.9.2 Chute intakes. Chute intakes shall comply with Section 1103.4.9.2.1 or 1103.4.9.2.2.

1103.4.9.2.1 Chute intake direct from corridor. Where intake to chutes is direct from a corridor, the intake opening shall be equipped with a chute-intake door in accordance with Section 716 of the International Building Code and having a fire protection rating of not less than 1 hour.

1103.4.9.2.2 Chute intake via a chute-intake room. Where the intake to chutes is accessed through a chute-intake room, the room shall be enclosed with 1-hour fire-resistance-rated construction. Opening protectives for the intake room shall be in accordance with Section 716 of the International Building Code and have a fire protection rating of not less than 3/4 hour. Opening protective for the chute enclosure shall be in accordance with Section 1103.4.9.1.

1103.4.9.3 Automatic sprinkler system. Chutes shall be equipped with an approved automatic sprinkler system in accordance with Section 903.2.11.2.

1103.4.9.4 Chute discharge rooms. Chutes shall terminate in a dedicated chute discharge room. Such rooms shall be separated from the remainder of the building by not less than 1-hour fire-resistance-rated construction. Opening protectives shall be in accordance with Section 716 of the International Building Code and have a fire protection rating of not less than 1 hour.

1103.4.9.5 Chute discharge protection. Chute discharges shall be equipped with a self-closing or automatic-closing opening protective in accordance with Section 716 of the International Building Code and having a fire protection rating of not less than 1 hour.

1103.4.10 Flue-fed incinerators. Existing flue-fed incinerator rooms and associated flue shafts shall be protected with 1-hour fire-resistance-rated construction and shall not have other vertical openings connected with the space other than the associated flue. Opening protectives shall be in accordance with Section 716 of the International Building Code and have a fire protection rating of not less than 1 hour.

Reason: Reason: The IFC has requirements for Shaft Enclosures in existing buildings which differ than the requirements for shaft enclosures in the IBC. The intent of IFC Section 1101 "is to provide a minimum degree of fire and life safety to persons occupying existing buildings by providing minimum construction requirements where such existing buildings do not comply with the minimum requirements of the International Building Code."

The IFC continues with the next section thus: "1101.3 Permits. Permits shall be required as set forth in Sections 105.6 and 105.7 and the International Building Code."

The disparity between the IFC and IBC is rather significant and the IFC requirements should correlate with the IBC requirements. The revisions as proposed in this code change to the IFC Section 1103.4 will correlate both codes. IFC Section 1101.3 Permits will require the building owner to apply for a permit with the Building Official. As such, the plans submitted for a permit with the Building Official would need to comply with the IBC. The provisions of IFC Section 1104 are not consistent with the IBC, ultimately putting the building and fire officials and the owner in a
conflicting position. Correlation between the IBC Section 713 and IFC 1103.4 obviously needs correlation in order to provide not only a safe environment but also to eliminate potential conflicts.

Cost Impact: Will increase the cost of construction
Cost Impact: Little to no cost impact. Since the IFC 1103.4 will require alterations to existing shafts, the construction cost to comply with the IBC Section 713 requirements represent little if no additional cost.
Add new text as follows:

1103.5.1 **Group A-2.** Where alcoholic beverages are consumed in a Group A-2 occupancy having an occupant load of 300 or more, the fire area containing the Group A-2 occupancy shall be equipped with an automatic sprinkler system in accordance with Section 903.3.1.1.

### TABLE 1103.1

**OCCUPANCY AND USE REQUIREMENTS**

<table>
<thead>
<tr>
<th>SECTION</th>
<th>USE</th>
<th>OCCUPANCY CLASSIFICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>High-rise</td>
<td>A</td>
</tr>
<tr>
<td>1103.2</td>
<td>R</td>
<td>R</td>
</tr>
<tr>
<td>1103.3</td>
<td>R</td>
<td>—</td>
</tr>
<tr>
<td>1103.4.1</td>
<td>R</td>
<td>—</td>
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<tr>
<td>1103.4.2</td>
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<td>1103.4.3</td>
<td>R</td>
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<td>1103.4.4</td>
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<td>R</td>
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<td>1103.4.5</td>
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<td>1103.4.6</td>
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<td>1103.4.7</td>
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<tr>
<td>1103.4.8</td>
<td>R</td>
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</tr>
<tr>
<td>1103.4.9</td>
<td>R</td>
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</tr>
</tbody>
</table>

**ICC COMMITTEE ACTION HEARINGS :::: April, 2016**

F472
### TABLE 903.2.11.6
**ADDITIONAL REQUIRED FIRE SUPPRESSION SYSTEMS**

<table>
<thead>
<tr>
<th>SECTION</th>
<th>SUBJECT</th>
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</thead>
<tbody>
<tr>
<td>914.2.1</td>
<td>Covered and open mall buildings</td>
</tr>
<tr>
<td>914.3.1</td>
<td>High-rise buildings</td>
</tr>
<tr>
<td>914.4.1</td>
<td>Atriums</td>
</tr>
<tr>
<td>914.5.1</td>
<td>Underground structures</td>
</tr>
<tr>
<td>914.6.1</td>
<td>Stages</td>
</tr>
</tbody>
</table>

**a.** Existing buildings shall comply with the sections identified as "Required" (R) based on occupancy classification or use, or both, whichever is applicable.

**b.** Only applies to Group I-2 Condition 2 as established by the adopting ordinance.

**c.** Only applies to Group A-2 occupancies where alcoholic beverages are consumed.

R = The building is required to comply.
<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>914.7.1</td>
<td>Special amusement buildings</td>
</tr>
<tr>
<td>914.8.2</td>
<td>Airport traffic control towers</td>
</tr>
<tr>
<td>914.8.3, 914.8.6</td>
<td>Aircraft hangars</td>
</tr>
<tr>
<td>914.9</td>
<td>Flammable finishes</td>
</tr>
<tr>
<td>914.10</td>
<td>Drying rooms</td>
</tr>
<tr>
<td>914.11.1</td>
<td>Ambulatory care facilities</td>
</tr>
<tr>
<td>1029.6.2.3</td>
<td>Smoke-protected assembly seating</td>
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<tr>
<td>1103.5.2</td>
<td>Pyroxyl plastic storage in existing buildings</td>
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<tr>
<td>1103.5.1</td>
<td>Existing Group A-2 occupancies</td>
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<tr>
<td>1103.5.3</td>
<td>Existing Group I-2 occupancies</td>
</tr>
<tr>
<td>1103.5.4</td>
<td>Existing Group I-2 Condition 2 occupancies</td>
</tr>
<tr>
<td>2108.2</td>
<td>Dry cleaning plants</td>
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<td>2108.3</td>
<td>Dry cleaning machines</td>
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<tr>
<td>2309.3.2.6.2</td>
<td>Hydrogen motor fuel-dispensing area canopies</td>
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<tr>
<td>2404.2</td>
<td>Spray finishing in Group A, E, I or R</td>
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<tr>
<td>2404.4</td>
<td>Spray booths and spray rooms</td>
</tr>
<tr>
<td>2405.2</td>
<td>Dip-tank rooms in Group A, I or R</td>
</tr>
<tr>
<td>2405.4.1</td>
<td>Dip tanks</td>
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<td>2405.9.4</td>
<td>Hardening and tempering tanks</td>
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<td>2703.10</td>
<td>HPM facilities</td>
</tr>
<tr>
<td>Section</td>
<td>Description</td>
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<td>---------</td>
<td>-------------</td>
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<tr>
<td>2703.10.1.1</td>
<td>HPM work station exhaust</td>
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<tr>
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<td>HPM gas cabinets and exhausted enclosures</td>
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<td>2703.10.4</td>
<td>HPM exhaust ducts</td>
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<tr>
<td>2703.10.4.1</td>
<td>HPM noncombustible ducts</td>
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<tr>
<td>2703.10.4.2</td>
<td>HPM combustible ducts</td>
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<td>2807.3</td>
<td>Lumber production conveyor enclosures</td>
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<tr>
<td>2808.7</td>
<td>Recycling facility conveyor enclosures</td>
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<tr>
<td>3006.1</td>
<td>Class A and B ovens</td>
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<tr>
<td>3006.2</td>
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<td>Table 3206.2</td>
<td>Storage fire protection</td>
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<tr>
<td>3206.4</td>
<td>Storage</td>
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<tr>
<td>5003.8.4.1</td>
<td>Gas rooms</td>
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<tr>
<td>5003.8.5.3</td>
<td>Exhausted enclosures</td>
</tr>
<tr>
<td>5004.5</td>
<td>Indoor storage of hazardous materials</td>
</tr>
<tr>
<td>5005.1.8</td>
<td>Indoor dispensing of hazardous materials</td>
</tr>
<tr>
<td>5104.4.1</td>
<td>Aerosol warehouses</td>
</tr>
</tbody>
</table>

For SI: 1 cubic foot = 0.023 m³.

**Reason:** This requirement implements the Recommendation #1 included in the NIST Report of the Technical Investigation of The Station Nightclub Fire (NIST NCSTAR 2: Vol. I). Recommendation 1 of the NIST report states: "Model codes should require sprinkler systems for all new and existing nightclubs regardless of size."

Group A-2 occupancies involve conditions such as large occupant loads, high occupant density, significant fuel loading and moveable furnishings and decorations. Group A-2 occupancies also include the potential for reduced lighting levels, high noise levels, combustible decorations, strobe and flashing lights, alcohol consumption, and confusing egress paths. Each of these alone can be a significant issue, but when combined they lead to the inability
of the occupants to promptly and safely exit the building under fire conditions.

This proposal does not reach as far as the recommendation from NIST. While the NIST proposal recommends fire sprinklers in ALL facilities, the proposed section requires the Group A-2 occupancy fire area where alcoholic drinks are consumed in excess of 300 occupants be provided with a fire sprinkler system. The section does not require the other fire areas that may be in the A-2 to be protected, nor does it require the entire floor to be protected. Setting the threshold at 300 occupants will place the requirement where the higher potential for loss of life exists.

The sprinkler retrofit requirement has been targeted to only apply to Group A-2 occupancies that serve alcoholic beverages. This is felt to be more in line with the NIST recommendations that were made following the Station Nightclub fire recognizing that intoxication of patrons plays a significant role in the potential risk of injury or loss of life in the event of a fire. In addition, limiting the scope of the change to only those occupancies where alcoholic beverages are consumed, allows a connection to licensing laws that jurisdictions typically have in place for sale of such beverages. Such licensing laws, where they apply, will provide significant leverage for jurisdictions to be able to effectively enforce the requirement for a fire sprinkler system as a condition of being code compliant and issuance of a license.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire safety and hazardous materials in new and existing buildings and facilities and the protection of life and property in wildland urban interface areas. In 2014 and 2015 the Fire-CAC has held 5 open meetings. In addition, there were numerous conference calls, Regional Work Group and Task Group meetings for the current code development cycle, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC

Cost Impact: Will increase the cost of construction
Adding a fire sprinkler system in an existing A-2 occupancy that serves alcohol will change the business plan of the owner. Investing into a fire sprinkler system in the long term will benefit the owner by protecting the investment, property, and life safety of the patrons, as well as reduce the liability to the owner and insurance premiums.

Staff Note: There is a published errata that has deleted the text for Section 1103.5.1 in the first printing of IFC, and the associated line in Table 1103.1. The text was as follows:

**1103.5.1 Group A-2.** An automatic sprinkler system shall be installed in accordance with Section 903.3.1.1 through-out existing buildings or portions thereof used as Group A-2 occupancies with an occupan load of 300 or more.
2015 International Fire Code

Revise as follows:

1103.9 Carbon monoxide alarms. Existing Group I-1, I-2, I-4 and R occupancies
   Carbon monoxide alarms shall be equipped with carbon monoxide alarms installed in accordance
   with Section 915, except that existing dwelling units and sleeping units when they include any of
   the conditions identified in Sections 915.1.2 through 915.1.6. The carbon monoxide alarms shall
   be allowed to be installed in the locations specified in Section 915.2.1 and the installation shall be
   solely battery operated in accordance with Section 915.4.

Exceptions:

1. Carbon monoxide alarms are permitted to be solely battery operated where the code
   that was in effect at the time of construction did not require carbon monoxide
   detectors to be provided.
2. Carbon monoxide alarms are permitted to be solely battery operated in dwelling units
   that are not served from a commercial power source.
3. A carbon monoxide detection system in accordance with Section 915.5 shall be an
   acceptable alternative to carbon monoxide alarms.

Reason: This proposal was developed by a Fire Code Action Committee working group consisting of FCAC,
   industry and fire service representatives.
   Most carbon monoxide poisoning fatalities in buildings occur in dwelling units with fuel burning appliances or
   attached garages. Requiring carbon monoxide alarms in these existing dwellings address this problem, and allowing
   battery powered units to be provided is a relatively low cost solution. This proposal focuses on this problem, and
   removes requirements for CO alarms to be provided in other existing Group I and R occupancies where the
   statistical risk of CO poisoning is not as great.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC
   Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire
   safety and hazardous materials in new and existing buildings and facilities and the protection of life and property in
   wildland urban interface areas. In 2014 and 2015 the Fire-CAC has held 5 open meetings. In addition, there were numerous conference calls, Regional Work Group and Task Group meetings for the current code development cycle, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC

Cost Impact: Will not increase the cost of construction
The proposal merely provides clarification on existing requirements.
Add new text as follows:

1104.5 Illumination emergency power. Where means of egress illumination is provided, the power supply for means of egress illumination shall normally be provided by the premises’ electrical supply. In the event of power supply failure, illumination shall be automatically provided from an emergency system for the following occupancies where such occupancies require two or more means of egress:

1. Group A having 50 or more occupants.
   **Exception:** Assembly occupancies used exclusively as a place of worship and having an occupant load of less than 300.

2. Group B buildings three or more stories in height, buildings with 100 or more occupants above or below a level of exit discharge serving the occupants or buildings with 1,000 or more total occupants.

3. Group E in interior exit access and exit stairways and ramps, corridors, windowless areas with student occupancy, shops and laboratories.

4. Group F having more than 100 occupants.
   **Exception:** Buildings used only during daylight hours and that are provided with windows for natural light in accordance with the *International Building Code*.

5. Group I.

6. Group M.
   **Exception:** Buildings less than 3,000 square feet (279 m\(^2\)) in gross sales area on one story only, excluding mezzanines.

7. Group R-1.
   **Exception:** Where each sleeping unit has direct access to the outside of the building at grade.

   **Exception:** Where each dwelling unit or sleeping unit has direct access to the outside of the building at grade.

   **Exception:** Where each sleeping unit has direct access to the outside of the building at ground level.

Reason: IBC Section 1006.3.2 Item 4 allows Group R-4 one exit (and emergency escape windows). Item 9 should not be in this text since this is a requirement for a two exit building. Doors directly to the outside are a bad idea for group homes that have concerns over wandering or flight.

This proposal is submitted by the ICC Code Technology Committee (CTC). The ICC Board has decided to sunset the CTC. The sunset plan includes re-assigning many of the CTC Areas of Study to the applicable Code Action Committee (CAC). The two remaining CTC Areas of Study are Care Facilities and Elevator Lobbies/WTC Elevator issues. This proposal falls under the Care Facilities Area of Study. In 2014 and 2015 ICC CTC Committee has held 4 open meetings and numerous Work Group meetings and conference calls for the current code development cycle which included members of the committees as well as any interested party to discuss and debate the proposed changes. Information on the CTC, including: the sunset plan; meeting agendas; minutes; reports; resource
documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the CTC website CTC.

**Cost Impact:** Will not increase the cost of construction
This is a clarification in the text, so there will be no change to construction costs.
Revise as follows:

1104.5 Illumination emergency power of means of egress. Where means of egress illumination is provided, the power supply for means of egress illumination shall normally be provided by the premises' electrical supply. Direct access to the outside of the building at grade.

1104.5.1 Illumination emergency power. In the event of power supply failure, illumination shall be automatically provided from an emergency system for the portions of the means of egress indicated in Section 1104.5.2 for the following occupancies where such occupancies require two or more means of egress:

1. Group A having 50 or more occupants.  
   Exception: Assembly occupancies used exclusively as a place of worship and having an occupant load of less than 300.
2. Group B buildings that are three or more stories in height building with, have 100 or more occupants above or below a level of exit discharge serving the occupants or buildings with have 1,000 or more total occupants.
3. Group E in interior exit access and exit stairways and ramps, corridors, windowless areas with student occupancy, shops and laboratories.
4. Group F having more than 100 occupants.  
   Exception: Buildings used only during daylight hours and that are provided with windows for natural light in accordance with the International Building Code.
5. Group I.
6. Group M.  
   Exception: Buildings less than 3,000 square feet (279 m² in gross sales area on one story only, excluding mezzanines.
7. Group R-1.  
   Exception: Where each sleeping unit has direct access to the outside of the building at grade.
   Exception: Where each dwelling unit or sleeping unit has direct access to the outside of the building at grade.
   Exception: Where each sleeping unit has direct access to the outside of the building at ground level.

Add new text as follows:

1104.5.2 Egress Illumination. Emergency power for means of egress illumination required in Section 1104.5.1 shall be provided in the following areas:

1. Aisles.
2. Corridors.
3. *Exit access stairways and ramps.*
4. Interior and exterior *exit stairways and ramps.*
5. *Exit passageways.*
6. Lobbies and vestibules on the level of discharge which are part of the means of egress.
7. For Group E, windowless areas with student occupancy, shops and laboratories in addition to Items 1 through 6.

**Revise as follows:**

**1104.5.1**

**1104.5.3 Emergency power duration and installation.** Emergency power for means of egress illumination shall be provided in accordance with Section 604.

In other than Group I-2, emergency power systems shall be provided for a duration of not less than 60 minutes for systems requiring emergency power. In Group I-2, essential electrical emergency power systems shall comply with Sections 1105.5.1 and 1105.5.2. The installation of the emergency power system shall be in accordance with Section 604.

**Reason:** The provisions for general lighting for means of egress and emergency lighting for limited portions of the means of egress where separated in Chapter 10 of the IBC and IFC. The intent of this proposal is to coordinate with that separation and to eliminate conflicts between new requirements and the requirements in Section 1104 for application in existing buildings.

The provisions in Section 1104.5 where originally written for emergency lighting only. The section is split and Section 1104.5.1 clarifies which occupancies require retroactive emergency power with a reference to a new section that specifies where emergency power is required – not emergency lighting throughout the facility. The list of locations in Section 1104.5.2 consists of all the locations listed in Section 1008.3.1 and 1008.3.2, with the exception of exterior landings at exit doors. This requirement was new in the 2006 edition of the codes and should not need to be included as a retroactive requirement.

- Group A – the charging sentence states that you only get here when two or means of egress are required, so this is redundant.
- Group B – the definition for level of exit discharge allows for the elimination of the phrase “serving the occupants” as redundant text.
- Group E – the “interior exit access and exit stairways and ramps, corridors” is included in the list of areas required in Section 1104.5.2 so they are deleted. The “in windowless areas with student occupancy, shops and laboratories” is relocated as Item 7 in Section 1104.5.2.

Section 1104.5.3 is revised to match the format in Section 1008.3.4.

For Group I-2 in Section 1104.5.3, the terms are changed from essential power to emergency power. This section is dealing with power for means of egress lighting which is not exactly the same as essential systems. The requirement for essential power systems is still in Section 1105.5.2.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire safety and hazardous materials in new and existing buildings and facilities and the protection of life and property in wildland urban interface areas. In 2014 and 2015 the Fire-CAC has held 5 open meetings. In addition, there were numerous conference calls, Regional Work Group and Task Group meetings for the current code development cycle, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: [FCAC](#)

**Cost Impact:** Will not increase the cost of construction

This is a clarification and coordination of code requirements, so there is no change to construction requirements.
Proponent: John Williams, CBO, representing Adhoc Healthcare Committee (AHC@iccsafe.org); Carl Baldassarra, P.E., FSFPE, representing Code Technology Committee (CTC@iccsafe.org)

2015 International Fire Code

Revise as follows:

1104.5.1 Emergency power duration and installation. Emergency power for means of egress illumination shall be provided in accordance with Section 604. In other than Group I-2, emergency power shall be provided for not less than 60 minutes for systems requiring emergency power. In Group I-2, essential electrical systems shall comply with Sections 1105.5.1 and 1105.5.2.

1105.5 Means of egress. In addition to the means of egress requirements in Section 1104, Group I-2 facilities shall meet the means of egress requirements in Section 1105.5.1 through 1105.5.8.

Delete without substitution:

1105.5.1 Exit signs and emergency illumination. The power system for exit signs and emergency illumination for the means of egress shall provide power for not less than 90 minutes and consist of storage batteries, unit equipment or an on-site generator.

1105.5.2 Emergency power for operational needs. The essential electrical system shall be capable of supplying services in accordance with NFPA 99.

Reason: The code change proposal is a correlation between change E-90-15 that was approved in the 2015 hearings. These sections are not needed, Section 604 of the fire code details requirements for exist signage power (Section 604.2.5) and the use of NFPA 99 (by reference 604.2.6). These requirements are duplicative and we recommend deleting them from the code.

This is a joint proposal submitted by the ICC Ad Hoc Committee on Healthcare (AHC) and the ICC Code Technology Committee (CTC). The AHC was established by the ICC Board to evaluate and assess contemporary code issues relating to hospitals and ambulatory healthcare facilities. This is a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. In 2014 and 2015 the ICC Ad Hoc Committee has held 4 open meetings and numerous Work Group meetings and conference calls for the current code development cycle which included members of the committees as well as any interested party to discuss and debate the proposed changes. Information on the AHC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the AHC effort can be downloaded from the AHC website at: AHC.

The two remaining CTC Areas of Study are Care Facilities and Elevator Lobbies/WTC Elevator issues. This proposal falls under the Care Facilities Area of Study. In 2014 and 2015 ICC CTC Committee has held 4 open meetings and numerous Work Group meetings and conference calls for the current code development cycle which included members of the committees as well as any interested party to discuss and debate the proposed changes. Information on the CTC, including: the sunset plan; meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the CTC website CTC.

Cost Impact: Will not increase the cost of construction
This is elimination of a duplicative section, there is no technical change.
2015 International Fire Code

Revise as follows:

1104.7 Size of doors. The minimum width required capacity of each door opening shall be sufficient for the occupant load thereof and shall provide a minimum clear opening width of not less than 28 inches (711 mm). The clear opening width of doorways with swinging doors shall be measured between the face of the door and the stop, with the door open 90 degrees (1.57 rad). Where this section requires a minimum clear opening width of 28 inches (711 mm) and a door opening includes two door leaves without a mullion, one leaf shall provide a minimum clear opening width of 28 inches (711 mm). In ambulatory care facilities, doors serving as means of egress from patient treatment rooms or patient sleeping rooms shall provide a minimum clear opening width of not less than 32 inches (813 mm). In Group I-2, means of egress doors where used for the movement of beds shall provide a minimum clear opening width not less than of 41\(\frac{1}{2}\) inches (1054 mm). The maximum width of a swinging door leaf shall be 48 inches (1219 mm) nominal. The minimum clear opening height of door openings doorways shall be not less than 80 inches (2032 mm).

Exceptions:

1. The minimum and maximum width shall not apply to door openings that are not part of the required means of egress in occupancies in Groups R-2 and R-3 units that are not required to be an Accessible Type A unit or Type B unit.
2. Door openings to storage closets less than 10 square feet (0.93 m\(^2\)) in area shall not be limited by the minimum clear opening width.
3. Width of door leafs leaves in revolving doors that comply with Section 1010.1.1 shall not be limited.
4. Door openings within a dwelling unit shall be not less than have a minimum clear opening height of 78 inches (1981 mm) in height.
5. Exterior In dwelling and sleeping units that are not required to be Accessible Type A or Type B units, exterior door openings in dwelling units other than the required exit door, shall be not less than have a minimum clear opening height of 76 inches (1930 mm) in height.
6. Exit access doors serving a room not larger than 70 square feet (6.5 m\(^2\)) shall be not less than have a minimum clear width opening of 24 inches (610 mm) in door width.
7. The minimum clear opening width shall not apply to doors for non-accessible showers or saunas compartments.
8. The minimum clear opening width shall not apply to the doors for non-accessible toilet stalls.
9. Door closers and door stops shall be permitted to be 78 inches (1980 mm) minimum above the floor.

K104.1 Size of doors. The minimum width required capacity of each door opening shall be sufficient for the occupant load thereof and shall provide a minimum clear opening width of not less than 28 inches (711 mm). Where this section requires a minimum clear opening width of 28
inches (711 mm) and a door opening includes two door leaves without a mullion, one leaf shall provide a minimum clear opening width of 28 inches (711 mm). In ambulatory care facilities, doors serving as means of egress from patient treatment rooms shall provide a minimum clear opening width of not less than 32 inches (813 mm). The maximum width of a swinging door leaf shall be 48 inches (1219 mm) nominal. The minimum clear opening height of doors openings shall be not less than 80 inches (2032 mm).

Exceptions:

1. Door openings to storage closets less than 10 square feet (0.93 m²) in area shall not be limited by the minimum clear opening width.
2. Width of door leaves in revolving doors that comply with Section 1010.1.4.1 shall not be limited.
3. Exitaccess doors serving a room not larger than 70 square feet (6.5 m²) shall be not less than have a minimum clear opening width of 24 inches (610 mm) in door width.
4. Door closers and door stops shall be permitted to be 78 inches (1980 mm) minimum above the floor.

Reason: Code Change E47-15 was Approved as Modified last cycle. The intent of that code change was to provide a consistent use of the terminology (e.g., minimum clear opening width/height) throughout this section. This proposal provides correlation with between IFC Chapter 11 and Appendix Section K104.1 and the requirements in Chapter 10.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire safety and hazardous materials in new and existing buildings and facilities and the protection of life and property in wildland urban interface areas. In 2014 and 2015 the Fire-CAC has held 5 open meetings. In addition, there were numerous conference calls, Regional Work Group and Task Group meetings for the current code development cycle, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC

Cost Impact: Will not increase the cost of construction
This is a correlation issue with the revised requirements in the IBC.
2015 International Fire Code

Revise as follows:

1104.7 Size of doors. The minimum width of each door opening shall be sufficient for the occupant load thereof and shall provide a clear width of not less than 28 inches (711 mm). Where this section requires a minimum clear width of 28 inches (711 mm) and a door opening includes two door leaves without a mullion, one leaf shall provide a clear opening width of 28 inches (711 mm). In ambulatory care facilities, doors serving as means of egress from patient treatment rooms or patient sleeping rooms shall provide a clear width of not less than 32 inches (813 mm). In Group I-2, means of egress doors where used for the movement of beds shall provide a clear width not less than 41-1/2 inches (1054 mm). The maximum width of a swinging door leaf shall be 48 inches (1219 mm) nominal. The height of door openings shall be not less than 80 inches (2032 mm).

Exceptions:
1. The minimum and maximum width shall not apply to door openings that are not part of the required means of egress in occupancies in Groups R-2 and R-3.
2. Door openings to storage closets less than 10 square feet (0.93 m²) in area shall not be limited by the minimum width.
3. Width of door leaves in revolving doors that comply with Section 1010.1.1 shall not be limited.
4. Door openings within a dwelling unit shall be not less than 78 inches (1981 mm) in height.
5. Exterior door openings in dwelling units, other than the required exit door, shall be not less than 76 inches (1930 mm) in height.
6. Exit access doors serving a room not larger than 70 square feet (6.5 m²) shall be not less than 24 inches (610 mm) in door width.
7. Door closers and door stops shall be permitted to be 78 inches (1980 mm) minimum above the floor.

Add new text as follows:

1104.7.1 Group I-2. In Group I-2, means of egress doors where used for the movement of beds shall provide a minimum clear opening width of 41-1/2 inches (1054 mm).

Exception: Doors serving as means of egress doors and not used for movement of beds shall provide a minimum clear opening width 32 inches (813 mm).

1104.7.2 Ambulatory Care. In ambulatory care facilities, doors serving as means of egress from patient treatment rooms shall provide a minimum clear opening width of 32 inches (813 mm).

Reason: Created separate sections to increase clarity. Exit access doors and exit doors used by health care occupants are of the swinging type and are at least 32 inches in clear width. Ambulatory Care does not have
This is a joint proposal submitted by the ICC Ad Hoc Committee on Healthcare (AHC) and the ICC Code Technology Committee (CTC). The AHC was established by the ICC Board to evaluate and assess contemporary code issues relating to hospitals and ambulatory healthcare facilities. This is a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. In 2014 and 2015 the ICC Ad Hoc Committee has held 4 open meetings and numerous Work Group meetings and conference calls for the current code development cycle which included members of the committees as well as any interested party to discuss and debate the proposed changes.

Information on the AHC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the AHC effort can be downloaded from the AHC website at: AHC.

The two remaining CTC Areas of Study are Care Facilities and Elevator Lobbies/WTC Elevator issues. This proposal falls under the Care Facilities Area of Study. In 2014 and 2015 ICC CTC Committee has held 4 open meetings and numerous Work Group meetings and conference calls for the current code development cycle which included members of the committees as well as any interested party to discuss and debate the proposed changes.

Information on the CTC, including: the sunset plan; meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the CTC website CTC.

Cost Impact: Will not increase the cost of construction
This proposal is a coordination and clarification, therefore, there is no change in the cost of construction.
2015 International Fire Code

1104.7 Size of doors. The minimum width of each door opening shall be sufficient for the occupant load thereof and shall provide a clear width of not less than 28 inches (711 mm). Where this section requires a minimum clear width of 28 inches (711 mm) and a door opening includes two door leaves without a mullion, one leaf shall provide a clear opening width of 28 inches (711 mm). In ambulatory care facilities, doors serving as means of egress from patient treatment rooms or patient sleeping rooms shall provide a clear width of not less than 32 inches (813 mm). In Group I-2, means of egress doors where used for the movement of beds shall provide a clear width not less than $41\frac{1}{2}$ inches (1054 mm). The maximum width of a swinging door leaf shall be 48 inches (1219 mm) nominal. The height of door openings shall be not less than 80 inches (2032 mm).

Exceptions:
1. The minimum and maximum width shall not apply to door openings that are not part of the required means of egress in occupancies in Groups R-2 and R-3.
2. Door openings to storage closets less than 10 square feet (0.93 m$^2$) in area shall not be limited by the minimum width.
3. Width. The width of door leaves in revolving doors that comply with Section 1010.1.1 shall not be limited.
4. The maximum width of door leaves in power-operated doors that comply with Section 1010.1.4.2 shall not be limited.
5. Door openings within a dwelling unit shall be not less than 78 inches (1981 mm) in height.
6. Exterior door openings in dwelling units, other than the required exit door, shall be not less than 76 inches (1930 mm) in height.
7. Exit access doors serving a room not larger than 70 square feet (6.5 m$^2$) shall be not less than 24 inches (610 mm) in door width.
8. Door closers and door stops shall be permitted to be 78 inches (1980 mm) minimum above the floor.

K104.1 Size of doors. The minimum width of each door opening shall be sufficient for the occupant load thereof and shall provide a clear width of not less than 28 inches (711 mm). Where this section requires a minimum clear width of 28 inches (711 mm) and a door opening includes two door leaves without a mullion, one leaf shall provide a clear opening width of 28 inches (711 mm). In ambulatory care facilities, doors serving as means of egress from patient treatment rooms shall provide a clear width of not less than 32 inches (813 mm). The maximum width of a swinging door leaf shall be 48 inches (1219 mm) nominal. The height of doors openings shall be not less than 80 inches (2032 mm).

Exceptions:
1. Door openings to storage closets less than 10 square feet (0.93 m$^2$) in area shall not be limited by the minimum width.
2. Width. The width of door leaves in revolving doors that comply with Section
1010.1.4.1 shall not be limited.

3. The maximum width of door leaves in power-operated doors that comply with Section 1010.1.4.2 shall not be limited.

4. Exitaccess doors serving a room not larger than 70 square feet \((6.5 \text{ m}^2)\) shall be not less than 24 inches \((610 \text{ mm})\) in door width.

5. Door closers and door stops shall be permitted to be 78 inches \((1980 \text{ mm})\) minimum above the floor.

Reason: The proposed revisions add an exception to not limit the size of door leaves of power operated doors is consistent with revisions approved in 2015 for the 2018 IBC in E49-15.

Cost Impact: Will not increase the cost of construction
Recognizing the size of door leaves of power operated doors need not be limited will not increase the cost of construction.
F246-16

IFC: 1104.16.2.

Proponent: Steven Orlowski, representing Building Owners and Managers Association International (sorlowski@boma.org); David Collins, representing The American Institute of Architects (dcollins@preview-group.com)

2015 International Fire Code

Revise as follows:

1104.16.2 Protection of openings Opening Protectives. Openings. Doors and windows within 10 feet (3048 mm) of fire escape stairways shall be protected by opening protectives having a minimum with $\frac{3}{4}$-hour fire protection rating opening protectives.

Exception: In buildings equipped throughout with an approved automatic sprinkler system, opening protection is not required.

Reason: During the Group A cycle, proposal EB 28-15 was submitted to coordinate the existing building code with the fire code by adding the exception for not requiring opening protection in and around the fire escape when the building is equipped with automatic sprinklers. The purpose of this code change is to coordinate the IFC with the IEBC by using the same language that was submitted and tentatively approved the last cycle.

Cost Impact: Will not increase the cost of construction

This code change is an editorial rewrite of language already contained in the IFC, resulting in no cost increase.
F247-16
1104.18, Table 1104.18

Proponent: Michael O'Brian, representing the Fire Code Action Committee (FCAC@iccsafe.org)

2015 International Fire Code

Revise as follows:

1104.18 Dead-end corridors. Where more than one exit or exit access doorway is required, the exit access shall be arranged such that dead ends do not exceed the limits specified in Table 1104.18. In Group I-2, in smoke compartments containing patient sleeping rooms and treatment rooms, dead end corridors shall be in accordance with Section 1105.5.6.

Exception: A dead-end passageway or corridor shall not be limited in length where the length of the dead-end passageway or corridor is less than 2.5 times the least width of the dead-end passageway or corridor.

### TABLE 1104.18
COMMON PATH, DEAD-END AND TRAVEL DISTANCE LIMITS (by occupancy)

<table>
<thead>
<tr>
<th>OCCUPANCY</th>
<th>COMMON PATH OF EGRESS TRAVEL LIMIT</th>
<th>DEAD-END LIMIT</th>
<th>EXIT ACCESS TRAVEL DISTANCE LIMIT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Unsprinklered (feet)</td>
<td>Sprinklered (feet)</td>
<td>Unsprinklered (feet)</td>
</tr>
<tr>
<td>Group A</td>
<td>20/75a</td>
<td>20/75a</td>
<td>20b</td>
</tr>
<tr>
<td>Group B</td>
<td>75g</td>
<td>100</td>
<td>50</td>
</tr>
<tr>
<td>Group E</td>
<td>75</td>
<td>75</td>
<td>20</td>
</tr>
<tr>
<td>Group F-1, S-1d,h</td>
<td>75g</td>
<td>100</td>
<td>50</td>
</tr>
<tr>
<td>Group F-2, S-2d,h</td>
<td>75g</td>
<td>100</td>
<td>50</td>
</tr>
<tr>
<td>Group H-1</td>
<td>25</td>
<td>25</td>
<td>0</td>
</tr>
<tr>
<td>Group H-2</td>
<td>50</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>Group</td>
<td>50</td>
<td>100</td>
<td>20</td>
</tr>
<tr>
<td>---------------</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
</tr>
<tr>
<td>Group H-3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group H-4</td>
<td>75</td>
<td>75</td>
<td>20</td>
</tr>
<tr>
<td>Group H-5</td>
<td>75</td>
<td>75</td>
<td>20</td>
</tr>
<tr>
<td>Group I-1</td>
<td>75</td>
<td>75</td>
<td>20</td>
</tr>
<tr>
<td>Group I-2</td>
<td>Notes d, e, g</td>
<td>Notes d, e, g</td>
<td>Note f</td>
</tr>
<tr>
<td>Group I-3</td>
<td>100</td>
<td>100</td>
<td>NR</td>
</tr>
<tr>
<td>Group I-4 (Day-care centers)</td>
<td>NR</td>
<td>NR</td>
<td>20</td>
</tr>
<tr>
<td>Group M (Covered or open mall)</td>
<td>75</td>
<td>100</td>
<td>50</td>
</tr>
<tr>
<td>Group M (Mercantile)</td>
<td>75</td>
<td>100</td>
<td>50</td>
</tr>
<tr>
<td>Group R-1 (Hotels)</td>
<td>75</td>
<td>75</td>
<td>50</td>
</tr>
<tr>
<td>Group R-2 (Apartments)</td>
<td>75</td>
<td>125</td>
<td>50</td>
</tr>
<tr>
<td>Group R-3 (One- and two-family)</td>
<td>NR</td>
<td>NR</td>
<td>NR</td>
</tr>
<tr>
<td>Group R-4 (Residential care/assisted living)</td>
<td>NR</td>
<td>NR</td>
<td>NR</td>
</tr>
<tr>
<td>Group U</td>
<td>75^d</td>
<td>100</td>
<td>20</td>
</tr>
</tbody>
</table>

NR = No requirements.
For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929 m².

a. 20 feet for common path serving 50 or more persons; 75 feet for common path serving less than 50 persons.

- a. See Section 1029.9.5 for dead-end aisles in Group A occupancies.

b. This dimension is for the total travel distance, assuming incremental portions have fully utilized their allowable maximums. For travel distance within the room, and from the room exit access door to the exit, see the appropriate occupancy chapter.

c. See Section 412.7 of the International Building Code for special requirements on spacing of doors in aircraft hangars.

d. In Group I-2, separation of exit access doors within a care recipient sleeping room, or any suite that includes care recipient sleeping rooms, shall comply with Section 1105.5.7.

e. In Group I-2, in smoke compartments containing care recipient sleeping rooms and treatment rooms, dead-end corridors shall comply with Section 1105.5.6.

f. In Group I-2 Condition 2, care recipient sleeping rooms, or any suite that includes care recipient sleeping rooms, shall comply with Section 1105.6.

g. Where a tenant space in Group B, S and U occupancies has an occupant load of not more than 30, the length of a common path of egress travel shall not be more than 100 feet.

h. Where the building, or portion of the building, is limited to one story and the height from the finished floor to the bottom of the ceiling or roof slab or deck is 24 feet or more, the exit access travel distance is increased to 400 feet.

i. For covered and open malls, the exit access travel distance is increased to 400 feet.

Reason: This proposal intends to clarify the requirements in Table 1104.18 and correlate the table with revisions that have occurred in recent code change cycles. All of the revisions proposed are editorial, there is no change in code requirements or code application. Revisions are as follows:

In Section 1104.18, the second sentence is deleted. This sentence is not needed since those provisions are already included in Table 1104.18 as Footnote f (which after revisions becomes Footnote e).

The header row in Table 1104.18 is revised to maintain consistency with the terms used throughout the code of "exit access travel distance" and "common path of egress travel".

The descriptors in the Occupancy column are deleted. These descriptors are unnecessary since they do not provide any limitation on the application of the requirements in the table, other than for Group M. Group M (covered and open malls) and Group M (mercantile) have been combined into one row with a single listing as Group M. New Footnote i is added to correlate with IBC Section 402.8 which allows a travel distance of 400 feet in malls and includes the provisions that were in the deleted row.

Footnote a is deleted along with the deletion of the limitation of 20 feet in Group A for common path of egress travel. Table 1006.2.1 allows a common path of egress travel of 75 feet for new Group A occupancies. The limitation of 20 feet is retained as applicable to dead-end aisles and dead-end corridors.

Footnote d (new Footnote c) is relocated from the Occupancy column to the Exit Access Travel Distance column. Since Footnote d only applies to the exit access travel distance in aircraft hangars this is the appropriate location for the footnote. Aircraft hangars can be classified as either Group F-1 or S-1 in accordance with IBC Sections 306.2 and 311.2, so the footnote is not included in the column for Groups F-2 and S-2.

Footnotes e and f (new Footnotes d and e) are revised by deleting "In Group I-2". This is redundant since the footnotes are located in the row which only applies to Group I-2.

Footnote h (new Footnote g) is relocated from the Occupancy column to the Common Path of Egress Travel column. Since Footnote h only applies to common path of egress travel in nonsprinklered Group B, S and U occupancies, this is the appropriate location for the footnote.

New Footnote h is added to correlate with Section 1017.2.2 which allows a travel distance of 400 feet in Group F-1 and S-1 under certain conditions.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire safety and hazardous materials in new and existing buildings and facilities and the protection of life and property in wildland urban interface areas. In 2014 and 2015 the Fire-CAC has held 5 open meetings. In addition, there were numerous conference calls, Regional Work Group and Task Group meetings for the current code development cycle, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC

To assist in reviewing this proposal, the table below shows the end result of all of the revisions.
<table>
<thead>
<tr>
<th>OCCUPANCY</th>
<th>COMMON PATH OF EGRESS TRAVEL LIMIT</th>
<th>DEAD-END LIMIT</th>
<th>EXIT ACCESS TRAVEL DISTANCE LIMIT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Unsprinklered (feet)</td>
<td>Sprinklered (feet)</td>
<td>Unsprinklered (feet)</td>
</tr>
<tr>
<td>Group A</td>
<td>75</td>
<td>75</td>
<td>20&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Group B</td>
<td>75&lt;sup&gt;g&lt;/sup&gt;</td>
<td>100</td>
<td>50</td>
</tr>
<tr>
<td>Group E</td>
<td>75</td>
<td>75</td>
<td>20</td>
</tr>
<tr>
<td>Group F-1, S-1</td>
<td>75&lt;sup&gt;g&lt;/sup&gt;</td>
<td>100</td>
<td>50</td>
</tr>
<tr>
<td>Group F-2, S-2</td>
<td>75&lt;sup&gt;g&lt;/sup&gt;</td>
<td>100</td>
<td>50</td>
</tr>
<tr>
<td>Group H-1</td>
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<tr>
<td>Group H-2</td>
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<td>0</td>
</tr>
<tr>
<td>Group H-3</td>
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<td>20</td>
</tr>
<tr>
<td>Group H-4</td>
<td>75</td>
<td>75</td>
<td>20</td>
</tr>
<tr>
<td>Group H-5</td>
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<td>20</td>
</tr>
<tr>
<td>Group I-1</td>
<td>75</td>
<td>75</td>
<td>20</td>
</tr>
<tr>
<td>Group I-2</td>
<td>Notes d, e</td>
<td>Notes d, e</td>
<td>Note e</td>
</tr>
<tr>
<td>Group I-3</td>
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</tr>
<tr>
<td>Group I-4</td>
<td>NR</td>
<td>NR</td>
<td>20</td>
</tr>
<tr>
<td>Group M</td>
<td>75</td>
<td>100</td>
<td>50</td>
</tr>
<tr>
<td>Group R-1</td>
<td>75</td>
<td>75</td>
<td>50</td>
</tr>
<tr>
<td>Group R-2</td>
<td>75</td>
<td>125</td>
<td>50</td>
</tr>
<tr>
<td>Group R-3</td>
<td>NR</td>
<td>NR</td>
<td>NR</td>
</tr>
<tr>
<td>Group R-4</td>
<td>NR</td>
<td>NR</td>
<td>NR</td>
</tr>
<tr>
<td>Group U</td>
<td>75&lt;sup&gt;g&lt;/sup&gt;</td>
<td>100</td>
<td>20</td>
</tr>
</tbody>
</table>

NR = No requirements.

For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929 m².

a. See Section 1029.9.5 for dead-end aisles in Group A occupancies.
b. This dimension is for the total travel distance, assuming incremental portions have fully utilized their allowable maximums. For travel distance within the room, and from the room exit access door to the exit, see the appropriate occupancy chapter.
c. See Section 412.7 of the *International Building Code* for special requirements on spacing of doors in aircraft hangars.
d. Separation of exit access doors within a care recipient sleeping room, or any suite that includes care recipient sleeping rooms, shall comply with Section 1105.5.7.
e. In smoke compartments containing care recipient sleeping rooms and treatment rooms, dead-end corridors shall comply with Section 1105.5.6.
f. In Group I-2 Condition 2, care recipient sleeping rooms, or any suite that includes care recipient sleeping rooms, shall comply with Section 1105.6.
g. Where a tenant space in Group B, S and U occupancies has an occupant load of not more than 30, the length of a common path of egress travel shall not be more than 100 feet.
h. Where the building, or portion of the building, is limited to one story and the height from the finished floor to the bottom of the ceiling or roof slab or deck is 24 feet or more, the exit access travel distance is increased to 400 feet.
i. For covered and open malls, the exit access travel distance is increased to 400 feet.

**Cost Impact:** Will not increase the cost of construction

This is clarification of the current code requirements.
### TABLE 1104.18
COMMON PATH, DEAD-END AND TRAVEL DISTANCE LIMITS (by occupancy)

<table>
<thead>
<tr>
<th>OCCUPANCY</th>
<th>COMMON PATH LIMIT</th>
<th>DEAD-END LIMIT</th>
<th>TRAVEL DISTANCE LIMIT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Unsprinklered</td>
<td>Sprinklered</td>
<td>Unsprinklered</td>
</tr>
<tr>
<td></td>
<td>(feet)</td>
<td>(feet)</td>
<td>(feet)</td>
</tr>
<tr>
<td></td>
<td></td>
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</tr>
<tr>
<td>Group A</td>
<td>20/75a</td>
<td>20/75a</td>
<td>20b</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>20b</td>
</tr>
<tr>
<td></td>
<td>200</td>
<td>250</td>
<td></td>
</tr>
<tr>
<td>Group B&lt;sup&gt;h&lt;/sup&gt;</td>
<td>75</td>
<td>100</td>
<td>50</td>
</tr>
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<td></td>
<td></td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>200</td>
<td>300</td>
<td></td>
</tr>
<tr>
<td>Group E</td>
<td>75</td>
<td>75</td>
<td>20</td>
</tr>
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<td>Group R-4 (Residential care/assisted living)</td>
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<td>Group U&lt;sup&gt;h&lt;/sup&gt;</td>
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NR = No requirements.

For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929 m<sup>2</sup>.

a. 20 feet for common path serving 50 or more persons; 75 feet for common path serving less than 50 persons.

b. See Section 1029.9.5 for dead-end aisles in Group A occupancies.

c. This dimension is for the total travel distance, assuming incremental portions have fully utilized their allowable maximums. For travel distance within the room, and from the room exit access door to the exit, see the appropriate occupancy chapter.

d. See the *International Building Code* for special requirements on spacing of doors in aircraft hangars.

e. In Group I-2, separation of exit access doors within a care recipient sleeping room, or any suite that includes care recipient sleeping rooms, shall comply with Section 1105.5.7.

f. In Group I-2, in smoke compartments containing care recipient sleeping rooms and treatment rooms, dead-end corridors shall comply with Section 1105.5.6.
g. In Group I-2 Condition 2, care recipient sleeping rooms, or any suite that includes care recipient sleeping rooms, shall comply with Section 1105.6.

h. Where a tenant space in Group B, S and U occupancies has an occupant load of not more than 30, the length of a common path of egress travel shall not be more than 100 feet.

**Reason:** The additional descriptions are only part of what each of these groups include. The descriptors should be deleted so that they are not perceived as limitations.

This proposal is submitted by the ICC Code Technology Committee (CTC). The ICC Board has decided to sunset the CTC. The sunset plan includes re-assigning many of the CTC Areas of Study to the applicable Code Action Committee (CAC). The two remaining CTC Areas of Study are Care Facilities and Elevator Lobbies/WTC Elevator issues. This proposal falls under the Care Facilities Area of Study. In 2014 and 2015 ICC CTC Committee has held 4 open meetings and numerous Work Group meetings and conference calls for the current code development cycle which included members of the committees as well as any interested party to discuss and debate the proposed changes. Information on the CTC, including: the sunset plan; meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the CTC website [CTC](#).

**Cost Impact:** Will not increase the cost of construction

This is a clarification in the text, so there will be no change to construction costs.
2015 International Fire Code

Revise as follows:

1104.23 Minimum aisle width. The minimum clear width of aisles shall comply with the following:

1. Forty-two inches (1067 mm) for aisle stairs stepped aisles having seating on each side both sides.
   Exception: Thirty-six inches (914 mm) where the stepped aisle serves less than 50 seats.
2. Thirty-six inches (914 mm) for stepped aisles having seating on only one side.
   Exceptions:
   1. Thirty inches (760 mm) for catchment areas serving not more than 60 seats.
   2. Twenty-three inches (584 mm) between a stepped aisle handrail and seating where an a steppedaisle does not serve more than five rows on one side.
5. Twenty inches (508 mm) between a stepped aisle handrail or guard and seating where the aisle is subdivided by the a mid-aislehandrail.
6. Forty-two inches (1067 mm) for level or ramped aisles having seating on both sides.
   Exception Exceptions: Thirty-six inches (914 mm) where the aisle serves less than 50 seats.
   6.1. Thirty-six inches (914 mm) where the aisle serves less than 50 seats.
   6.2. Thirty inches (762 mm) where the aisle serves less than 15 seats and does not serve as part of an accessible route.
7. Thirty-six inches (914 mm) for level or ramped aisles having seating on only one side.
   Exception: Thirty inches (760 mm) for catchment areas serving not more than 60 seats and does not serve as part of an accessible route.
8. In Group I-2, where aisles are used for movement of patients in beds, aisles shall comply with Section 1105.5.8.

Reason: Code Change E134-15 was Approved as Submitted last cycle. That proposal revised Section 1029.9.1 of the IBC and IFC.
This proposal is intended to correlate IFC Chapter 11 requirements for existing buildings with the revised requirements in Section 1029.9.1.
If this proposal is not approved, the requirements in IFC Chapter 11 will be more restrictive than the requirements in Chapter 10 for new buildings.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire safety and hazardous materials in new and existing buildings and facilities and the protection of life and property in wildland urban interface areas. In 2014 and 2015 the Fire-CAC has held 5 open meetings. In addition, there were numerous conference calls, Regional Work Group and Task Group meetings for the current code development cycle, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC
Cost Impact: Will not increase the cost of construction
This proposal provides correlation with other code requirements.
**2015 International Fire Code**

**SECTION 1105 CONSTRUCTION REQUIREMENTS FOR EXISTING GROUP I-2**

1105.1 General. Existing Group I-2 shall meet all of the following requirements:

1. The minimum fire safety requirements in Section 1103.
2. The minimum mean of egress requirements in Section 1104.
3. The additional egress and construction requirements in Section 1105.

Where the provisions of this chapter conflict with the construction requirements that applied at the time of construction, the most restrictive provision shall apply.

Add new text as follows:

**1105.2 Applicability.** The provisions of Section 1105.3 through 1105.8, 1105.10 and 1105.11 shall apply to the existing Group I-2 fire area.

Revise as follows:

**1105.8 1105.9 Group I-2 automatic sprinkler system.** An automatic sprinkler system installed in accordance with Section 903.3.1.1 shall be provided throughout the floor containing existing the Group I-2 fire areas area. The sprinkler system shall be provided throughout the floor where the Group I-2 occupancy is located, and in on all floors between the Group I-2 occupancy fire area and the level of exit discharge. The sprinkler system shall be provided in on all floors below the level of exit discharge.

**Exception:** Floors classified as an open parking garage are not required to be sprinklered.

**Reason:** This proposal addresses the federal requirement that a separation between I-2 occupancies that comply with the requirements in this section and those that do not. Since a building could be several different occupancies, it is reinforcing the need for separation between a portion of the building that is compliant with chapter 11 for Group I-2, and other portions of the buildings. This would require a fire separation between the Group B portion of an existing building that does not comply with all of the minimum retroactive standards of this chapter.

The revision of Section 1105.8 was to be consistent with the language in Section 1103.5.3 requiring retroactive sprinkler systems in Group I-2 division 2 occupancies. The intent is to increase the scope of the minimum sprinkler coverage to below the level of existing discharge. 1103.5.3 require coverage of the building by date certain.

This is a joint proposal submitted by the ICC Ad Hoc Committee on Healthcare (AHC) and the ICC Code Technology Committee (CTC). The AHC was established by the ICC Board to evaluate and assess contemporary code issues relating to hospitals and ambulatory healthcare facilities. This is a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. In 2014 and 2015 the ICC Ad Hoc Committee has held 4 open meetings and numerous Work Group meetings and conference calls for the current code development cycle which included members of the committees as well as any interested party to discuss and debate the proposed changes.

Information on the AHC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the AHC effort can be downloaded from the AHC website at: [AHC](https://www.iccsafe.org/ahc).

The two remaining CTC Areas of Study are Care Facilities and Elevator Lobbies/WTC Elevator issues. This proposal falls under the Care Facilities Area of Study. In 2014 and 2015 ICC CTC Committee has held 4 open meetings and numerous Work Group meetings and conference calls for the current code development cycle which included.
members of the committees as well as any interested party to discuss and debate the proposed changes. Information on the CTC, including: the sunset plan; meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the CTC website CTC.

Cost Impact: Will increase the cost of construction
The required separation is already a federal requirement. Retroactive sprinklering below the level of exit discharge is already required for nursing homes, per federal regulation. Sprinklering below the LED will be an impact for those hospitals that did not do this today.
IFC: 1105.4.2.
Proponent: Tony Crimi, International Firestop Council, representing International Firestop Council (tcrimi@sympatico.ca)

2015 International Fire Code
Delete and substitute as follows:

1105.4.2 Fire-resistance rating. Unless required elsewhere in this code, corridor walls are not required to have a fire-resistance rating.

Corridor walls that were installed as fire-resistance rated assemblies in accordance with the applicable codes under which the building was constructed, remodeled, or altered shall be maintained.

Exception: Where approved by the code official, in buildings sprinklered in accordance with Section 903.3.1.1 of the International Building Code, the required fire resistance ratings of corridor walls shall be permitted to meet the requirements of the current building code. The building is also required to meet the other applicable requirements of the International Building Code. Plans, investigation and evaluation reports, and other data shall be submitted indicating which building elements and materials the applicant is requesting the code official to review and approve for determination of applying the current building code fire-resistance ratings. Any special construction features, including fire-resistance-rated assemblies and smoke-resistive assemblies, conditions of occupancy, means of egress conditions, fire code deficiencies, approved modifications or approved alternative materials, design and methods of construction, and equipment applying to the building that impact required fire-resistance ratings shall be identified in the evaluation reports submitted.

Reason: The existing language is problematic, in that this language assumes that the Group I-2 fire area is sprinklered, and therefore seeks to take advantage of sprinkler tradeoffs in the IBC, but does not mandate the installation of automatic sprinklers, nor mandate that the building was originally designed as a sprinklered building. It is also problematic in that the statement “Where permitted elsewhere in this code ..” requires the Fire Code official and Building Owner to research the entire IFC to look for situations where this exception might be prohibited. This proposal modifies the section to tell users of the IFC what is required, what is permitted, and when. This clarity should aid both compliance and enforcement.

This proposals uses the same approach that was approved in Section 803.6 of the International Existing Building Code during the previous code development cycle, via code change EB26-13. The concept is that once a building without sprinkler protection has been sprinklered throughout, whether due to renovations or retroactive code application, the designer should be permitted to take advantage of some of the sprinkler trade-offs that are allowed for new construction, such as the allowance for healthcare corridors to be smoke partitions instead of needing to be fire partitions. Corridors in I-2 occupancies were required to be fire partitions for decades in non-sprinklered hospitals, and also in sprinklered hospitals built to one of the legacy codes. The issue that this code article needs to properly and accurately address is how to provide for that application of code and ensure a proper review by the building code official is performed to ensure there are no impediments to granting an approval that may result in the reduction of existing levels of protection to below the level of safety provided by the current building code.

This proposal attempts to provide a mechanism for that process by adding a new section to the IFC which is adapted, essentially verbatim, from Section 803.6 of the IEBC. The suggested language provides that once an existing building is sprinklered throughout and meets the other fire protection requirements of the IBC, plans, investigation and evaluation reports, and other data can be submitted seeking approval of the code official for the re-assignment of the original fire-resistance rating for corridors down to zero (i.e. smoke resistance only).

It should be noted that, according to the NFPA "Report on Fires in Health Care Facilities" published November 2012, between 2006 and 2010, Sprinklers were present in only 55% of reported health care fires. Although those statistics for fires 5-10 years ago may not precisely gauge the exact proportion of healthcare facilities without sprinklers today, the fact remains that a substantial number of existing I-2 occupancies are not sprinklered throughout. Revising this code article to lay out a clear path for reducing the required fire resistance rating of
corridors can only assist in incentivizing older hospitals to have sprinklers retrofitted as soon as possible.

For reference, the language in 2015 IEBC is provided as follows:

"803.6 Fire-resistance ratings. Where approved by the code official, buildings where an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2 of the International Building Code has been added, and the building is now sprinklered throughout, the required fire resistance ratings of building elements and materials shall be permitted to meet the requirements of the current building code. The building is required to meet the other applicable requirements of the International Building Code.

Plans, investigation and evaluation reports, and other data shall be submitted indicating which building elements and materials the applicant is requesting the code official to review and approve for determination of applying the current building code fire-resistance ratings. Any special construction features, including fire-resistance-rated assemblies and smoke-resistive assemblies, conditions of occupancy, means-of-egress conditions, fire code deficiencies, approved modifications or approved alternative materials, design and methods of construction, and equipment applying to the building that impact required fire-resistance ratings shall be identified in the evaluation reports submitted."

Bibliography: 1 Source: NFPA "Fires in Health Care Facilities" Author: Marty Ahrens Issued: November 2012, National Fire Protection Association Fire Analysis and Research Division

2 2015 International Existing Building Code®, INTERNATIONAL CODE COUNCIL, INC., Date of First Publication: May 30, 2014

Cost Impact: Will not increase the cost of construction
This proposal permits alternatives which are consistent with existing requirements of the IEBC, and the intent of the IFC with regards to maintenance of fire protection features of buildings.
F252-16
IFC: 1105.4.3.
Proponent: Tony Crimi, International Firestop Council (tcrimi@sympatico.ca)

2015 International Fire Code
Revise as follows:

1105.4.3 Corridor wall continuity. Corridor walls maintained as smoke partitions shall extend from the top of the foundation or floor below to one of the following:

1. The underside of the floor or roof sheathing, deck or slab above.
2. The underside of a ceiling above where the ceiling membrane is constructed to limit the passage of smoke.
3. The underside of a lay-in ceiling system where the ceiling system is constructed to limit the passage of smoke and where the ceiling tiles weigh not less than 1 pound per square foot (4.88 kg/m²) of tile.

Reason: The language of this section clearly describes the criteria and requirements for smoke partitions. This condition would be appropriate where Group I-2 hospitals are sprinklered. However, the language in this new section (added to 2015 code) would also incorrectly apply to non-sprinklered Group I-2, even where corridor walls have been constructed as fire partitions, smoke barriers or fire barriers, and would be required as part of a building's overall fire safety design.

According to the NFPA "Report on Fires in Health Care Facilities" published November 2012, between 2006 and 2010, Sprinklers were present in only 55% of reported health care fires. Although those statistics for fires 5-10 years ago may not precisely gauge the exact proportion of healthcare facilities without sprinklers today, the fact remains that many existing I-2 occupancies are not sprinklered.

The practice of constructing corridor walls in Group I-2 hospitals as fire partitions existed for many years in the legacy codes, as a means of providing safe harbor for patients. The corridor walls may still be required to be maintained as fire partitions, based on other conditions present (sprinklers, conformance of other fire safety features to the current building code). The continuity requirements of 1105.4.3, as added to the 2015 IFC, would void the fire resistance provided by an existing and required fire partition. Additionally, a corridor wall might also serve as part of a required smoke barrier (1-hr rated construction) or as a fire barrier providing incidental use separation. It is incorrect to state that the continuity of any and all corridor walls should therefore be to extend only to a ceiling that limits the passage of smoke. Some corridor walls will need to have the continuity required of the assembly that it is designed to be (smoke barrier, fire partition, fire barrier).

Compartmentation using construction to contain fire risks protect patients in place reduces the need for relocation or evacuation and allows for a continuation of medical care. This level of protection cannot be permitted to be removed without additional measures being employed, or without investigation, evaluation reports, and other data indicating approved modifications or approved alternative materials, design and methods of construction, and equipment applying to the building that impact required fire-resistance ratings shall be identified in the evaluation reports submitted.


Cost Impact: Will not increase the cost of construction
Applies only to corridor walls maintained as smoke partitions. Other assembly types are governed elsewhere in the IFC.
2015 International Fire Code

Add new text as follows:

1105.5.4 Group I-2 occupancies. In Group I-2, where a door serves as an opening protective in a fire barrier, smoke barrier or fire wall and where the door is equipped with a hold-open device, such door shall automatically close upon any of the following conditions:

1. Actuation of smoke detectors initiating the hold-open device;
2. Activation of the fire alarm system within the zone;
3. Activation of an automatic sprinkler system within the zone.

Reason: This addresses the concern that the IFC could be more restrictive than the IBC with regard to hold open devices. This proposal seeks to bring ambulatory care centers that receive Medicare / Medicaid funding into compliance with federal standards (specifically, with K-tag K21). This also addresses the concern that the IFC could be more restrictive than the IBC with regard to hold open devices, specifically allowing the hold-opens when designed with the proposed activation of smoke detectors, fire alarms and/or sprinkler system activation.

This is a joint proposal submitted by the ICC Ad Hoc Committee on Healthcare (AHC) and the ICC Code Technology Committee (CTC). The AHC was established by the ICC Board to evaluate and assess contemporary code issues relating to hospitals and ambulatory healthcare facilities. This is a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. In 2014 and 2015 the ICC Ad Hoc Committee has held 4 open meetings and numerous Work Group meetings and conference calls for the current code development cycle which included members of the committees as well as any interested party to discuss and debate the proposed changes.

Information on the AHC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the AHC effort can be downloaded from the AHC website at: AHC.

The two remaining CTC Areas of Study are Care Facilities and Elevator Lobbies/WTC Elevator issues. This proposal falls under the Care Facilities Area of Study. In 2014 and 2015 ICC CTC Committee has held 4 open meetings and numerous Work Group meetings and conference calls for the current code development cycle which included members of the committees as well as any interested party to discuss and debate the proposed changes.

Information on the CTC, including: the sunset plan; meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the CTC website CTC.

Cost Impact: Will not increase the cost of construction

By federal standards, ambulatory healthcare facilities are already allowed this provision. Furthermore, allowance of the hold-open prevents damage to the door when a stretcher or supply cart moves through the barrier, providing significant operational savings by increasing the useful life of the rated door.
F254-16
IFC: 1105.6.3.

Proponent: John Williams, CBO, representing Adhoc Healthcare Committee (AHC@iccsafe.org); Carl Baldassarra, P.E., FSFPE, representing Code Technology Committee (CTC@iccsafe.org)

2015 International Fire Code

1105.6.3 Opening protectives. Openings in smoke barriers shall be protected in accordance with Section 716 of the International Building Code. Opening protectives shall have a minimum fire-protection-rating of 1/3 hour.

Exceptions:
1. Existing wired glass vision panels in doors shall be permitted to remain.
2. Existing non-labeled protection plates shall be permitted to remain.

Reason: This change is in correlation with a code change to IBC Section 709.5 that was part of Group A, FS44-15. Smoke barrier doors are typically installed across corridors and patient treatment areas. These doors see a very high volume of gurney and bed traffic, as well as carts, wheeled equipment and transport devices. As a result they are often damaged. This proposal would allow the installation of a non-labeled protective plate, usually made of steel or other resilient material, to be installed on these doors to protect them from excessive wear and damage. Due to the size of equipment being wheeled through, these protective plates need to be allowed to be greater than 48" high. Currently NFPA 80 would require that the protective plates on rated doors be limited to 48" and that they be labeled. The doors in smoke barriers do not function as true fire doors. This section contains many special directives and requirements exempting smoke barriers doors from meeting fire door requirements. This code change follows with the established intent of this section. Smoke barriers are intended to be substantial construction and providing protective plates provides additional protection to the doors keeping the original construction free from damage thus in a more substantial manner. They do not provide the same fire resistance rating as a true 1 hour fire barrier.

This is a joint proposal submitted by the ICC Ad Hoc Committee on Healthcare (AHC) and the ICC Code Technology Committee (CTC). The AHC was established by the ICC Board to evaluate and assess contemporary code issues relating to hospitals and ambulatory healthcare facilities. This is a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. In 2014 and 2015 the ICC Ad Hoc Committee has held 4 open meetings and numerous Work Group meetings and conference calls for the current code development cycle which included members of the committees as well as any interested party to discuss and debate the proposed changes. Information on the AHC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the AHC effort can be downloaded from the AHC website at: AHC. The two remaining CTC Areas of Study are Care Facilities and Elevator Lobbies/WTC Elevator issues. This proposal falls under the Care Facilities Area of Study. In 2014 and 2015 ICC CTC Committee has held 4 open meetings and numerous Work Group meetings and conference calls for the current code development cycle which included members of the committees as well as any interested party to discuss and debate the proposed changes. Information on the CTC, including: the sunset plan; meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the CTC website CTC.

Cost Impact: Will not increase the cost of construction
Allowing the use of non-labeled plates will allow for existing doors to not be replaced.
IFC: 1105.10, 1105.10.1, 1105.10.2.

Proponent: John Williams, CBO, representing Adhoc Healthcare Committee (AHC@iccsafe.org)

2015 International Fire Code

1105.10 Essential electrical systems. Essential electrical systems in Group I-2 Condition 2 occupancies shall be in accordance with Sections 1105.10.1 and 1105.10.2.

Revise as follows:

1105.10.1 Where required. Where required by NFPA 99, Group I-2 Condition 2 occupancies where life support is being provided, an essential electrical system shall be provided in accordance with NFPA 99.

1105.10.2 Installation and duration. In Group I-2 Condition 2 occupancies, the installation and duration of operation of existing essential electrical systems shall be based on a hazard vulnerability analysis conducted in accordance with NFPA 99.

Reason: NFPA 99 changes have moved to a risk-based approach to requirements for essential electrical systems. Those requirements are more specific than the current language which is where life support is being provided. The recent changes look at the risk of failure of the system and its implications to the patients or caregivers in terms of injury or death. Specific design considerations are set based upon the risk. This change will not increase the cost of construction since NFPA 99 is required to be followed in these facilities. This change more closely aligns with NFPA 99 and correctly defines the need for emergency beyond the requirement of "where life support is being provided."

This proposal is submitted by the ICC Ad Hoc Committee on Healthcare (AHC). The AHC was established by the ICC Board to evaluate and assess contemporary code issues relating to hospitals and ambulatory healthcare facilities. This is a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. In 2014 and 2015 the ICC Ad Hoc Committee has held 4 open meetings and numerous Work Group meetings and conference calls for the current code development cycle which included members of the committees as well as any interested party to discuss and debate the proposed changes. Information on the AHC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the AHC effort can be downloaded from the AHC website at: AHC.

Cost Impact: Will not increase the cost of construction

There is no cost impact because facilities are using the proposed language in construction today. They are designing their facilities to meet the Medicare conditions of participation. Medicare conditions of participation require that hospitals and ambulatory surgery facilities install emergency power systems in accordance with NFPA 99. The proposal changes language to align with the requirements of Medicare.
Add new text as follows:

CHAPTER 12  ENERGY SYSTEMS

SECTION 1201  GENERAL

1201.1  Scope.  The provisions of this chapter shall apply to the installation, operation and maintenance of energy systems used for generating or storing energy. It shall not apply to equipment associated with the generation, control, transformation, transmission, or distribution of energy installations that is under the exclusive control of an electric utility or lawfully designated agency.

1201.2  Electrical wiring and equipment.  Electrical wiring and equipment used in connection with energy systems shall be installed and maintained in accordance with Chapter 12 and NFPA 70.

1201.3  Mixed systems.  Different types of energy systems shall not be installed in the same room or fire area unless approved.

1201.3.1  Mixed system installation.  Where approved, the aggregate KWh energy in a fire area shall not exceed the maximum quantity specified for any of the energy systems in this chapter. Where required by the fire code official a hazard mitigation analysis shall be provided and approved in accordance with Section 104.7.2 to evaluate any potential adverse interaction between the various energy systems and technologies.

SECTION 1202  DEFINITIONS

1202.1  Definitions.  The following terms are defined in Chapter 2:

BATTERY SYSTEM, STATIONARY LEAD-ACID.
BATTERY TYPES.
CRITICAL CIRCUIT.
EMERGENCY POWER SYSTEM.
STANDBY POWER SYSTEM.

Revise as follows:

SECTION 604 1203  EMERGENCY AND STANDBY POWER SYSTEMS

604.1 1203.1  General.  No change to text.

604.1.1 1203.1.1  Stationary generators.  No change to text.

604.1.2 1203.1.2  Installation.  No change to text.

604.1.3 1203.1.3  Load transfer.  No change to text.

604.1.4 1203.1.4  Load duration.  No change to text.

604.1.5 1203.1.5  Uninterruptable power source.  No change to text.
604.1.6 1203.1.6 Interchangeability. No change to text.

604.1.7 1203.1.7 Group I-2 occupancies. No change to text.

604.1.8 1203.1.8 Maintenance. No change to text.

604.2 1203.2 Where required. No change to text.

604.2.1 1203.2.1 Elevators and platform lifts. No change to text.

604.2.2 1203.2.2 Emergency alarm systems. No change to text.

604.2.3 1203.2.3 Emergency responder radio coverage systems. No change to text.

604.2.4 1203.2.4 Emergency voice/alarm communication systems. No change to text.

604.2.5 1203.2.5 Exit signs. No change to text.

604.2.6 1203.2.6 Group I-2 occupancies. No change to text.

604.2.7 1203.2.7 Group I-3 occupancies. Power-operated sliding doors or power-operated locks for swinging doors in Group I-3 occupancies shall be operable by a manual release mechanism at the door. Emergency power shall be provided for the doors and locks in accordance with Section 604.

Exceptions:

1. Emergency power is not required in facilities where provisions for remote locking and unlocking of occupied rooms in Occupancy Condition 4 are not required as set forth in the International Building Code.

2. Emergency power is not required where remote mechanical operating releases are provided.

604.2.8 1203.2.8 Hazardous materials. Emergency and standby power shall be provided in occupancies with hazardous materials as required in the following sections:

   1. Sections 5004.7 and 5005.1.5 for hazardous materials.
   2. Sections 6004.2.2.8 and 6004.3.4.2 for highly toxic and toxic gases.
   3. Section 6204.1.11 for organic peroxides.

604.2.9 1203.2.9 High-rise buildings. No change to text.

604.2.10 1203.2.10 Horizontal sliding doors. No change to text.

604.2.11 1203.2.11 Hydrogen fuel gas rooms. No change to text.

604.2.12 1203.2.12 Means of egress illumination. No change to text.

604.2.13 1203.2.13 Membrane structures. No change to text.

604.2.14 1203.2.14 Semiconductor fabrication facilities. No change to text.

604.2.15 1203.2.15 Smoke control systems. No change to text.

604.2.16 1203.2.16 Underground buildings. No change to text.

604.3 1203.3 Critical circuits. No change to text.
604.4 **1203.4** Maintenance. No change to text.

604.4.1 **1203.4.1** Schedule. No change to text.

604.4.2 **1203.4.2** Records. No change to text.

604.4.3 **1203.4.3** Switch maintenance. No change to text.

604.5 **1203.5** Operational inspection and testing. Emergency power systems, including all appurtenant components, shall be inspected and tested under load in accordance with NFPA 110 and NFPA 111.

   **Exception:** Where the emergency power system is used for standby power or peak load shaving, such use shall be recorded and shall be allowed to be substituted for scheduled testing of the generator set, provided that appropriate records are maintained.

604.5.1 **1203.5.1** Transfer switch test. No change to text.

604.6 **1203.6** Emergency lighting equipment. No change to text.

604.6.1 **1203.6.1** Activation test. No change to text.

604.6.1.1 **1203.6.1.1** Activation test record. No change to text.

604.6.2 **1203.6.2** Power test. No change to text.

604.6.2.1 **1203.6.2.1** Power test record. No change to text.

604.7 **1203.7** Supervision of maintenance and testing. No change to text.

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**SECTION 1204  SOLAR PHOTOVOLTAIC POWER SYSTEMS**

605.11 **1204.1** Solar photovoltaic power systems. **General** Solar photovoltaic power systems shall be installed in accordance with Sections 605.11.1 **1204.2** through 605.11.2 **1204.5**, the International Building Code or International Residential Code, and NFPA 70.

605.11.1 **1204.2** Access and pathways. Roof access, pathways, and spacing requirements shall be provided in accordance with Sections 605.11.1.1 through 605.11.1.3.3.

   **Exceptions:**
   1. Detached, nonhabitable Group U structures including, but not limited to, parking shade structures, carports, solar trellises and similar structures.
   2. Roof access, pathways and spacing requirements need not be provided where the fire chief has determined that rooftop operations will not be employed.

605.11.1.1 **1204.2.1** Roof access points. No change to text.

605.11.1.2 **1204.2.2** Solar photovoltaic systems for Group R-3 buildings. Solar photovoltaic systems for Group R-3 buildings shall comply with Sections 605.11.1.2.1 through 605.11.1.2.5.

   **Exception:** These requirements shall not apply to structures designed and constructed in accordance with the International Residential Code.

605.11.1.2.1 **1204.2.2.1** Size of solar photovoltaic array. No change to text.

605.11.1.2.2 **1204.2.2.2** Hip roof layouts. Panels and modules installed on Group R-3 buildings
with hip roof layouts shall be located in a manner that provides a 3-foot-wide (914 mm) clear access pathway from the eave to the ridge on each roof slope where panels and modules are located. The access pathway shall be at a location on the building capable of supporting the fire fighters accessing the roof.

**Exception:** These requirements shall not apply to roofs with slopes of two units vertical in 12 units horizontal (2:12) or less.

**605.11.1.2.3 1204.2.2.3 Single-ridge roofs.** Panels and modules installed on Group R-3 buildings with a single ridge shall be located in a manner that provides two, 3-foot-wide (914 mm) access pathways from the eave to the ridge on each roof slope where panels and modules are located.

**Exception:** This requirement shall not apply to roofs with slopes of two units vertical in 12 units horizontal (2:12) or less.

**605.11.1.2.4 1204.2.2.4 Roofs with hips and valleys.** Panels and modules installed on Group R-3 buildings with roof hips and valleys shall not be located closer than 18 inches (457 mm) to a hip or a valley where panels/modules are to be placed on both sides of a hip or valley. Where panels are to be located on only one side of a hip or valley that is of equal length, the panels shall be permitted to be placed directly adjacent to the hip or valley.

**Exception:** These requirements shall not apply to roofs with slopes of two units vertical in 12 units horizontal (2:12) or less.

**605.11.1.2.5 1204.2.2.5 Allowance for smoke ventilation operations.** Panels and modules installed on Group R-3 buildings shall be located not less than 3 feet (914 mm) from the ridge in order to allow for fire department smoke ventilation operations.

**Exception:** Panels and modules shall be permitted to be located up to the roof ridge where an alternative ventilation method approved by the fire chief has been provided or where the fire chief has determined vertical ventilation techniques will not be employed.

**605.11.1.3 1204.2.3 Other than Group R-3 buildings.** Access to systems for buildings, other than those containing Group R-3 occupancies, shall be provided in accordance with Sections 605.11.1.3.1 through 605.11.1.3.3.

**Exception:** Where it is determined by the fire code official that the roof configuration is similar to that of a Group R-3 occupancy, the residential access and ventilation requirements in Sections 605.11.1.2.1 through 605.11.1.2.5 shall be permitted to be used.

**605.11.1.3.1 1204.2.3.1 Access.** There shall be a minimum 6-foot-wide (1829 mm) clear perimeter around the edges of the roof.

**Exception:** Where either axis of the building is 250 feet (76 200 mm) or less, the clear perimeter around the edges of the roof shall be permitted to be reduced to a minimum 4 foot wide (1290 mm).

**605.11.1.3.2 1204.2.3.2 Pathways.** The solar installation shall be designed to provide designated pathways. The pathways shall meet the following requirements:

1. The pathway shall be over areas capable of supporting fire fighters accessing the roof.
2. The centerline axis pathways shall be provided in both axes of the roof. Centerline axis pathways shall run where the roof structure is capable of supporting fire fighters accessing the roof.
3. Pathways shall be a straight line not less than 4 feet (1290 mm) clear to roof standpipes or ventilation hatches.
4. Pathways shall provide not less than 4 feet (1290 mm) clear around roof access hatch with not less than one singular pathway not less than 4 feet (1290 mm) clear to a parapet or roof edge.

605.11.1.3.3 1204.2.3.3 Smoke ventilation. The solar installation shall be designed to meet the following requirements:

1. Arrays shall be not greater than 150 feet (45 720 mm) by 150 feet (45 720 mm) in distance in either axis in order to create opportunities for fire department smoke ventilation operations.
2. Smoke ventilation options between array sections shall be one of the following:
   2.1. A pathway 8 feet (2438 mm) or greater in width.
   2.2. A 4-foot (1290 mm) or greater in width pathway and bordering roof skylights or gravity-operated dropout smoke and heat vents on not less than one side.
   2.3. A 4-foot (1290 mm) or greater in width pathway and bordering all sides of nongravity-operated dropout smoke and heat vents.
   2.4. A 4-foot (1290 mm) or greater in width pathway and bordering 4-foot by 8-foot (1290 mm by 2438 mm) "venting cutouts" every 20 feet (6096 mm) on alternating sides of the pathway.

605.11.2 1204.3 Ground-mounted photovoltaic arrays. No change to text.

SECTION 608 1205 STATIONARY ELECTRICAL ENERGY STORAGE BATTERY SYSTEMS

1205.1 Scope. The provisions in this section are applicable to energy storage systems designed to provide electrical power to a building or facility. These systems are used to provide standby or emergency power, an uninterruptable power supply, load shedding, load sharing or similar capabilities.

608.1 1205.2 Scope Stationary storage battery systems. No change to text.

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<th>Recombinant Batteries</th>
<th>Other Batteries</th>
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<td>Valve Regulated Lead-Acid (VRLA) Cells</td>
<td>Lithium-Ion Cells</td>
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<td>Venting caps</td>
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<td>Required (608.9)</td>
<td>Required (608.9)</td>
</tr>
</tbody>
</table>

608.2 1205.2.1 Safety caps. No change to text.

608.2.1 1205.2.1.1 Nonrecombinant batteries. No change to text.

608.2.2 1205.2.1.2 Recombinant batteries. No change to text.

608.3 1205.2.2 Thermal runaway. No change to text.

608.4 1205.2.3 Room design and construction. No change to text.

608.4.1 1205.2.3.1 Separate rooms. No change to text.

608.4.2 1205.2.3.2 Occupied work centers. No change to text.

608.4.3 1205.2.3.3 Cabinets. No change to text.

608.5 1205.2.4 Spill control and neutralization. An approved method and materials for the control and neutralization of a spill of electrolyte shall be provided in areas containing lead-acid, nickel-cadmium or other types of batteries with free-flowing liquid electrolyte. For purposes of this paragraph, a "spill" is defined as any unintentional release of electrolyte.
Exception: VRLA, lithium-ion, lithium metal polymer or other types of sealed batteries with immobilized electrolyte shall not require spill control.

608.5.1 1205.2.4.1 Nonrecombinant battery neutralization. No change to text.

608.5.2 1205.2.4.2 Recombinant battery neutralization. For VRLA or other types of batteries with immobilized electrolyte, the method and material 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.

Exception: Lithium-ion and lithium metal polymer batteries shall not require neutralization.

608.6 1205.2.5 Ventilation. No change to text.

608.6.1 1205.2.5.1 Room ventilation. Ventilation shall be provided in accordance with the International Mechanical Code and the following:

1. For flooded lead-acid, flooded Ni-Cd and VRLA batteries, the ventilation system shall be designed to limit the maximum concentration of hydrogen to 1.0 percent of the total volume of the room; or
2. Continuous ventilation shall be provided at a rate of not less than 1 cubic foot per minute per square foot $(1 \text{ ft}^3/\text{min}/\text{ft}^2)$ $[0.0051 \text{ m}^3/\text{s} \cdot \text{m}^2]$ of floor area of the room. 
   Exception: Lithium-ion and lithium metal polymer batteries shall not require additional ventilation beyond that which would normally be required for human occupancy of the space in accordance with the International Mechanical Code.

608.6.2 1205.2.5.2 Cabinet ventilation. Where VRLA batteries are installed inside a cabinet, the cabinet shall be approved for use in occupied spaces and shall be mechanically or naturally vented by one of the following methods:

1. The cabinet ventilation shall limit the maximum concentration of hydrogen to 1 percent of the total volume of the cabinet during the worst-case event of simultaneous "boost" charging of all the batteries in the cabinet.
2. Where calculations are not available to substantiate the ventilation rate, continuous ventilation shall be provided at a rate of not less than 1 cubic foot per minute per square foot $[1 \text{ ft}^3/\text{min}/\text{ft}^2$ or $0.0051 \text{ m}^3/(\text{s} \cdot \text{m}^2)]$ of floor area covered by the cabinet. The room in which the cabinet is installed shall be ventilated as required in Section 608.6.1.

608.6.3 1205.2.5.3 Supervision. No change to text.

608.7 1205.2.6 Signage. No change to text.

608.7.1 1205.2.6.1 Equipment room and building signage. Doors into electrical equipment rooms or buildings containing stationary battery systems shall be provided with approved signs. The signs shall state that:

1. The room contains energized battery systems.
2. The room contains energized electrical circuits.
3. The battery electrolyte solutions, where present, are corrosive liquids.

608.7.2 1205.2.6.2 Cabinet signage. No change to text.

608.8 1205.2.7 Seismic protection. No change to text.
Smoke detection. No change to text.

**Reason:** The introduction of a wide range of systems to generate and store energy in, on and adjacent to buildings and facilities covered by this code is expanding rapidly to meet today’s energy, environmental and economic challenges. Ensuring appropriate criteria to address the safety of such systems in building and fire codes is an important part of protecting the public at large, building occupants and emergency responders.

Currently requirements for energy systems such as standby power systems, PV systems and stationary battery systems are scattered about in various locations in the Chapter 6 Building Services and Systems section.

This proposal creates a new Chapter 12 for energy systems that covers systems that generate and store energy. Without this new chapter the energy systems currently under consideration, fuel cells, capacitor energy storage systems, and an expanded stationary storage battery section, would have to be placed in Chapter 6, which isn’t the best fit. In addition future energy systems on the horizon, including thermal, mechanical, compressed air and pumped hydro energy storage systems, if covered by these codes, will have a more logical home than Chapter 6.

Note that the intent of this proposal is to also add provisions being developed on Fuel Cells and Capacitors. Those provisions are addressed in different proposals and will be adding new provisions to Chapter 6. It is the desire that if those proposals are approved that the provisions be located in this chapter. Since the outcome of those proposals is unknown those provisions are not currently included in this proposal. It is hoped that if the proposals dealing with Fuel Cells and Capacitors are approved they will be placed as follows:

**Fuel Cells** - new section 1205 (move currently proposed Section 1205 to 1206)

**Capacitors** - new section 1206.3 (It will be Section 1206.3 if the fuel cell proposal also is approved)

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire safety and hazardous materials in new and existing buildings and facilities and the protection of life and property in wildland urban interface areas. In 2014 and 2015 the Fire-CAC has held 5 open meetings. In addition, there were numerous conference calls, Regional Work Group and Task Group meetings for the current code development cycle, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC

**Cost Impact:** Will not increase the cost of construction

This proposal essentially relocates existing requirements from Chapter 6, and potential new requirements from other proposals.

**Analysis:** As the proponent states there is a desire to provide a new section on Fuel Cells and Capacitors within this Chapter if those proposals should be approved. Therefore it is anticipated if those new sections should be approved they will be located as the proponent suggests. Also any revisions to the existing sections that have been placed into this chapter will reflect any revisions made during the 2016 code change cycle.

- **Section 1205 - Fuel Cells**
- **Section 1206.3 - Capacitors** (This anticipates that the new Section 1205 is created for Fuel Cells. If not Section 1206.3 will be used.)
F257-16

IFC: 2006.4.1.1 (New).

Proponent: Jay Weightman, representing Colorado Springs Fire Department, Division of the Fire Marshal (jweightman@springsgov.com)

2015 International Fire Code

Add new text as follows:

2006.4.1.1 Documentation A vehicle checklist for aircraft-fueling vehicles shall be documented on a daily basis by the apparatus driver.

Reason: Section 2006.4 deals with the operation, maintenance and use of aircraft-fueling vehicles and this proposal adds a level of responsibility to the operator of the vehicle. Most companies require operators to fill out this type of form but without this form, the inspector may not be able to effectively determine if the operator has checked to ensure the mechanical safety of the vehicle.

Cost Impact: Will not increase the cost of construction

This proposal will not create a cost to the company and may actually save money on some previously undetected maintenance issues.
2015 International Fire Code

SECTION 2201 GENERAL

Revise as follows:

2201.1 Scope. The equipment, processes and operations involving dust explosion hazards shall comply with the provisions of this chapter code and NFPA 652.

2201.2 Permits. Permits shall be required for combustible dust-producing operations as set forth in Section 105.6.

SECTION 2203 PRECAUTIONS

Add new text as follows:

2203.1 Owner responsibility. The owner or operator of a facility with operations that manufacture, process, blend, convey, repackage, generate, or handle potentially combustible dusts or combustible particulate solids shall be responsible for compliance with the provisions of this code and NFPA 652.

2203.2 Dust hazard analysis (DHA). The requirements of NFPA 652 apply to all new and existing facilities and operations with potentially combustible dust. Existing facilities shall have a Dust Hazards Analysis (DHA) completed in accordance with Section 7.1.2 of NFPA 652.

The fire code official shall order a dust hazard analysis to occur sooner if a combustible dust hazard has been identified in a facility that has not previously performed an analysis.

Revise as follows:

2203.1 2203.3 Sources of ignition. No change to text.

2203.2 2203.4 Housekeeping. No change to text.

SECTION 2204 EXPLOSION PROTECTION ADDITIONAL REQUIREMENTS

2204.1 Standards Specific hazards standards. The fire code official is authorized to enforce applicable provisions of the industry- or commodity-specific codes and standards listed in Table 2204.1 to prevent dust explosions and control dust explosion hazards that potentially exist at a facility.

<table>
<thead>
<tr>
<th>STANDARD</th>
<th>SUBJECT</th>
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</table>
2015 International Building Code

CHAPTER 4 SPECIAL DETAILED REQUIREMENTS BASED ON USE AND OCCUPANCY

SECTION [F] 426 COMBUSTIBLE DUSTS, GRAIN PROCESSING AND STORAGE

426.1 Combustible dusts, grain processing and storage. The provisions of Sections 426.1.1 through 426.1.7 shall apply to buildings in which materials that produce combustible dusts are stored or handled. Buildings that store or handle combustible dusts shall comply with NFPA 652 and the applicable provisions of NFPA 61, NFPA 85, NFPA 120, NFPA 484, NFPA 654, NFPA 655 and NFPA 664 and the International Fire Code.

Reference standards type: This reference standard is new to the ICC Code Books

Add new standard(s) as follows:
Add the standard to both the IFC and the IBC
NFPA 652 - 2016 THE FUNDAMENTALS OF COMBUSTIBLE DUST


Reason: NFPA has developed a new dust standard, , NFPA 652 THE FUNDAMENTALS OF COMBUSTIBLE DUST, to serve as the fundamental standard for assessing the hazard of combustible dusts or particulates at a facility and the conducting of a dust hazard analysis to quantify the hazard and identify remedial actions and protections levels. The purpose of this proposal is to add NFPA 652 to both the IFC and IBC as the lead standard to apply to potential dust hazards.

Cost Impact: Will not increase the cost of construction
For facilities already in compliance with current standards of care there should be no increase in cost.

Analysis: A review of the standard(s) proposed for inclusion in the code, NFPA 652 - 2016 with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1, 2016.
2015 International Fire Code

2204.1 Standards. The fire code official is authorized required to enforce applicable provisions of the codes and standards listed in Table 2204.1 to prevent and control dust explosions.

Reason: Between January and May 2011, the U.S. Chemical Safety Board investigated three iron dust related incidents at the Gallatin, TN facility of the Hoeganaes Corporation, a worldwide producer of atomized iron and steel powders. The first iron dust flash fire incident killed two workers and the second injured an employee. The third incident, a hydrogen explosion and resulting iron dust flash fires, claimed three lives and injured two other workers. As part of its investigations, the CSB reviewed codes and standards applicable to operations at the Hoeganaes Gallatin facility, and found that both the State of Tennessee and the City of Gallatin have adopted the 2006 edition of International Fire Code (IFC), a product of the International Code Council (ICC), into law. Chapter 13 of the IFC (2006), Combustible Dust Producing Operations, briefly addresses precautions for ignition sources and housekeeping in areas where combustible dust is generated, stored, manufactured or handled. The IFC also references several NFPA standards, such as NFPA 484, Combustible Metals, Metal Powders, and Metal Dusts, and specifies that "the fire code official is authorized to enforce applicable provisions of the codes and standards listed ... to prevent and control dust explosions." This language does not make clear, however, whether compliance with and enforcement of the referenced NFPA standards is a mandatory or voluntary requirement of the IFC.

The CSB concluded that had the Hoeganaes facility adhered to the requirements of this chapter, including the more detailed design and engineering requirements contained in NFPA 484, the January and March incidents may have been prevented, and the effects of the May incident could have been reduced. Therefore, the Board voted to issue the following recommendation to the ICC:

CSB Recommendation No. 2011-4-I-TN-R4: Revise IFC Chapter 22 Combustible Dust Producing Operations: Section 2204.1 Standards, to require mandatory compliance and enforcement with the detailed requirements of the NFPA standards cited in the chapter, including NFPA 484.

ICC's letter dated December 10, 2013 stated that the Fire Code Action Committee considered, but ultimately disapproved the change proposal (F245-13) in October 2013. In this letter, ICC also expressed intent to continue to work on this matter and engage stakeholders during the next code revision (IFC 2015). We note that the 2015 IFC 2204.1 reads "The fire code official is authorized to enforce applicable provisions of the codes and standards listed in Table 2204.1 to prevent and control dust explosions." We maintain that the language should require fire code officials to use NFPA 484.

The CSB is happy to discuss this recommendation further with ICC committees. Please contact Veronica Tinney, Recommendations Specialist, at 202-261-7642 or [email protected]


Cost Impact: Will increase the cost of construction
CSB anticipates that this revision will increase the cost of construction because it will now be mandatory for the code official to enforce the standards in this chapter, as applicable, which may lead to more stringent code application where it did not exist previously.
IFC: 2301.1.
Proponent: Jonathan Roberts (jonathan.roberts@ul.com)

2015 International Fire Code

Revise as follows:

2301.1 Scope. Automotive motor fuel-dispensing facilities, marine motor fuel-dispensing facilities, fleet vehicle motor fuel-dispensing facilities, aircraft motor-vehicle fuel-dispensing facilities and repair garages shall be in accordance with this chapter and the International Building Code, International Fuel Gas Code and International Mechanical Code and NFPA 30A. Such operations shall include both those that are accessible to the public and private operations.

Reason: NFPA 30A is currently referenced in six different places in Chapter 23, but is not referenced in this particular section. This provides an additional reference to 30A that is applicable to all requirements within this section.

Cost Impact: Will not increase the cost of construction
The additional reference to NFPA 30A simply adds a requirement that is already being referenced throughout other areas of the code.
2015 International Fire Code

Add new text as follows:

2303.2.1 Height The height of the emergency disconnect switch shall be not less than 42 inches (1067 mm) and not more than 48 inches (1372 mm) measured vertically, from the floor level to the activating button.

Reason: This proposal provides a prescriptive height requirement for emergency disconnect switches at motor vehicle fuel dispensing facilities. In the IFC, along with the legacy codes, the switch height was not identified, allowing contractors to install the switch at any height, usually at an inaccessible height. The proposal mirrors the manual fire alarm box height in Section 907.4.2.2.

Cost Impact: Will not increase the cost of construction
This is a prescriptive requirement for placement and will not increase the cost of construction.
F262-16

IFC: 2305.1.1, 5706.5.1.1.

Proponent: Jeffrey Shapiro, representing Steel Tank Institute / Steel Tank Fabricators Association (jeff.shapiro@intlcodeconsultants.com)

2015 International Fire Code

Revise as follows:

2305.1.1 Delivery vehicle location. Where liquid delivery to above-ground storage tanks is accomplished by positive-pressure operation, tank vehicles shall be positioned not less than 25 feet (7620 mm) from tanks receiving Class I liquids and 15 feet (4572 mm) from tanks receiving Class II and IIIA liquids, measured from the tank to the nearest unloading valve on the tank vehicle.

5706.5.1.1 Location. Bulk transfer and process transfer operations shall be conducted in approved locations. Tank cars shall be unloaded only on private sidings or railroad-siding facilities equipped for transferring flammable or combustible liquids. Tank vehicle vehicles and tank car cars engaged in bulk transfer facilities or process transfer operations shall be separated from buildings, above-ground tanks, combustible materials, lot lines, public streets, public alleys or public ways by a distance of 25 feet (7620 mm) for Class I liquids and 15 feet (4572 mm) for Class II and IIIA liquids measured from the nearest position of any loading or unloading valve on the tank vehicle or tank car.

Exception: Buildings for pumps or- and shelters for personnel supporting transfer operations shall not be considered part of the required to be separated from tank vehicles and tank cars engaged in bulk transfer facility or process transfer operations.

Reason: The two sections of the code affected by this proposal deal with similar topics. One section deals with separating aboveground tanks at motor vehicle fuel dispensing stations from tank vehicles that fill them, and the other deals with separating aboveground tanks and other exposures from tank vehicles and tank cars that are involved in bulk and process transfer of flammable or combustible liquids. The separation distances, 25 feet for Class I liquids and 15 feet for Class II and Class III liquids are the same, except that Section 5706.5.1.1 does not currently exclude Class IIIB liquids from the requirement.

This proposal adds the Class IIIB exception to Section 5706.5.1.1 for consistency, recognizing that Class IIIB liquids have a flashpoint of 200 degrees Fahrenheit, or more, and present a minimal ignition hazard when spilled in a controlled area designated for bulk or process transfer operations. For additional correlation and clarification, the proposal also copies the basis of measuring the separation distance, which is distance from the exposure to the nearest valve on a vehicle that might be involved in transfer operations, from Section 5706.5.1.1 to 2305.1.1. Finally, there is some general cleanup of Section 5706.5.1.1 to put the exception into exception format and to clarify that the loading and unloading valves being referenced are those on a tank vehicle or tank car. This is important to avoid confusion with NFPA 30, which uses a different basis of measurement for separation distances.

Cost Impact: Will not increase the cost of construction

The proposal may decrease the cost of construction by reducing the amount of piping necessary to install tank fill connections.
F263-16

IFC: 2305.2.
Proponent: Richard Kraus, American Petroleum Institute, representing American Petroleum Institute (petrosafety@verizon.net)

2015 International Fire Code

Revise as follows:

2305.2 Equipment maintenance and inspection. Motor fuel-dispensing facility equipment shall be maintained in proper working order at all times in accordance with Sections 2305.2.1 through 2305.2.5. Contractors working at retail petroleum convenience facilities shall comply with the requirements of API 1646.

Reference standards type: This reference standard is new to the ICC Code Books
Add new standard(s) as follows:
API 1646-2006 Safe Work Practices for Contractors Working at Retail Petroleum Convenience Facilities
Reason: API 1646 Safe Work Practices for Contractors Working at Retail Petroleum Convenience Facilities has been in use in the industry for many years. API 1646 covers PERSONAL PROTECTIVE EQUIPMENT (PPE), TOOL SELECTION, DRIVING SAFETY, HAZARD COMMUNICATIONS; WORK AT HEIGHTS, BARRICADING, TRENCHING AND EXCAVATION, RIGGING, HOISTING, AND LIFTING, CONFINED SPACE ENTRY, LOCKOUT-TAGOUT, HOT WORK, UNDERGROUND STORAGE TANKS, TRAINING and other contractor operations at service stations, many of which are intended to provide for fire prevention and protection.

Cost impact: Will not increase the cost of construction
These safe work practices have been in place for many years and are basically required by OSHA

Analysis: A review of the standard(s) proposed for inclusion in the code, API 1646-2006, with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1, 2016.

Analysis: A review of the standard(s) proposed for inclusion in the code, API 1646-2006 Safe Work Practices for Contractors Working at Retail Petroleum Convenience Facilities with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1, 2016.
# 2015 International Fire Code

## TABLE 2306.2.3
MINIMUM SEPARATION REQUIREMENTS FOR ABOVE-GROUND TANKS

<table>
<thead>
<tr>
<th>CLASS OF LIQUID AND TANK TYPE</th>
<th>INDIVIDUAL TANK CAPACITY (gallons)</th>
<th>MINIMUM DISTANCE FROM NEAREST IMPORTANT BUILDING ON SAME PROPERTY (feet)</th>
<th>MINIMUM DISTANCE FROM NEAREST FUEL DISPENSER (feet)</th>
<th>MINIMUM DISTANCE FROM LOT LINE THAT IS OR CAN BE BUILT UPON, INCLUDING THE OPPOSITE SIDE OF A PUBLIC WAY (feet)</th>
<th>MINIMUM DISTANCE BETWEEN TANKS (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class I protected above-ground tanks</td>
<td>Less than or equal to 6,000</td>
<td>5</td>
<td>25&lt;sup&gt;a,c&lt;/sup&gt;</td>
<td>15</td>
<td>5</td>
</tr>
<tr>
<td>Class II and III protected above-ground tanks</td>
<td>Greater than 6,000</td>
<td>15</td>
<td>25&lt;sup&gt;a,c&lt;/sup&gt;</td>
<td>25</td>
<td>15</td>
</tr>
<tr>
<td>Class I protected above-ground tanks</td>
<td>Same as Class I</td>
<td>Same as Class I</td>
<td>Same as Class I</td>
<td>Same as Class I</td>
<td>Same as Class I</td>
</tr>
<tr>
<td>Tanks in vaults</td>
<td>0–20,000</td>
<td>0&lt;sup&gt;b&lt;/sup&gt;</td>
<td>0</td>
<td>0&lt;sup&gt;b&lt;/sup&gt;</td>
<td>0</td>
</tr>
<tr>
<td>Other tanks</td>
<td>All</td>
<td>50</td>
<td>50</td>
<td>100</td>
<td>50</td>
</tr>
</tbody>
</table>
For SI: 1 foot = 304.8 mm, 1 gallon = 3.785 L.

a. At fleet vehicle motor fuel-dispensing facilities, a minimum separation distance is not required.

b. Underground vaults shall be located such that they will not be subject to loading from nearby structures, or they shall be designed to accommodate applied loads from existing or future structures that can be built nearby.

c. For Class IIIIB liquids in protected above-ground tanks, a minimum separation distance is not required.

**Reason:** The purpose of this code change is to simplify the requirements found in Table 2306.2.3. Currently, the first column heading states “Class of Liquid and Tank Type”. However, in the table, the only location where ‘class of liquid’ is shown is for Protected Aboveground Storage Tanks, where Class I is separated from Classes II and III. But then the requirements for Class II and III are the same as for Class I with the exception of Footnote c.

So the reference to Class of Liquid has been removed, and Protected Aboveground Storage Tanks are combined into one entry. Footnote c has been relocated to the appropriate entries in the same column.

The end result is that the table has been clarified, and there are no changes in requirements.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire safety and hazardous materials in new and existing buildings and facilities and the protection of life and property in wildland urban interface areas. In 2014 and 2015 the Fire-CAC has held 5 open meetings. In addition, there were numerous conference calls, Regional Work Group and Task Group meetings for the current code development cycle, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: [FCAC](#)

**Cost Impact:** Will not increase the cost of construction

This proposal is editorial and does not affect the application of the code.
2015 International Fire Code

Revise as follows:

2306.7 Fuel-dispensing systems for flammable or combustible liquids. The design, fabrication and installation of fuel-dispensing systems for flammable or combustible liquid fuels shall be in accordance with Sections 2306.7.1 through 2306.7.9.2.4. and NFPA 30A. Alcohol-blended fuel-dispensing systems shall also comply with Section 2306.8.

Reason: NFPA 30A is currently referenced in six different places in Chapter 23, but is not referenced in this particular section. This provides an additional reference to 30A that is applicable to all requirements within this section.

Cost impact: Will not increase the cost of construction

The additional reference to NFPA 30A simply adds a requirement that is already being referenced throughout other areas of the code.
IFC: 2306.8.1

2015 International Fire Code

Revise as follows:

2306.8.1 Listed equipment. Dispensers shall be listed in accordance with UL 87A. Hoses, nozzles, breakaway fittings, swivels, flexible connectors or dispenser emergency shutoff valves, vapor recovery systems, leak detection devices and pumps used in alcohol-blended fuel dispensing systems, hose assemblies shall be listed for the specific purpose in accordance with UL 330A. Hose nozzle valves shall be listed in accordance with UL 2586A. Breakaway fittings, swivels and flexible connectors shall be listed in accordance with UL 567A. Dispenser emergency shutoff valves shall be listed in accordance with UL 842A. Submersible pumps shall be listed in accordance with UL 79A.

Reference standards type: This reference standard is new to the ICC Code Books

Add new standard(s) as follows:

79A - 15 Standard for Power-Operated Pumps for Gasoline and Gasoline/Ethanol Blends with Nominal Ethanol Concentrations Up to 85 Percent (E0 - E85).

330A - 12 Outline for Hose and Hose Assemblies for Use With Dispensing Devices Dispensing Gasoline and Gasoline/Ethanol Blends With Nominal Ethanol Concentrations Up To 85 Percent (E0 - E85).

2586A - 15 Standard for Hose Nozzle Valves for Gasoline and Gasoline/Ethanol Blends with Nominal Ethanol Concentrations Up to 85 Percent (E0 - E85).

567A - 15 Standard for Emergency Breakaway Fittings, Swivel Connectors and Pipe-Connection Fittings for Gasoline/Ethanol Blends with Nominal Ethanol Concentrations Up to 85 Percent (E0 - E85).

842A - 15 Standard for Valves for Gasoline and Gasoline/Ethanol Blends with Nominal Ethanol Concentrations up to 85 Percent (E0 - E85).

Reason: The current IFC does not reference the most recent developments related to alcohol blended fuel dispensing listings. The proposal adds the UL standards that have been developed to list these dispensing system components. Listed products are available that have been investigated to these standards.

Cost Impact: Will increase the cost of construction

Providing dispensing system components listed to the new UL standards may present a nominal increase the cost of construction compared to providing traditional gasohol components. However, this may be offset by decreased expenses for maintaining components listed to traditional gasohol requirements that have degraded prematurely due to the high alcohol content of the blended fuel.

Analysis: A review of the standard(s) proposed for inclusion in the code,

- 79A - 15 Standard for Power-Operated Pumps for Gasoline and Gasoline/Ethanol Blends with Nominal Ethanol Concentrations Up to 85 Percent (E0 - E85).
- 330A - 12 Outline for Hose and Hose Assemblies for Use With Dispensing Devices Dispensing Gasoline and Gasoline/Ethanol Blends With Nominal Ethanol Concentrations Up To 85 Percent (E0 - E85),
- 2586A - 15 Standard for Hose Nozzle Valves for Gasoline and Gasoline/Ethanol Blends with
Nominal Ethanol Concentrations Up to 85 Percent (E0 - E85).

- 842A - 15 Standard for Valves for Gasoline and Gasoline/Ethanol Blends with Nominal Ethanol Concentrations up to 85 Percent (E0 - E85).

with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1, 2016.
F267-16
IFC: 2306.7.3.1 (New).
Proponent: Daniel Nichols, New York State Division of Building Standards and Codes, representing State of New York (dnichols@dos.state.ny.us)

2015 International Fire Code

Add new text as follows:

2306.7.3.1 Additional impact protection The fire code official is authorized to require additional impact protection in accordance with Section 312 where dispensing devices are located in areas near parking areas, multiple dispensing devices, highway on- and off-ramps, and other areas where there is a higher potential for vehicle impacts.

Reason: Fuel-dispensing facilities have changed over the past 10-20 years. Some facilities are larger than the previous generations of service stations and there is more facility traffic due to dispensing operations being combined with mercantile-type operations. This has led to layouts that do not conform to the normal 'wait in line' for fuel pumps; promoting traffic navigating through fueling vehicles, more backing up into available fueling positions, and more parking lot-type traffic.

In these newer facilities, the fire code official should have the ability to require additional impact protection. Even though it is industry standard to place impact protection at the end of a row of pumps, this is not required by the IFC. The current requirement of the 6-inch raised dispenser mounting island provides protection for a parallel vehicle impact and pushes the tire away prior to impact. This does not protect against a perpendicular or angled vehicle impact to the island-type dispenser.

The language has been developed to give latitude to the fire code official rather than changing the baseline requirements. Examples have been given within the proposal based upon experience within the State of New York that has lead to vehicles striking and knocking over dispensers. These incidents have caused fires at pumps and, even though a majority of them were contained to the product remaining in the pump (after the shutoff valve), the currently required impact protection did not have any benefit to protecting the dispenser.

The use of Section 312 is consistent with the optional requirements of installing impact protection instead of the raised island arrangement.

An example of multiple pumps in a line with additional impact protection.
An example of a vehicle strike in a parking lot of a convenience store. Notice the strike is from the opposite direction of the non-required end-of-row bollards.

**Cost Impact:** Will increase the cost of construction
Additional impact protection methods, mainly bollards, will increase the cost of construction. The costs will be minimized by only requiring additional impact protection where determined by the fire code official. Further, the installation of impact protection is an alternative to installing a raised island and is the option of the owner on how compliance will be achieved.
F268-16

IFC: 2306.8.
Proponent: Richard Kraus, American Petroleum Institute, representing American Petroleum Institute (petrosafety@verizon.net)

2015 International Fire Code

2306.8 Alcohol-blended fuel-dispensing operations. The design, fabrication and installation of alcohol-blended fuel-dispensing systems shall be in accordance with Section 2306.7 and Sections 2306.8.1 through 2306.8.5. Storing and handling of ethanol and gasoline-ethanol blends at service stations shall be in accordance with the requirements of API 1626.

Reference standards type: This reference standard is new to the ICC Code Books
Add new standard(s) as follows:
API 1626- 2010 (ADDENDUM 2012) Storing and Handling Ethanol and Gasoline Ethanol Blends at Distribution Terminals and Filling Stations
Reason: API 1626 Storing and Handling Ethanol and Gasoline Ethanol Blends at Distribution Terminals and Filling Stations covers the fire - safety requirements for these flammable liquids in both new and existing service stations.

Cost Impact: Will not increase the cost of construction
These requirements have been in place for many years.

Analysis: A review of the standard(s) proposed for inclusion in the code, API 1626- 2010 (ADDENDUM 2012) Storing and Handling Ethanol and Gasoline Ethanol Blends at Distribution Terminals and Filling Stations with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1, 2016.
2015 International Fire Code

2307.2 Approvals. Storage vessels and equipment used for the storage or dispensing of LP-gas shall be approved or listed in accordance with Sections 2307.2.1 and 2307.2.2.

Revise as follows:

2307.2.1 Approved equipment. Containers, dispensers, pressure relief devices (including pressure relief valves), pressure regulators and piping for LP-gas shall be approved.

2307.2.2 Listed equipment. Hoses, hose connections, vehicle fuel connections, dispensers installed in accordance with 2307.7, LP-gas pumps and electrical equipment used for LP-gas shall be listed.

Reason: The vast majority of LP-gas motor fuel dispensers in use today are not listed units. However, these dispensers are not available to the general public to refuel its vehicles. They are installed at private companies for use with fleet vehicles or at propane bulk plants for filling portable motor fuel cylinders used with forklift trucks, lawn mowers and vehicles. Requiring these dispensers to be "approved" rather than "listed" allows for their continued installation and use. The code official is able to approve the installation whether the "packaged" dispenser system itself is listed or not, using the requirements in Section 2307 and Chapter 61 of the IFC, as well as referenced standard NFPA 58 "LP-Gas Code." These references provide all the necessary requirements for approving the installation of a LP-gas dispenser. The individuals that use these dispensers are properly trained on the hazards of LP-gas and the safe use of the filling equipment.

Dispensers may also be located at public refueling stations (gasoline stations) along with other fuels. We are proposing that for these applications, propane dispenser systems must be listed units to make them equivalent to the units that are being installed for self-service gasoline and diesel applications. These units would be factory-assembled with a storage container, pump, meter and dispenser hose and hose end valve on a common base or skid and shipped to the site for installation as a packaged unit. Or, they may be assembled at a factory and fully contained within a cabinet, shipped to the site for installation on an island and served by a remote LP-gas tank, similar to gasoline dispensers. These dispensers are typically listed to Underwriters Laboratories standard UL 495 "Standard for Power-Operated Dispensing Devices for LP-Gas."

Reasoning: Dispensers must be "approved" rather than "listed" allows for the installation of the various dispenser configurations that are being used today. The code official is able to approve the installation whether the dispenser itself is listed or not, using the requirements in Section 2307 and Chapter 61 of the IFC, as well as referenced standard NFPA 58 "LP-Gas Code." These references provide all the necessary requirements for approving the location of the installation and the equipment used in order to achieve a code-complying installation.

Bibliography: [NFPA 58 Liquefied Petroleum Gas Code] [National Fire Protection Association] [2014] [UL 495 Standard for Power-Operated Dispensing Devices for LP-Gas] [Underwriters Laboratories] [2000]

Cost Impact: Will not increase the cost of construction

This proposal will decrease the cost of construction because it will permit certain LP-gas dispensers to be installed without the assembly having to be listed. The process of listing a piece of equipment involves testing the equipment and then subscribing to a follow up inspection program. This can be a costly process and since certain LP-gas dispensers would not be required to be listed, these costs would be avoided and therefore the cost of construction would DECREASE.
2015 International Fire Code

SECTION 2309 HYDROGEN MOTOR FUEL-DISPENSING AND GENERATION FACILITIES

Revise as follows:

2309.6 Defueling of hydrogen from fuel storage containers. Repairs, purging, defueling and discharge. The repair, purging, defueling or discharge or defueling activities associated with hydrogen motor fuel supply systems and tanks and the installation of hydrogen from fuel storage tanks for the purpose of maintenance, cylinder certification, calibration of dispensers or other activities shall be in accordance with Sections 2309.6.1 through 2309.6.1.2.4 Chapter 53, Chapter 58 and NFPA 2.

Exception: The fuel supply piping from the fuel storage tank to the engine compartment on a motor vehicle or forklift.

Delete without substitution:

2309.6.1 Methods of discharge. The discharge of hydrogen from fuel storage tanks shall be accomplished through a closed transfer system in accordance with Section 2309.6.1.1 or an approved method of atmospheric venting in accordance with Section 2309.6.1.2.

Revise as follows:

2309.6.1.1 2309.6.1 Closed transfer system. Documented procedure. A documented procedure that explains the logic sequence for defueling or discharging the storage tank operations shall be maintained on site and shall be provided to the fire code official upon request. The procedure shall include what actions the operator is required to take in the event of a low-pressure or high-pressure hydrogen release during discharging activity. Schematic design documents shall be maintained on site illustrating the arrangement of piping, regulators and equipment settings. The construction documents shall illustrate the piping and regulator arrangement and shall be shown in spatial relation to the location of the vehicle being defueled and, if applicable, to the compressor, storage vessels and emergency shutdown devices.

Delete without substitution:

2309.6.1.2 Atmospheric venting of hydrogen from fuel storage containers. Where atmospheric venting is used for the discharge of hydrogen from fuel storage tanks, such venting shall be in accordance with Sections 2309.6.1.2.1 through 2309.6.1.2.1.4.

2309.6.1.2.1 -Defueling equipment. Equipment used for defueling shall be listed and labeled or approved for the intended use.

2309.6.1.2.1.1 -Manufacturer's equipment required. Equipment supplied by the manufacturer shall be used to connect the storage tanks to be defueled to the vent pipe system.
2309.6.1.2.1.2 - **Vent pipe maximum diameter.** - Defueling vent pipes shall have a maximum inside diameter of 1 inch (25 mm).

2309.6.1.2.1.3 - **Maximum flow rate.** - The maximum rate of hydrogen flow through the vent pipe system shall not exceed 1,000 cfm at NTP (0.47 m³/s) and shall be controlled by means of the manufacturer’s equipment, at low pressure and without adjustment.

2309.6.1.2.1.4 - **Isolated use.** - The vent pipe used for defueling shall not be connected to another venting system used for any other purpose.

2309.6.1.2.2 - **Construction documents.** - Construction documents shall be provided illustrating the defueling system to be utilized. Plan details shall be of sufficient detail and clarity to allow for evaluation of the piping and control systems to be utilized and include the method of support for cylinders, containers or tanks to be used as part of a closed transfer system, the method of grounding and bonding and other requirements specified herein.

2309.6.1.2.3 - **Stability of cylinders, containers and tanks.** - A method of rigidly supporting cylinders, containers or tanks used during the closed transfer system discharge or defueling of hydrogen shall be provided. The method shall provide not less than two points of support and shall be designed to resist lateral movement of the receiving cylinder, container or tank. The system shall be designed to resist movement of the receiver based on the highest gas-release velocity through valve orifices at the receiver’s rated service pressure and volume. Supporting structures or appurtenances used to support receivers shall be constructed of noncombustible materials in accordance with the *International Building Code*.

2309.6.1.2.4 - **Grounding and bonding.** - Cylinders, containers or tanks and piping systems used for defueling shall be bonded and grounded. Structures or appurtenances used for supporting the cylinders, containers or tanks shall be grounded in accordance with NFPA 70. The valve of the vehicle storage tank shall be bonded with the defueling system prior to the commencement of discharge or defueling operations.

2309.6.2 - **Repair of hydrogen piping.** - Piping systems containing hydrogen shall not be opened to the atmosphere for repair without first purging the piping with an inert gas to achieve 1-percent hydrogen or less by volume. Defueling operations and exiting purge flow shall be vented in accordance with Section 2309.6.1.2.

2309.6.3 - **Purging.** - Each individual manufactured component of a hydrogen generating, compression, storage or dispensing system shall have a label affixed as well as a description in the installation and owner’s manuals describing the procedure for purging air from the system during startup, regular maintenance and for purging hydrogen from the system prior to disassembly (to admit air).

For the interconnecting piping between the individual manufactured components, the pressure rating must be not less than 20 times the absolute pressure present in the piping when any hydrogen meets any air.

2309.6.3.1 - **System purge required.** - After installation, repair or maintenance, the hydrogen piping system shall be purged of air in accordance with the manufacturer’s procedure for purging air from the system.

**Reason:** This portion of the code is proposed to be modified by deleting the technical language addressing repairs, purging, defueling, and methods of discharge and instead pointing the user to NFPA 2. Language was provided for documentation to be on site and available to the fire code official detailing how defueling and discharging activities are to be conducted. The current language is a hold over for when language was added to the ICC series of codes addressing the initial
introduction of code requirements for the ‘new’ applications of hydrogen as a motor fuel. At that time it was testified to and understood that as the technology matured along with an understanding of how to utilize hydrogen as a fuel safely, the initial requirements would be modified or replaced. Part of that effort was the development of NFPA 2, the Hydrogen Technologies Code which serves as a comprehensive document addressing construction and operational issues. These defueling/discharging activities and the installation requirements for the necessary equipment are included in NFPA 2. The code already points the user to NFPA 2 for the overwhelming majority of the requirements for the installation and operation of hydrogen motor fuel related facilities including the equipment needed for these activities with only small bits such as this section remaining within the I-Codes. By deleting the current limited requirements still found within the IFC at Section 2309 and pointing the user to NFPA 2, a tighter correlation and ease of application of the relevant requirements is provided for. The suggested change will also address problems with the existing language such as an impractical label requirement found in Section 2309.6.3 along with unnecessary piping pressure ratings, (actually higher than can be obtained); and a lack of information on the location of vent pipe locations which is covered by NFPA 2.

The goal is for a designer, installer or fire code official to be able to rely as much as possible on NFPA 2 as the main source of technical language for installations dealing with hydrogen.

**Cost Impact:** Will not increase the cost of construction

This proposal will reduce the cost of construction and operation by deleting problematic language and providing for tighter coordination with NFPA 2.

F270-16 : 2309.6-
DAVISON12754
F271-16
2311.5, 2311.5.1 (New), 2311.5.2 (New), Table 2311.5.2 (New)

Proponent: Dan Bowerson, NGV America, representing NGVAmerica (dbowerson@ngvamerica.org)

2015 International Fire Code

Revise as follows:

2311.5 Preparation of vehicles for repair. For vehicles powered by gaseous fuels, the fuel shut-off valves shall be closed prior to repairing any portion of the vehicle fuel system.

Vehicles powered by gaseous fuels in which the fuel system has been damaged shall be inspected and evaluated for fuel system integrity prior to being brought into the repair garage. The inspection shall include testing of the entire fuel delivery system for leakage.

Liquefied Natural Gas (LNG) vehicles and Compressed Natural Gas (CNG) vehicles shall comply with Sections 2311.5.1 and 2311.5.2, as applicable.

Add new text as follows:

2311.5.1 Liquefied Natural Gas (LNG). Liquefied Natural Gas (LNG) vehicle fuel system pressure shall be measured and recorded prior to entering the repair facility. The maximum allowable system pressure shall be no more than 170 psig. Pressure above 170 psig shall be reduced by operating the vehicle, or limited venting outdoors as required.

2311.5.2 Compressed Natural Gas (CNG). Compressed Natural Gas (CNG) vehicle fuel system pressure and the ambient temperature shall be measured and recorded prior to entering the repair facility. Pressure above the indicated maximum pressure in accordance with Table 2311.5.2 shall be reduced by defueling the vehicle.

<table>
<thead>
<tr>
<th>GAS TEMPERATURE F</th>
<th>PRESSURE IN FULL 3,600 PSI CNG CONTAINER, psig</th>
</tr>
</thead>
<tbody>
<tr>
<td>123.6</td>
<td>4,500</td>
</tr>
<tr>
<td>120</td>
<td>4,455</td>
</tr>
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<td>1.919</td>
</tr>
<tr>
<td>-40</td>
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</tr>
</tbody>
</table>

a. 3,600 psi service pressure calculated from the standard gas composition used to create the gasoline gallon equivalent (GGE)

**Reason:** The IFC has determined the credible release hazards associated with CNG and LNG vehicles only occur during maintenance operations related to working on CNG and LNG fuel systems (see section 2311.7 exception 1). In that situation, it is important to mitigate any possible hazardous release of natural gas related to those maintenance operations.

1) Since LNG warms over time, which increases the fuel system pressure, the storage tank includes a relief valve set at pressure of about 220 psig to protect the system. In a typical LNG system, the relief valve resets at a pressure between 205 and 210 psig. Usually the LNG tank pressure increases at about 15 psig per day so by reducing the system pressure to 170 psig prior to entering the repair facility will allow a two-day period for repairs before any venting takes place. The pressure should be monitored periodically to prevent venting. The LNG gas phase venting is a small volume of fuel, which dissipates quickly (see SANDIA Report SAND2014-2342) and poses no significant hazard. It can be prevented by monitoring and regulating the system pressure.

2) Since some CNG cylinders use pressure activated pressure relief devices (PRDs) to protect the cylinders from possible over-pressure due to faulty temperature compensation of fueling systems, a method is required to recognize the excess system pressure and reduce it prior to the CNG vehicle entering the repair facility. Therefore, measuring the system pressure and the ambient temperature, and then comparing those values to the chart provided will indicate if the CNG vehicle should be defueled to the proper pressure prior to entering the facility.

Additional information:

LNG relief valve venting due to pressure build in tank: This release is about 138 cu.ft. of natural gas within a few minutes. Mitigation of this hazard is addressed in this proposal.

CNG released by the operation of a pressure activated pressure relief device (PRD): This may release the full contents of a cylinder for a vehicle that has been significantly over-filled by a defective fueling station at a very cold ambient temperature and then brought into a warm repair garage. Mitigation of this hazard is addressed in this proposal.

**Cost Impact:** Will increase the cost of construction
This proposal may add a slight cost to monitor the CNG and LNG fuel tank pressure.
Delete and substitute as follows:

2311.5 Preparation of vehicles for repair  Vehicles powered by liquefied petroleum gas (LP-gas).  For vehicles powered by gaseous fuels, the fuel shutoff valves shall be closed prior to repairing any portion of the vehicle fuel system.

Vehicles powered by gaseous fuels in which the fuel system has been damaged shall be inspected and evaluated for fuel system integrity prior to being brought into the repair garage. The inspection shall include testing of the entire fuel delivery system for leakage.

Vehicles powered by liquefied petroleum gas (LP-gas) and the servicing of vehicles powered by liquefied petroleum gas (LP-gas) shall be in compliance with this chapter, Chapter 61 of this code and NFPA 58.

2311.7.1 Preparation of vehicles for repair  For vehicles powered by gaseous fuels, the fuel shutoff valves shall be closed prior to repairing any portion of the vehicle fuel system.

Vehicles powered by gaseous fuels in which the fuel system has been damaged shall be inspected and evaluated for fuel system integrity prior to being brought into the repair garage. The inspection shall include testing of the entire fuel delivery system for leakage.

Reason:  This proposal is a correlation of code requirements by moving the preparation requirements relevant to the repair of lighter-than-air motor fuels to a location under Section 2311.7 Repair garages for vehicles fueled by lighter-than-air fuels.

In its existing location, 2311.5, it is proposed to replace the language with a pointer to NFPA 58 for LP-gas fueled vehicles. Chapter 23 does not have any requirements the servicing of LP-gas fueled vehicles other than the requirement found here currently, these two items are covered by NFPA 58 which contains extensive additional language for vehicles fueled by lp-gas. NFPA 58 is referenced through Chapter 61, at Section 6111 specifically for vehicles, by adding the replacement language there is a clarification to the code by providing a more direct reference for lp-gas fueled vehicles.

Cost Impact:  Will not increase the cost of construction

The proposal is editorial for the most part. No technical changes are included.
2015 International Fire Code

Revise as follows:

2311.7 Repair garages for vehicles fueled by lighter-than-air fuels. Repair garages for the conversion and repair of vehicles that use CNG, liquefied natural gas (LNG), hydrogen or other lighter-than-air motor fuels shall be in accordance with Sections 2311.7 through 2311.7.2.3 in addition to the other requirements of Section 2311.

Exceptions:

1. Repair garages where work is conducted only on vehicles that have been defueled and their systems purged with nitrogen gas, and where standard operating procedures to document and maintain the fueling status throughout repair operations are approved.

2. Repair garages where work is not performed on the fuel system and is limited to exchange of parts and maintenance not requiring open flame or welding on the CNG-, LNG-, hydrogen- or other lighter-than-air-fueled motor vehicle.

3. Repair garages for hydrogen-fueled vehicles where work is not performed on the hydrogen storage tank and is limited to the exchange of parts and maintenance not requiring open flame or welding on the hydrogen-fueled vehicle. During the work, the entire hydrogen fuel system shall contain a quantity that is less than 200 cubic feet (5.6 m$^3$) of hydrogen.

Reason: Based on the findings of the SANDIA Report (SAND2014-2342), the credible natural gas releases during LNG and CNG vehicle maintenance operations are limited to about 128,700 BTUs of fuel over a very short time frame. The released natural gas dissipates quickly and is typically ignitable from the point of release to no more than eight feet from that point. These releases do not create an ignitable mixture at the ceiling of the facility due to rapid dispersion of the gas; and ventilation above the normal ventilation rates of a typical repair has little or no impact on the dispersion. There has not been any reported release of a full CNG cylinder due to any maintenance operation in the last 35 years of record keeping. In the 1990’s there were full cylinder releases due to faulty temperature activated pressure relief devices (TPRDs), but they have been eliminated from the population and were not related to maintenance operations.

Additional information:

CNG, or gas phase LNG, released due to maintenance on the fuel lines and associated equipment without proper defueling and purging of those systems: It is estimated that less than 150 cu.ft. of natural gas is released at varying pressures based on the specific fuel system. Mitigation of the hazard associated with these releases is covered in the SANDIA Report, SAND2014-2342, which indicates the hazardous areas (extent of ignitable mixtures) and time to dispersion of released gas. The proposed code change to 2311.7.1 will no longer require any increased ventilation to disperse natural gas from these releases since the SANDIA report shows that ventilation has little or no impact on these small, short term hazards.

**Cost Impact:** Will not increase the cost of construction
This proposal will reduce the cost of operation. Because the vehicle will be defueled prior to entering the maintenance facility, the facility will not need to be updated for work on vehicles fueled by lighter-than-air fuels.
CHAPTER 23 MOTOR FUEL-DISPENSING FACILITIES AND REPAIR GARAGES

SECTION 2311 REPAIR GARAGES

2311.7 Repair garages for vehicles fueled by lighter-than-air fuels. Repair garages for the conversion and repair of vehicles that use CNG, liquefied natural gas (LNG), hydrogen or other lighter-than-air motor fuels shall be in accordance with Sections 2311.7 through 2311.7.2.3 in addition to the other requirements of Section 2311.

Exceptions:

1. Repair garages where work is not performed on the fuel system and is limited to exchange of parts and maintenance not requiring open flame or welding on the CNG-, LNG-, hydrogen- or other lighter-than-air-fueled motor vehicle.
2. Repair garages for hydrogen-fueled vehicles where work is not performed on the hydrogen storage tank and is limited to the exchange of parts and maintenance not requiring open flame or welding on the hydrogen-fueled vehicle. During the work, the entire hydrogen fuel system shall contain a quantity that is less than 200 cubic feet (5.6 m$^3$) of hydrogen.

Add new text as follows:

2311.7.1 Repair garages used for the repair of hydrogen-fueled vehicles. Repair garages used for the repair of hydrogen-fueled vehicles shall be provided with an approved exhaust ventilation system in accordance with the International Mechanical Code and Chapter 6 of NFPA 2.

Revise as follows:

2311.7.1 2311.7.2 Exhaust Ventilation System. Repair garages used for the repair of CNG, liquefied natural gas (LNG), or hydrogen-fueled vehicles other lighter-than-air motor fuels other than hydrogen shall be provided with an approved mechanical exhaust ventilation system. The mechanical ventilation system shall be in accordance with the International Mechanical Code and Sections 2311.7.1.1 2311.7.2.1 and 2311.7.1.2 2311.7.2.2.

Exception: Repair garages with Where approved by the fire code official, natural ventilation when approved shall be permitted in lieu of mechanical exhaust ventilation.

2311.7.1.1 2311.7.2.1 Design. Indoor locations shall be ventilated exhausted utilizing air supply inlets and exhaust outlets arranged to provide uniform air movement to the extent practical. Inlets shall be uniformly arranged on exterior walls near floor level. Outlets shall be located at the high
point of the room in exterior walls or the roof.

**Ventilation.** Exhaust ventilation shall be by a continuous mechanical exhaust ventilation system or by a mechanical exhaust ventilation system activated by a continuously monitoring natural gas detection system or, for hydrogen, a continuously monitoring flammable gas detection system, each activating at a gas concentration of not more than 25 percent of the lower flammable limit (LFL). In all cases, the system shall shut down the fueling system in the event of failure of the ventilation system.

The exhaust ventilation rate shall be not less than 1 cubic foot per minute per 12 cubic feet \([0.00139 \, \text{m}^3 \times (\text{s} \cdot \text{m}^3)]\) of room volume.

**2311.7.2 2311.7.2.2 Operation.** The mechanical exhaust ventilation system shall operate continuously.

**Exceptions:**

1. Mechanical exhaust ventilation systems that are interlocked with a gas detection system designed in accordance with Sections 2311.7.2 2311.7.3 through 2311.7.2.3 2311.7.3.3.
2. Mechanical exhaust ventilation systems in repair garages that are used only for repair of vehicles fueled by liquid fuels or odorized gases, such as CNG, where the exhaust ventilation system is electrically interlocked with the lighting circuit.

**2311.7.2 2311.7.3 Gas detection system.** No change to text.

**2311.7.2.1 2311.7.3.1 System design.** No change to text.

**2311.7.2.1.1 2311.7.3.1.1 Gas detection system components.** No change to text.

**2311.7.2.2 2311.7.3.2 Operation.** Activation of the gas detection system shall result in all the following:

1. Initiation of distinct audible and visual alarm signals in the repair garage.
2. Deactivation of all heating systems located in the repair garage.
3. Activation of the mechanical exhaust ventilation system, where the system is interlocked with gas detection.

**2311.7.2.3 2311.7.3.3 Failure of the gas detection system.** Failure of the gas detection system shall result in the deactivation of the heating system, activation of the mechanical exhaust ventilation system where the system is interlocked with the gas detection system and cause a trouble signal to sound in an approved location.

**2015 International Mechanical Code**

Revise as follows:

[F] 502.16 Repair garages for natural gas and hydrogen fueled vehicles fueled by lighter-than-air fuels. Repair garages used for the conversion and repair of vehicles which use CNG, liquefied natural gas (LNG), hydrogen or hydrogen fueled vehicles other lighter-than-air motor fuels shall be provided with an approved mechanical exhaust ventilation system. The mechanical exhaust ventilation system shall be in accordance with Sections 502.16.1 and or 502.16.2 as applicable.

**Exception Exceptions:** Where approved by the code official, natural ventilation shall be
permitted in lieu of mechanical ventilation.

1. Repair garages where work is not performed on the fuel system and is limited to exchange of parts and maintenance not requiring open flame or welding on the CNG-, LNG-, hydrogen- or other lighter-than-air-fueled motor vehicle.

2. Repair garages for hydrogen-fueled vehicles where work is not performed on the hydrogen storage tank and is limited to the exchange of parts and maintenance not requiring open flame or welding on the hydrogen-fueled vehicle. During the work, the entire hydrogen fuel system shall contain a quantity that is less than 200 cubic feet (5.6 m³) of hydrogen.

Add new text as follows:

[F] 502.16.1 Repair garages used for the repair of hydrogen-fueled vehicles

Repair garages used for the repair of hydrogen-fueled vehicles shall be provided with an approved exhaust ventilation system in accordance with this code and Chapter 6 of NFPA 2.

[F] 502.16.2 Exhaust ventilation system

Repair garages used for the repair of CNG, liquefied natural gas (LNG), or other lighter-than-air motor fuels other than hydrogen shall be provided with an approved mechanical exhaust ventilation system. The mechanical exhaust ventilation system shall be in accordance with this code and Sections 502.16.2.1 and 502.16.2.2.

Exception: Where approved by the code official, natural ventilation shall be permitted in lieu of mechanical exhaust ventilation.

Revise as follows:

[F] 502.16.1 502.16.2.1 Design. Indoor locations shall be ventilated exhausted utilizing air supply inlets and exhaust outlets arranged to provide uniform air movement to the extent practical. Inlets shall be uniformly arranged on exterior walls near floor level. Outlets shall be located at the high point of the room in exterior walls or the roof.

Exhaust ventilation shall be by a continuous mechanical exhaust ventilation system or by a mechanical exhaust ventilation system activated by a continuously monitoring natural gas detection system, or for hydrogen, a continuously monitoring flammable gas detection system, each activating at a gas concentration of 25 percent of the lower flammable limit (LFL). In all cases, the system shall shut down the fueling system in the event of failure of the exhaust ventilation system.

The exhaust ventilation rate shall be not less than 1 cubic foot per minute per 12 cubic feet [0.00138 m³/(s • m³)] of room volume.

[F] 502.16.2 502.16.2.2 Operation. The mechanical exhaust ventilation system shall operate continuously.

Exceptions:

1. Mechanical exhaust ventilation systems that are interlocked with a gas detection system designed in accordance with the International Fire Code.
2. Mechanical exhaust ventilation systems in garages that are used only for the repair of vehicles fueled by liquid fuels or odorized gases, such as CNG, where the exhaust ventilation system is electrically interlocked with the lighting circuit.

2015 International Fuel Gas Code
703.1 Hydrogen-generating and refueling operations. Hydrogen-generating and refueling appliances shall be installed and located in accordance with their listing and the manufacturer's instructions. Ventilation- Exhaust ventilation shall be required in accordance with Section 703.1.1, 703.1.2 or 703.1.3 in public garages, private garages, repair garages, automotive motor fuel-dispensing facilities and parking garages that contain hydrogen-generating appliances or refueling systems in accordance with NFPA 2. For the purpose of this section, rooms or spaces that are not part of the living space of a dwelling unit and that communicate directly with a private garage through openings shall be considered to be part of the private garage.

Delete without substitution:

703.1.1 -Natural ventilation. Indoor locations intended for hydrogen-generating or refueling operations shall be limited to a maximum floor area of 850 square feet (79 m²) and shall communicate with the outdoors in accordance with Sections 703.1.1.1 and 703.1.1.2. The maximum rated output capacity of hydrogen generating appliances shall not exceed 4 standard cubic feet per minute (0.00189 m³/s) of hydrogen for each 250 square feet (23.2 m²) of floor area in such spaces. The minimum cross-sectional dimension of air openings shall be 3 inches (76 mm). Where ducts are used, they shall be of the same cross-sectional area as the free area of the openings to which they connect. In such locations, equipment and appliances having an ignition source shall be located such that the source of ignition is not within 12 inches (305 mm) of the ceiling.

703.1.1.1 -Two openings. Two permanent openings shall be provided within the garage. The upper opening shall be located entirely within 12 inches (305 mm) of the ceiling of the garage. The lower opening shall be located entirely within 12 inches (305 mm) of the floor of the garage. Both openings shall be provided in the same exterior wall. The openings shall communicate directly with the outdoors and shall have a minimum free area of 1/2 square foot per 1,000 cubic feet (1 m²/ 610 m³) of garage volume.

703.1.1.2 -Louvers and grilles. In calculating the free area required by Section 703.1.1.1, the required size of openings shall be based on the net free area of each opening. If the free area through a design of louver or grille is known, it shall be used in calculating the size opening required to provide the free area specified. If the design and free area are not known, it shall be assumed that wood louver will have 25-percent free area and metal louver and grilles will have 75-percent free area. Louvers and grilles shall be fixed in the open position.

703.1.2 -Mechanical ventilation. Indoor locations intended for hydrogen-generating or refueling operations shall be ventilated in accordance with Section 502.16 of the International Mechanical Code. In such locations, equipment and appliances having an ignition source shall be located such that the source of ignition is below the mechanical ventilation outlet(s).

703.1.3 -Specially engineered installations. As an alternative to the provisions of Sections 703.1.1 and 703.1.2, the necessary supply of air for ventilation and dilution of flammable gases shall be provided by an approved engineered system.

Reference standards type: This is an update to reference standard(s) already in the ICC Code Books
Add new standard(s) as follows:
IMC and IFGC
NFPA 2-2016 Hydrogen Technologies Code
Reason: This proposal is a comprehensive fix of the exhaust ventilation requirements for repair garages for hydrogen fueled vehicles and for exhaust ventilation requirements for the installation hydrogen-generating and
The primary goal was consistency and correlation between the requirements found within the IFC, the IMC and the IFGC along with tighter correlation with the requirements of NFPA 2. (A special note: Currently the hydrogen exhaust requirements are blended with the requirements for other lighter than air fuels; this proposal separates those technical requirements with no technical change other than for hydrogen.)

Section 2311.7 of the fire code has been modified to separate the requirements for hydrogen fueled vehicles from other lighter than air fueled vehicles. A new Section 2311.7.1 has been added to direct the code user to NFPA 2 for hydrogen fueled vehicle repair garages.

All of the requirements for exhaust of repair garages for hydrogen fuel vehicles is covered in NFPA 2 where the IFC already directs the user for the overwhelming majority of the hydrogen as a fuel construction and operation requirements regulated by the fire code. In addition, the air exhaust rate is different in NFPA 2 for hydrogen and this proposal would point the user to the correct exhaust rate.

The exception language in 2311.7.2 (new numbering) was modified to match existing verbiage found in the IMC. The word exhaust was added to or replaced references to ventilation throughout 2311.7 to correlate with the type of system being required in accordance with Chapter 5 Exhaust in the IMC.

The IMC correlating language found in Section 502.16 has been modified to match the scoping language found within the IFC as to types of fuels covered. The technical language has been aligned to pick up earlier changes to the IFC over several cycles as well as the new modifications proposed to separate out hydrogen fueled vehicles and point to NFPA 2 for those facilities.

Section 304.5 of the IMC, the correlating Section 703.1 of the IFGC address exhaust ventilation for occupancies with Hydrogen-generating and refueling appliances. The language has been modified to delete the three subsections and point the user to NFPA 2 where the requirements are covered. Eliminating the language provides clarification and eliminates a conflict within the mechanical code, Option 1 was natural ventilation with very specific requirements; Option 2 was mechanical exhaust which points to Section 502.16 of the mechanical code which again provided for a natural ventilation exception with no specific requirements. Option 3 was for a specialty engineered system with no parameters, as a result a designer would default to NFPA 2 for guidance.

By deleting the three options and pointing the user to NFPA 2 the correct requirements are provided including a natural ventilation option along with the other comprehensive portions of NFPA 2 that apply to this specialized type of installation.

The provisions NFPA 2 - related to the issues addressed in this proposal are found in Section 6.17 of NFPA 2-2016. A link to the NFPA website where free access is provided to the standard is as follows: NFPA 2

Cost Impact: Will not increase the cost of construction
This proposal will reduce the cost of installation by eliminating an internal conflict within the IMC, by correlating all of the ICC codes dealing with this topic, and by providing for tighter correlation with NFPA 2 which the I-Codes already refer to for these types of installations.
105.7.13 Motor vehicle repair rooms and booths. A construction permit is required to install or modify a motor vehicle repair room or booth. Maintenance performed in accordance with this code is not considered to be a modification and does not require a permit.

SECTION 202 DEFINITIONS

MOTOR VEHICLE REPAIR ROOM. A room designed to accommodate motor vehicle repair operations, constructed in accordance with the code and separated from the remainder of the building by a minimum 1-hour fire barrier.

SECTION 202 DEFINITIONS

MOTOR VEHICLE REPAIR SPACE. An area in which lighter than air gaseous fuels may be present due to motor vehicle repair operations. The fire code official is authorized to define the limits of the motor vehicle repair space in any specific case.

SECTION 202 DEFINITIONS

MOTOR VEHICLE REPAIR BOOTH. A mechanically exhausted appliance of varying dimensions and construction provided to enclose or accommodate motor vehicle repair operations and to confine and limit the escape of lighter than air gaseous fuels.

CHAPTER 23 MOTOR FUEL-DISPENSING FACILITIES AND REPAIR GARAGES

SECTION 2311 REPAIR GARAGES

Revise as follows:

2311.7 Repair garages for vehicles fueled by lighter-than-air fuels. Repair garages containing repair activities for the conversion and repair of vehicles that use CNG, liquefied natural gas (LNG), hydrogen or other lighter-than-air motor fuels shall be in accordance with Sections 2311.7 through 2311.7.2.3 2311.7.8 in addition to the other requirements of Section 2311.

Exceptions:

1. Repair garages where work is not performed on the fuel system and is limited to exchange of parts and maintenance not requiring open flame or welding on the CNG-, LNG-, hydrogen- or other lighter-than-air-fueled motor vehicle.

2. Repair garages for hydrogen-fueled vehicles where work is not performed on the hydrogen storage tank and is limited to the exchange of parts and maintenance not requiring open flame or welding on the hydrogen-fueled vehicle. During the work, the entire hydrogen fuel system shall contain a quantity that is less than 200 cubic feet (5.6 m³) of hydrogen.

Add new text as follows:

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F547
2311.7.1  **Motor vehicle repair rooms** Motor vehicle repair rooms shall be enclosed with not less than 1-hour fire barriers constructed in accordance with Section 707 of the International Building Code, or horizontal assemblies constructed in accordance with Section 711 of the International Building Code, or both, with 1-hour rated opening protectives.

2311.7.2  **Motor vehicle repair booths** The design and construction of motor vehicle repair booths shall be in accordance with Sections 2311.7.2.1 through 2311.7.2.4.

2311.7.2.1  **Construction** Motor vehicle repair booths shall be constructed of approved noncombustible materials. Where walls or ceiling assemblies are constructed of sheet metal, single-skin assemblies shall be no thinner than 0.0478 inch (18 gage) (1.2 mm) and each sheet of double-skin assemblies shall be no thinner than 0.0359 inch (20 gage) (0.9 mm). Structural sections of motor vehicle repair booths are allowed to be sealed with latex-based or similar caulks and sealants.

2311.7.2.2  **Surfaces** The interior surfaces of motor vehicle repair booths shall be constructed so as to permit the free passage of exhaust air from all parts of the interior.

2311.7.2.3  **Means of egress** Means of egress shall be provided in accordance with Chapter 10.

**Exception:** Means of egress doors from premanufactured motor vehicle repair booths shall be not less than 30 inches (762 mm) in width by 80 inches (2032 mm) in height

2311.7.2.4  **Clear space** Motor vehicle repair booths shall be installed so that all parts of the booth are readily accessible for cleaning. A clear area of not less than 3 feet (914 mm) wide shall be maintained on all sides of the motor vehicle repair booth. This clear area shall be kept free of any storage or combustible construction.

**Exceptions:**

1. This requirement shall not prohibit locating a motor vehicle repair booth closer than 3 feet (914 mm) to or directly against an interior partition, wall or floor/ceiling assembly that has a fire-resistance rating of not less than 1 hour, provided the motor vehicle repair booth can be adequately maintained and cleaned.

2. This requirement shall not prohibit locating a motor vehicle repair booth closer than 3 feet (914 mm) to an exterior wall or a roof assembly, provided the wall or roof is constructed of noncombustible material and the motor vehicle repair booth can be adequately maintained and cleaned.

2311.7.3  **Motor vehicle repair spaces** Where such spaces are not separately enclosed, noncombustible spray curtains shall be provided to restrict the spread of flammable gases.

2311.7.4  **Fire Protection** Motor vehicle repair booths or spaces installed in a room or area protected by an automatic sprinkler system shall have the protection extended to include the inside of the motor vehicle repair booth or space.

2311.7.5  **Fire extinguishers** Portable fire extinguishers complying with Section 906 shall be provided for motor vehicle repair rooms, motor vehicle repair booths, or motor vehicle repair spaces.

2311.7.6  **Ventilation.** Repair garages used for the repair of natural gas- or hydrogen-fueled vehicles shall be provided with an approved mechanical ventilation system. The mechanical ventilation system shall be in accordance with the *International Mechanical Code* and Sections

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2311.7.1.1 and 2311.7.1.2.

Exception: Repair garages with natural ventilation when approved.

2311.7.2 2311.7.7 Gas detection system. No change to text.

Revise as follows:

2311.8 2311.7.8 Defueling equipment required at vehicle maintenance and repair facilities. Facilities for repairing or replacing hydrogen fuel system tanks on hydrogen-fueled vehicles shall have equipment to defuel vehicle storage tanks. Where work must be performed on a vehicle’s fuel storage tank for the purpose of maintenance, repair or cylinder certification, defueling and purging shall be conducted in accordance with Section 2309.6 and NFPA 2.

Reason: The purpose of this proposal is to limit the impact of application of the enhanced requirements necessary for the repair of vehicles that use CNG, liquefied natural gas (LNG), hydrogen or other lighter-than-air motor fuels. As currently written an entire motor vehicle repair facility must be constructed or renovated to these increased requirements even if a single bay space out of many is all that is required to service such vehicles.

The new language provides that the requirements apply to the room, which could be the entire service bay area or a room separated by 1 hour construction methods, to a motor vehicle repair booth, or a motor vehicle repair area. The requirements for the motor vehicle repair room/booth/area options have been copied from relevant portions of existing language in the IFC for spray finishing and modified for this application. The concept is the same, limit any increased hazard to a specific space (room/booth/area) and protect that limited area. The hazard presented by servicing lighter-than-air motor fuel vehicles is much less than flammable spray finishing. The motor vehicle repair booth could be prefabricated or field constructed as long as it meets the specified requirements.

This new option enhances the ease of acceptance of alternative motor fuels while properly addressing the additional hazards these vehicles may present with no reduction in the level of protection currently required to be met.

The language in the proposal closely mirrors the following existing language for spray rooms/booths/areas.

International Fire Code

2404.2 Location of spray-finishing operations.
Spray-finishing operations conducted in buildings used for Group A, E, I or R occupancies shall be located in a spray room protected with an approved automatic sprinkler system installed in accordance with Section 903.3.1.1 and separated vertically and horizontally from other areas in accordance with the International Building Code. In other occupancies, spray-finishing operations shall be conducted in a spray room, spray booth or spraying space approved for such use.

Exceptions:

1. Automobile undercoating spray operations and spray-on automotive lining operations conducted in areas with approved natural or mechanical ventilation shall be exempt from the provisions of Section 2404 when approved and where utilizing Class IIIA or IIIB combustible liquids.

2. In buildings other than Group A, E, I or R occupancies, approved limited spraying space in accordance with Section 2404.9.

3. Resin application areas used for manufacturing of reinforced plastics complying with Section 2409 shall not be required to be located in a spray room, spray booth or spraying space.

2404.3 Design and construction.
Design and construction of spray rooms, spray booths and spray spaces shall be in accordance with Sections 2404.3.1 through 2404.3.3.1.

2404.3.1 Spray rooms.
Spray rooms shall be constructed and designed in accordance with Section 2404.3.1.1 and the International Building Code, and shall comply with Sections 2404.4 through 2404.8.

2404.3.1.1 Floor.
Combustible floor construction in spray rooms shall be covered by approved, noncombustible, nonsparking material, except where combustible coverings, including but not limited to thin paper or plastic and stripplable coatings, are
utilized over noncombustible materials to facilitate cleaning operations in spray rooms.

2404.3.2 Spray booths.
The design and construction of spray booths shall be in accordance with Sections 2404.3.2.1 through 2404.3.2.6, Sections 2404.4 through 2404.8 and NFPA 33.

2404.3.2.1 Construction.
Spray booths shall be constructed of approved noncombustible materials. Aluminum shall not be used. Where walls or ceiling assemblies are constructed of sheet metal, single-skin assemblies shall be no thinner than 0.0478 inch (18 gage) (1.2 mm) and each sheet of double-skin assemblies shall be no thinner than 0.0359 inch (20 gage) (0.9 mm). Structural sections of spray booths are allowed to be sealed with latex-based or similar caulks and sealants.

2404.3.2.2 Surfaces.
The interior surfaces of spray booths shall be smooth; shall be constructed so as to permit the free passage of exhaust air from all parts of the interior, and to facilitate washing and cleaning; and shall be designed to confine residues within the booth. Aluminum shall not be used.

2404.3.2.3 Floor.
Combustible floor construction in spray booths shall be covered by approved, noncombustible, nonsparking material, except where combustible coverings, including but not limited to thin paper or plastic and strippable coatings, are utilized over noncombustible materials to facilitate cleaning operations in spray booths.

2404.3.2.4 Means of egress.
Means of egress shall be provided in accordance with Chapter 10.

Exception: Means of egress doors from premanufactured spray booths shall be not less than 30 inches (762 mm) in width by 80 inches (2032 mm) in height.

2404.3.2.5 Clear space.
Spray booths shall be installed so that all parts of the booth are readily accessible for cleaning. A clear space of not less than 3 feet (914 mm) shall be maintained on all sides of the spray booth. This clear space shall be kept free of any storage or combustible construction.

Exceptions:
1. This requirement shall not prohibit locating a spray booth closer than 3 feet (914 mm) to or directly against an interior partition, wall or floor/ceiling assembly that has a fire-resistance rating of not less than 1 hour, provided the spray booth can be adequately maintained and cleaned.
2. This requirement shall not prohibit locating a spray booth closer than 3 feet (914 mm) to an exterior wall or a roof assembly, provided the wall or roof is constructed of noncombustible material and the spray booth can be adequately maintained and cleaned.

International Building Code
SECTION 416
APPLICATION OF FLAMMABLE FINISHES

[F] 416.1 General.
The provisions of this section shall apply to the construction, installation and use of buildings and structures, or parts thereof, for the application of flammable finishes. Such construction and equipment shall comply with the International Fire Code.

[F] 416.2 Spray rooms.
Spray rooms shall be enclosed with not less than 1-hour fire barriers constructed in accordance with Section 707 or horizontal assemblies constructed in accordance with Section 711, or both. Floors shall be waterproofed and drained in an approved manner.

[F] 416.2.1 Surfaces.
The interior surfaces of spray rooms shall be smooth and shall be so constructed to permit the free passage of exhaust air from all parts of the interior and to facilitate washing and cleaning, and shall be so designed to confine residues within the room. Aluminum shall not be used.

[F] 416.2.2 Ventilation.
Mechanical ventilation and interlocks with the spraying operation shall be in accordance with the International Mechanical Code.

[F] 416.3 Spraying spaces.
Spraying spaces shall be ventilated with an exhaust system to prevent the accumulation of flammable mist or vapors in accordance with the International Mechanical Code. Where such spaces are not separately enclosed, noncombustible spray curtains shall be provided to restrict the spread of flammable vapors.

[F] 416.3.1 Surfaces.
The interior surfaces of spraying spaces shall be smooth and continuous without edges; shall be so constructed to permit the free passage of exhaust air from all parts of the interior and to facilitate washing and cleaning; and shall be so designed to confine residues within the spraying space. Aluminum shall not be used.

[F] 416.4 Spray booths.
Spray booths shall be designed, constructed and operated in accordance with the International Fire Code

[F] 416.5 Fire protection.
An automatic sprinkler system or fire-extinguishing system shall be provided in all spray, dip and immersing spaces and storage rooms and shall be installed in accordance with Chapter 9.

SPRAY BOOTH. A mechanically ventilated appliance of varying dimensions and construction provided to enclose or accommodate a spraying operation and to confine and limit the escape of spray vapor and residue and to exhaust it safely.

SPRAY ROOM. A room designed to accommodate spraying operations, constructed in accordance with the International Building Code and separated from the remainder of the building by a minimum 1-hour fire barrier.

SPRAYING SPACE. An area in which dangerous quantities of flammable vapors or combustible residues, dusts or deposits are present due to the operation of spraying processes. The fire code official is authorized to define the limits of the spraying space in any specific case.

Cost Impact: Will not increase the cost of construction
This proposal will not increase the cost of construction and will likely reduce the cost of construction by limiting the impact of the additional code requirements for these motor vehicles.
2015 International Fire Code

CHAPTER 23 MOTOR FUEL-DISPENSING FACILITIES AND REPAIR GARAGES

SECTION 2311 REPAIR GARAGES

2311.7 Repair garages for vehicles fueled by lighter-than-air fuels. Repair garages for the conversion and repair of vehicles that use CNG, liquefied natural gas (LNG), hydrogen or other lighter-than-air motor fuels shall be in accordance with Sections 2311.7 through 2311.7.2.3 in addition to the other requirements of Section 2311. Repair garages for the repair of vehicles that use hydrogen fuel shall be in accordance with this code and NFPA 2.

Exceptions:

1. Repair garages where work is not performed on the fuel system and is limited to exchange of parts and maintenance not requiring open flame or welding on the CNG-, LNG-, hydrogen- or other lighter-than-air-fueled motor vehicle.

2. Repair garages for hydrogen-fueled vehicles where work is not performed on the hydrogen storage tank and is limited to the exchange of parts and maintenance not requiring open flame or welding on the hydrogen-fueled vehicle. During the work, the entire hydrogen fuel system shall contain a quantity that is less than 200 cubic feet (5.6 m$^3$) of hydrogen.

Reason: NFPA 2 has additional requirements for motor vehicle repairs facilities, adding a direct reference at Section 2311.7 recognizes this and provides for tighter correlation with Sections 2309, Chapters 53 and 58 along with NFPA 2.

Cost Impact: Will not increase the cost of construction
This proposal may reduce the cost of construction by providing for increased correlation with NFPA 2.
F277-16
IFC: 2311.7.1.
Proponent: Dan Bowerson, NGVAmerica, representing NGVAmerica Technology & Development Committee (dbowerson@ngvamerica.org); Myra Blaylock, representing TBD (mlblayl@sandia.gov)

2015 International Fire Code

Revise as follows:

2311.7.1 Ventilation. Repair garages used for the repair of natural gas- or hydrogen-fueled vehicles shall be provided with an approved mechanical ventilation system. The mechanical ventilation system shall be in accordance with the International Mechanical Code and Sections 2311.7.1.1 and 2311.7.1.2.

Exception Exceptions: Repair garages with natural ventilation when approved.

1. Repair garages with natural ventilation when approved.
2. Natural gas vehicle repair garages complying with the ventilation rates of Table 403.3.1.1 of the International Mechanical code are not required to meet the ventilation requirements of this section.

Reason:
Bowerson: Based on the findings of the Sandia Report (SAND2014-2342), the credible natural gas releases during LNG and CNG vehicle maintenance operations are limited to about 128,700 BTUs of fuel over a very short time frame. The released natural gas dissipates quickly and is typically ignitable from the point of release to no more than eight feet from that point. These releases do not create an ignitable mixture at the ceiling of the facility due to rapid dispersion of the gas and ventilation above the normal ventilation rates of a typical repair has little or no impact on the dispersion. There has not been any reported release of a full CNG cylinder due to any maintenance operation in the last 35 years of record keeping. In the 1990's there were full cylinder releases due to faulty temperature activated pressure relief device (TPRD) designs, but they have been eliminated from the population and were not related to maintenance operations. They are longer a hazard as indicated by the section 2311.7 exception 1.

Additional Information:

CNG, or gas phase LNG, released due to maintenance on the fuel lines and associated equipment without proper defueling and purging of those systems: It is estimated that less than 150 cu.ft. of natural gas is released at varying pressures based on the specific fuel system. Mitigation of the hazard associated with these releases is covered in the SANDIA Report, SAND2014-2342, which indicates the hazardous areas (extent of ignitable mixtures) and time to dispersion of released gas. Mitigation of this risk is addressed in this proposal.

Blaylock: To develop a comprehensive analysis into existing regulatory issues regarding NGV maintenance facility operations, the Clean Vehicle Education Foundation (CVEF) partnered with Sandia National Laboratories (SNL) to take advantage of Sandia's extensive experience performing similar analyses in support of hydrogen refueling infrastructure. A full report on the findings of these investigations can be found in "Analyses in Support of Risk-Informed Natural Gas Vehicle Maintenance Facility Codes and Standards: Phase I" by Ekoto, et. al. (SAND2014-2342). A synopsis of relevant information is presented below.

For the hazard analysis work, detailed Computational Fluid Dynamics (CFD) simulations were performed at Sandia to examine the three release scenarios identified from a hazard and operability study (HAZOP) analysis: (1) a dormant LNG blow-off, (2) indoor CNG fuel system purge downstream of the storage isolation valves, and (3) a full-scale CNG tank blow-down due to a failure of the pressure relief device (PRD). Methane was used as a proxy for natural gas in the simulations. The reference NGV facility had dimensions of 30.5 m long, 15.2 m wide and 6.1 m tall, with pitched roof. Geometries with and without solid, evenly spaced roof rafters were examined. The impact of active ventilation at the commonly prescribed rate of 5 air changes per hour versus a facility with passive ventilation was considered. For conditions with mechanical ventilation, air was forced into the enclosure 750 seconds before the start of the release to ensure internal steady flows. The vehicle was modeled as a cuboid (2.44 × 2.44 × 3.42 m³) and placed in the center of the NGV maintenance facility.
From velocity maps within the NGV maintenance facility, ventilation currents were observed to form recirculation regions when they interacted with the vehicle or roof structures, which could distort the release plumes and generate accumulation regions for flammable mixture. However, for the scenarios investigated, little sensitivity in the development of flammable regions was observed for simulations with or without active ventilation. This was due to the small duration of the release relative to the ventilation rate. Similarly, the sensitivity of flammable mixture development with facility layouts with or without roof rafters was likewise weak as the mixtures were generally already lean by the time they reached the rafters. The LNG blow-off scenario was modeled as a constant leak for five minutes. During that time the amount of flammable mass quickly reached a steady state, and dissipated within seconds of the leak stopping. For the case of the indoor CNG fuel system purge downstream of the storage isolation valves, the gas was purged from the line within 30 seconds, and the gas was within the flammable concentration limits only during the time of this blowdown. For both of these cases, the leaked gas was in the flammable range only within an area of several feet from the leak source: less than two feet for case (1) and less than 10 feet for case (2). In neither case did the area of flammable mass reach the ceiling. For case (1) simulations with and without ventilation were compared. While the ventilation did slightly lower the amount of flammable mass, it did not alleviate it completely.

For the low-flow release scenarios that involved a dormant LNG blow-off or a CNG fuel system purge, peak overpressures predicted by the FM Global overpressure model with input flammable mass values from the CFD simulations were well below 1 kPa—no significant hazard is expected for such a low overpressure.


Cost Impact: Will not increase the cost of construction
Bowerson: This proposal will eliminate the cost for additional ventilation requirements for natural gas vehicle repair garages.
Blaylock: Since the proposed change is an exception to the ventilation requirements, it would not increase the cost of construction.
2015 International Fire Code

2311.7.2.1 System design. The flammable gas detection system shall be listed or approved and shall be calibrated to the types of fuels or gases used by vehicles to be repaired. The gas detection system shall be designed to activate when the level of flammable gas exceeds 25 percent of the lower flammable limit (LFL). Gas detection shall be provided in lubrication or chassis service pits of repair garages used for repairing nonodorized LNG-fueled vehicles.

Delete without substitution:

2311.7.2.1.1 Gas detection system components. Gas detection system control units shall be listed and labeled in accordance with UL 864 or UL 2017. Gas detectors shall be listed and labeled in accordance with UL 2075 for use with the gases and vapors being detected.

Reason: There currently are no hydrogen gas detection systems listed in accordance with this section due to practical difficulties complying with the standards. The requirement for "listed or approved" remains in Section 2311.7.2.1 providing the code official the authority to approve or disapprove detection systems presented for review and approval.

Cost Impact: Will not increase the cost of construction
Requirements for listing of detectors and control units was removed because listed products are not available. As a result this proposal will likely decrease the cost of construction by eliminating requirements that cannot be complied with at this time.
F279-16
IFC: 2311.7.2.2.
Proponent: Dan Bowerson, representing NGVAmerica Technology & Development Committee (dbowerson@ngvamerica.org)

2015 International Fire Code

Revise as follows:

2311.7.2.2 Operation. Activation of the gas detection system shall result in all the following:

1. Initiation of distinct audible and visual alarm signals in the repair garage.
2. Deactivation of all heating systems located in the repair garage for hydrogen-fueled vehicles and deactivation of all open flame heaters or heating equipment with exposed surfaces having a temperature in excess of 399°C (750°F) for LNG vehicles.
3. Activation of the mechanical ventilation system, where the system is interlocked with gas detection.

Reason: Since the gas phase of LNG has an ignition temperature of greater than 1,000ºF, some heating system designs may not need to be deactivated when the gas detection system is activated due to a leak. This is consistent with the requirements in NFPA 30A section 7.6.6.


Cost Impact: Will not increase the cost of construction
Due to the fact that some heating equipment will may not have to be deactivated due to the activation of the gas detection system, this proposal has the potential to reduce the cost for maintenance facility operators.
**F280-16**

**IFC: 2311.7.2.3.**

**Proponent:** Dan Bowerson, NGVAmerica, representing NGVAmerica Technology & Development Committee (dbowerson@ngvamerica.org)

**2015 International Fire Code**

Revise as follows:

**2311.7.2.3 Failure of the gas detection system.** Failure of the gas detection system shall result in the deactivation of the heating system, for hydrogen-fueled vehicles and deactivation of all open flame heaters or heating equipment with exposed surfaces having a temperature in excess of 399ºC (750ºF) for LNG vehicles and activation of the mechanical ventilation system for hydrogen-fueled vehicle repair facilities where the system is such systems are interlocked with the gas detection system and cause a trouble signal to sound in an approved location.

**Reason:** Since CNG, and the gas phase of LNG, has an ignition temperature of greater than 1,000ºF some heating system designs may not need to be deactivated when the gas detection system is activated due to a leak. This is consistent with the requirements in NFPA 30A section 7.6.6 and per rationale for the NGV America Technology & Development Committee proposal for section 2311.7.1. LNG gas phase releases, as shown in the SANDIA report (SAND2014-2342) do not benefit from additional ventilation to dissipate the released gas.


**Cost Impact:** Will not increase the cost of construction

Due to the fact that some heating equipment may not have to be deactivated due to the activation of the gas detection system, this proposal has the potential to reduce the cost for maintenance facility operators.
2015 International Fire Code

CHAPTER 23 MOTOR FUEL-DISPENSING FACILITIES AND REPAIR GARAGES
SECTION 2311 REPAIR GARAGES

2311.7 Repair garages for vehicles fueled by lighter-than-air fuels. Repair garages for the conversion and repair of vehicles that use CNG, liquefied natural gas (LNG), hydrogen or other lighter-than-air motor fuels shall be in accordance with Sections 2311.7 through 2311.7.2.3 in addition to the other requirements of Section 2311.

Exceptions:
1. Repair garages where work is not performed on the fuel system and is limited to exchange of parts and maintenance not requiring open flame or welding on the CNG-, LNG-, hydrogen- or other lighter-than-air-fueled motor vehicle.
2. Repair garages for hydrogen-fueled vehicles where work is not performed on the hydrogen storage tank and is limited to the exchange of parts and maintenance not requiring open flame or welding on the hydrogen-fueled vehicle. During the work, the entire hydrogen fuel system shall contain a quantity that is less than 200 cubic feet (5.6 m$^3$) of hydrogen.

Add new text as follows:

2311.7.3 Classified electrical area. Areas within 18 inches (450 mm) of a ceiling within a motor vehicle repair room or motor vehicle repair booth shall be designed and installed in accordance with the requirements for Class I, Division 2 classified locations, as set forth in NFPA 70.

Exceptions:
1. Rooms or motor vehicle repair booths with exhaust ventilation of at least 1 ft$^3$/min/ft$^2$ (0.3 m$^3$/min/m$^2$) of floor area, with suction taken from a point within 18 in. (450 mm) of the highest point in the ceiling in repair garages for vehicles that use CNG, liquefied natural gas (LNG) or other lighter-than-air motor fuels.
2. Rooms or motor vehicle repair booths used for the repair of hydrogen-fueled vehicles that have an approved exhaust ventilation system in accordance with the International Mechanical Code and NFPA 2.

Reason: The purpose of this proposal is to provide where classified wiring methods are required when repairing vehicles that use CNG, liquefied natural gas (LNG), hydrogen or other lighter-than-air motor fuels and clarifying that they are not required if the requirements in the exceptions are met.

The source for this requirement and exception is the 2015 edition of NFPA 30A Table 8.3.2.

Cost Impact: Will not increase the cost of construction
This proposal provides a clarification by addressing this issue. This will have no impact or reduce the cost of compliance.
F282-16
IFC: 2403.2.1.3.
Proponent: Geoffrey Raifsnider, representing Self

2015 International Fire Code

2403.2.1.3 Areas adjacent to spray booths. Electrical wiring and equipment located outside of, but within 5 feet (1524 mm) horizontally and 3 feet (914 mm) vertically of openings in a spray booth or a spray room, shall be approved for Class I, Division 2 or Class II, Division 2 hazardous locations, whichever is applicable.

Reason: The proposed change brings this section in alignment with current editions of NFPA 33 and NFPA 70.

Cost Impact: Will not increase the cost of construction
This change may reduce the cost impact of a spray booth or spray room installation as the area in which approved electrical devices is smaller.
2015 International Fire Code
Revise as follows:

SECTION 202 DEFINITIONS

SPRAY ROOM. A room designed to accommodate spraying operations, constructed in accordance with the International Building Code and separated from the remainder of the building by a minimum 1-hour fire barrier.

2404.2 Location of spray-finishing operations. Spray-finishing operations conducted in buildings used for Group A, E, I or R occupancies shall be located in a spray room protected with an approved automatic sprinkler system installed in accordance with Section 903.3.1.1 and separated vertically and horizontally from other areas the remainder of the building by fire barrier walls and horizontal assemblies with not less than a 1-hour fire-resistance rating in accordance with the International Building Code. In other occupancies, spray-finishing operations shall be conducted in a spray room, spray booth or limited spraying space approved for such use.

Exceptions:
1. Automobile undercoating spray operations and spray-on automotive lining operations conducted in areas with approved natural or mechanical ventilation shall be exempt from the provisions of Section 2404 when approved and where utilizing Class IIIA or IIIB combustible liquids.
2. In buildings other than Group A, E, I or R occupancies, approved limited spraying space in accordance with Section 2404.9.
3. Resin application areas used for manufacturing of reinforced plastics complying with Section 2409 shall not be required to be located in a spray room, spray booth or spraying space.

2404.3.1 Spray rooms. Spray rooms shall be constructed and designed in accordance with Section 2404.3.1.1 and 416 of the International Building Code and Section 2404.3.2, and shall comply with Sections 2404.4 through 2404.8.

2404.3.1.1 2404.3.2 Floor. No change to text.

914.9 Application of flammable finishes. An automatic sprinkler system or fire-extinguishing system shall be provided in all spray, dip rooms and immersing spaces and storage rooms spray booths, and shall be installed in accordance with Chapter 9.

2015 International Building Code
Revise as follows:

SECTION 416 SPRAY APPLICATION OF FLAMMABLE FINISHES

[F] 416.1 General. The provisions of this section shall apply to the construction, installation and
use of buildings and structures, or parts thereof, for the spray application of flammable finishes. Such construction Operations and equipment shall comply with the International Fire Code.

Add new text as follows:

416.2.1 Construction. Walls and ceilings of spray rooms shall be constructed of noncombustible materials or the interior surface shall be completely covered with noncombustible materials. Aluminum shall not be used.

Revise as follows:

[F] 416.2.1 Surfaces. The interior surfaces of spray rooms shall be smooth and shall be so constructed to permit the free passage of exhaust air from all parts of the interior and to facilitate washing and cleaning, and shall be so designed to confine residues within the room. Aluminum shall not be used.

[F] 416.2.2 Ventilation. Mechanical ventilation and interlocks with the spraying operation shall be in accordance with the International Mechanical Fire Code and International Mechanical Code.

[F] 416.3.1 Surfaces. The interior surfaces of spraying spaces shall be smooth and continuous without edges; shall be so constructed to permit the free passage of exhaust air from all parts of the interior and to facilitate washing and cleaning; and shall be so designed to confine residues within the spraying space. Aluminum shall not be used.

[F] 416.5 Fire protection. An automatic sprinkler system or fire-extinguishing system shall be provided in all spray, dip rooms and immersing spaces and storage rooms spray booths, and shall be installed in accordance with Chapter 9.

Reason: This proposed code change is intended to correlate the requirements for spray operations in the IBC and the IFC.

First, the definition of spray room is revised. The definition of a term is never a good location for code requirements. This proposal removes the 1-hour separation construction requirement from the definition of spray room and places the requirement into Section 2404.2 where it belongs. This revision also correlates with IBC Section 416.2 which requires the 1-hour separation.

In IFC Section 2404.2, the separation requirement is clarified that the separation is between the spray room and other portions of the building. The requirement has been misapplied by requiring the exterior wall of the building, which is also the spray room wall, to be fire resistant construction. In this design, only the interior walls would be fire resistance rated, in order to separate the spray room from the remainder of the building.

Also, the term "limited" is added to correlate with the limited spray area requirements. A "spraying space" is the result of spraying operation and the limit of hazardous vapors; it is not an area to designate as a spraying location. A "limited spraying space", by definition, is an area where spraying can occur outside of a spray room or spray booth.

After the term dip tank is removed from IBC Section 416.5, the remaining provisions in IBC Section 416 all apply to spray operations. Therefore, the title of IBC Section 416 is revised to refer to the spray application of flammable finishes. This includes spray rooms, spray booths and spraying spaces.

The IFC contains requirements for ventilation and interlocking the ventilation system with the spraying apparatus. IFC Section 2404.3.1 is revised so it correlates with IBC Section 416.2 with regard to construction of spray rooms.

IFC Section 914.9 and IBC Section 416.5 are revised to be consistent with IFC Section 2405.4. A fire extinguishing system is not required for all dipping operations. For dip tanks less than 150 gallons, a fire extinguishing system is an optional method or protection.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire safety and hazardous materials in new and existing buildings and facilities and the protection of life and property in wildland urban interface areas. In 2014 and 2015 the Fire-CAC has held 5 open meetings. In addition, there were numerous conference calls, Regional Work Group and Task Group meetings for the current code development cycle,
which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC

**Cost Impact:** Will not increase the cost of construction
This proposal correlates the spray finishing requirements in the IFC and the IBC.
F284-16

IFC: 2404.2, 2404.7.5.

Proponent: Christopher Moran, Jensen Hughes, representing United Technologies Corporation/Marioff (cmoran@jensenhughes.com)

2015 International Fire Code

Revise as follows:

2404.2 Location of spray-finishing operations. Spray-finishing operations conducted in buildings used for Group A, E, I or R occupancies shall be located in a spray room protected with an approved automatic sprinkler system installed in accordance with Section 903.3.1.1 or an approved automatic water mist system installed in accordance with Section 904.11 and separated vertically and horizontally from other areas in accordance with the International Building Code. In other occupancies, spray-finishing operations shall be conducted in a spray room, spray booth or spraying space approved for such use.

Exceptions:

1. Automobile undercoating spray operations and spray-on automotive lining operations conducted in areas with approved natural or mechanical ventilation shall be exempt from the provisions of Section 2404 when approved and where utilizing Class IIIA or IIIB combustible liquids.
2. In buildings other than Group A, E, I or R occupancies, approved limited spraying space in accordance with Section 2404.9.
3. Resin application areas used for manufacturing of reinforced plastics complying with Section 2409 shall not be required to be located in a spray room, spray booth or spraying space.

2404.7.5 Independent ducts. Each spray booth and spray room shall have an independent exhaust duct system discharging to the outside.

Exceptions:

1. Multiple spray booths having a combined frontal area of 18 square feet (1.67 m²) or less are allowed to have a common exhaust when identical spray finishing material is used in each booth. If more than one fan serves one booth, fans shall be interconnected such that all fans will operate simultaneously.
2. Where treatment of exhaust is necessary for air pollution control or for energy conservation, ducts shall be allowed to be manifolded if all of the following conditions are met:
   2.1. The sprayed materials used are compatible and will not react or cause ignition of the residue in the ducts.
   2.2. Nitrocellulose-based finishing material shall not be used.
   2.3. A filtering system shall be provided to reduce the amount of overspray carried into the duct manifold.
   2.4. Automatic sprinkler or water mist protection shall be provided at the junction of each booth exhaust with the manifold, in addition to the protection required by this chapter.

Reason: Water mist systems are listed for use in Ordinary Hazard occupancies and machinery spaces. Additionally, VdS has approved systems for paint shops and flammable liquid storage and FM has approved systems for spray and pool fires. The spaces described in this section are consistent with the listings/approvals. Automatic water mist systems provide a water efficient alternative to sprinkler systems. Water mist systems
reduce the water supply demand which can be of significance in areas where municipal water supplies may be marginal or inadequate for conventional sprinklers. Reducing the water demand for automatic fire protection systems that are tested in the same manner by recognized laboratories to conventional sprinklers, will encourage the installation of fire protection where water shortages due to drought may be a problem. Furthermore, the reduced discharge from water mist systems, compared to conventional sprinklers, in turn reduces the potential water damage.

Water have been used for years in buildings and on passenger ships specifically as a "sprinkler equivalent system" per Resolution A.800(19), November 1995 (IMO A800). The listings of the systems have been used as design guidance in buildings.

Water mist works to extinguish, suppress or control fires in fully open or enclosed compartments. Water-mist systems tested in environments identical to automatic sprinkler testing and have been found to achieve at least equal performance using less water than conventional sprinklers.

Cost Impact: Will not increase the cost of construction
This only provides another suppression option.
2015 International Fire Code

Delete without substitution:

2404.3.2.6 -Size. The aggregate area of spray booths in a building shall not exceed the lesser of 10 percent of the area of any floor of a building or the basic area allowed for a Group H-2 occupancy without area increases, as set forth in the International Building Code. The area of an individual spray booth in a building shall not exceed the lesser of the aggregate size limit or 1,500 square feet (139 m²).

**Exception:** One individual booth not exceeding 500 square feet (46 m²).

**Reason:** This section does not seem to take into account that regardless of the footprint of the spray booth the safety ventilation increases as the amount of spray increases in order to meet the requirements of 2404.7.3. A spray booth, regardless of size, that meets the requirements of Chapter 24 provides a safe and reliable piece of equipment. This requirement puts a financial burden on the purchaser of the spray booth. NFPA 33 does not have a size limitation. The proposed change brings this section in alignment with current edition of NFPA 33.

**Cost Impact:** Will not increase the cost of construction
This change will allow use of spray booth construction which may be less expensive than fire rated construction.
2015 International Fire Code

Add new text as follows:

2404.6.1.2.1 Interlocks. The spraying apparatus, drying apparatus and ventilating system for the spray booth or spray room shall be equipped with interlocks arranged to accomplish all of the following:

1. Prevent operation of the spraying apparatus while drying operations are in progress.
2. Where the drying apparatus is located in the spray booth or spray room, prevent operation of the drying apparatus until a timed purge of spray vapors from the spray booth or spray room is complete. This purge time shall be based upon completing at least four air changes of spray booth or spray room volume or for a period of not less than 3 minutes, whichever is greater.
3. Have the ventilating system maintain a safe atmosphere within the spray booth or spray room during the drying process and automatically shut off drying apparatus in the event of a failure of the ventilating system.
4. Shut off the drying apparatus automatically if the air temperature within the booth exceeds 200°F (93°C).

2404.6.1.2.1.1 Testing Interlocks required by Section 2404.6.1.2.1 shall be tested annually and a record shall be kept in accordance with Section 107.3.

Reason: In the IFC, some safety interlocks require testing and others don't. The purpose of this code change is to work towards a consistent approach by requiring safety interlocks to be tested.

Cost Impact: Will not increase the cost of construction
No cost increase is expected from this code change proposal. This code change is for the testing of existing equipment only. As a result, it does not require a change in construction and there is no cost increase.
2015 International Fire Code

2404.7.1 Operation. Mechanical ventilation shall be kept in operation at all times while spraying operations are being conducted and for a sufficient time thereafter to allow vapors from drying coated articles and finishing material residue to be exhausted. Spraying equipment shall be interlocked with the ventilation of the flammable vapor areas such that spraying operations cannot be conducted unless the ventilation system is in operation.

Add new text as follows:

2404.7.1.1 Testing The interlock required by Section 2404.7.1 shall be tested annually and a record shall be kept in accordance with Section 107.3.

Reason: In the IFC, some safety interlocks require testing and others don't. The purpose of this code change is to work towards a consistent approach by requiring safety interlocks to be tested.

Cost Impact: Will not increase the cost of construction

No cost increase is expected from this code change proposal. This code change is for the testing of existing equipment only. As a result, it does not require a change in construction and there is no cost increase.

F287-16 : 2404.7.1-
WINSLow11880
2015 International Fire Code

Add new text as follows:

2404.8.1 Automated spray application operations. Where protecting automated spray application operations, automatic fire-extinguishing systems shall be equipped with an approved interlock feature that will, upon discharge of the system, automatically stop the spraying operations and workpiece conveyors into and out of the flammable vapor areas. Where the building is equipped with a fire alarm system, discharge of the automatic fire-extinguishing system shall also activate the building alarm notification appliances. The interlocks shall be tested annually and a record kept in accordance with Section 107.3.

Reason: In the IFC, some safety interlocks require testing and others don't. The purpose of this code change is to work toward a consistent approach by requiring safety interlocks to be tested.

Cost Impact: Will not increase the cost of construction
No cost increase is expected from this code change proposal. This code change is for the testing of existing equipment only. As a result, it does not require a change in construction and there is no cost increase.
F289-16
IFC: 2404.8.2, 2404.8.2.1 (New), 2404.8.2.2 (New).
Proponent: Geoffrey Raifsnider, representing Self

2015 International Fire Code

2404.8.2 Ventilation interlock prohibited. Air
Except as addressed in Sections 2404.8.2.1 and 2404.8.2.2 air makeup and flammable vapor area exhaust systems shall not be interlocked with the fire alarm system and shall remain in operation during a fire alarm condition.

Exception: Where the type of fire-extinguishing system used requires such ventilation to be discontinued, air makeup and exhaust systems shall shut down and dampers shall close.

2404.8.2.1 Recirculation. Where flammable vapor area exhaust is recirculated, the recirculation system shall shut down during any fire alarm condition.

2404.8.2.2 Shutdown of air circulation. Where the type of fire-extinguishing system used requires such ventilation to be discontinued, air makeup, recirculation and exhaust systems shall shut down and dampers shall close.

Reason: Addresses the operation of the recirculation portion of a spray booth or spray room during a fire alarm condition. Shutting down the recirculation prevents smoke from a fire within the spray area from being recirculated.

Cost Impact: Will not increase the cost of construction
Change is only in the operation of equipment and its response to a fire alarm.
F290-16
IFC: 2405.8, 2405.8.1 (New).
Proponent: William Winslow, representing Self (will-winslow@comcast.net)

2015 International Fire Code

2405.8 Conveyor interlock. Dip tanks utilizing a conveyor system shall be arranged such that in the event of a fire, the conveyor system shall automatically cease motion and the required tank bottom drains shall open.

Add new text as follows:

2405.8.1 Testing The interlocks required by Section 2405.8 shall be tested annually and a record shall be kept in accordance with Section 107.3.

Reason: In the IFC, some safety interlocks require testing and others don't. The purpose of this code change is to work towards a consistent approach by requiring safety interlocks to be tested.

Cost Impact: Will not increase the cost of construction
No cost increase is expected from this code change proposal. This code change is for the testing of existing equipment only. As a result, it does not require a change in construction and there is no cost increase.
2015 International Fire Code

2407.9 Ventilation interlock. Hand electrostatic equipment shall be interlocked with the ventilation system for the spraying area so that the equipment cannot be operated unless the ventilating system is in operation.

Add new text as follows:

2407.9.1 Testing The interlock required by Section 2407.9 shall be tested annually and a record shall be kept in accordance with Section 107.3.

Reason: In the IFC, some safety interlocks require testing and others don't. The purpose of this code change is to work towards a consistent approach by requiring safety interlocks to be tested.

Cost impact: Will not increase the cost of construction

No cost increase is expected from this code change proposal. This code change is for the testing of existing equipment only. As a result, it does not require a change in construction and there is no cost increase.
2015 International Fire Code

Revise as follows:

2703.10 Automatic sprinkler suppression system. An approved automatic sprinkler system or automatic water mist system shall be provided in accordance with Sections 2703.10.1 through 2703.10.5 and Chapter 9.

2703.10.1 Workstations and tools. The design of the sprinkler or water mist system in the area shall take into consideration the spray pattern and the effect on the equipment.

2703.10.1.1 Combustible workstations. A sprinkler head or nozzle shall be installed within each branch exhaust connection or individual plenums of workstations of combustible construction. The sprinkler head or water mist nozzle in the exhaust connection or plenum shall be located not more than 2 feet (610 mm) from the point of the duct connection or the connection to the plenum. Where necessary to prevent corrosion, the sprinkler head or water mist nozzle and connecting piping in the duct shall be coated with approved or listed corrosion-resistant materials. The sprinkler head or water mist nozzle shall be accessible for periodic inspection.

Exceptions:

1. Approved alternative automatic fire-extinguishing systems are allowed. Activation of such systems shall deactivate the related processing equipment.
2. Process equipment that operates at temperatures exceeding 932°F (500°C) and is provided with automatic shutdown capabilities for hazardous materials.
3. Exhaust ducts 10 inches (254 mm) or less in diameter from flammable gas storage cabinets that are part of a workstation.
4. Ducts listed or approved for use without internal automatic sprinkler protection.

2703.10.1.2 Combustible tools. Where the horizontal surface of a combustible tool is obstructed from ceiling sprinkler discharge, automatic sprinkler protection that covers the horizontal surface of the tool shall be provided.

Exceptions:

1. An automatic gaseous fire-extinguishing local surface application system shall be allowed as an alternative to sprinklers. Gaseous-extinguishing systems shall be actuated by infrared (IR) or ultraviolet/infrared (UV/IR) optical detectors.
2. Tools constructed of materials that are listed as Class 1 or Class 2 in accordance with UL 2360 or approved for use without internal fire-extinguishing system protection.

2703.10.2 Gas cabinets and exhausted enclosures. An approved automatic sprinkler or water mist system shall be provided in gas cabinets and exhausted enclosures containing HPM compressed gases.
Exception: Gas cabinets located in an HPM room other than those cabinets containing pyrophoric gases.

2703.10.3 Pass-throughs in existing exit access corridors. Pass-throughs in existing exit access corridors shall be protected by an approved automatic sprinkler or water mist system.

2703.10.4 Exhaust ducts for HPM. An approved automatic sprinkler system shall be provided in exhaust ducts conveying gases, vapors, fumes, mists or dusts generated from HPM in accordance with this section and the International Mechanical Code.

2703.10.4.1 Metallic and noncombustible nonmetallic exhaust ducts. An approved automatic sprinkler system shall be provided in metallic and noncombustible nonmetallic exhaust ducts where all of the following conditions apply:

1. Where the largest cross-sectional diameter is equal to or greater than 10 inches (254 mm).
2. The ducts are within the building.
3. The ducts are conveying flammable gases, vapors or fumes.

2703.10.4.2 Combustible nonmetallic exhaust ducts. An approved automatic sprinkler system shall be provided in combustible nonmetallic exhaust ducts where the largest cross-sectional diameter of the duct is equal to or greater than 10 inches (254 mm).

Exceptions:

1. Ducts listed or approved for applications without automatic sprinkler system protection.
2. Ducts not more than 12 feet (3658 mm) in length installed below ceiling level.

2703.10.4.3 Exhaust connections and plenums of combustible workstations. Automatic fire-extinguishing system protection for exhaust connections and plenums of combustible workstations shall comply with Section 2703.10.1.1.

2703.10.4.4 Exhaust duct sprinkler system requirements. Automatic sprinklers installed in exhaust duct systems shall be hydraulically designed to provide 0.5 gallons per minute (gpm) (1.9 L/min) over an area derived by multiplying the distance between the sprinklers in a horizontal duct by the width of the duct. Minimum discharge shall be 20 gpm (76 L/min) per sprinkler from the five hydraulically most remote sprinklers.

2703.10.4.4.1 Sprinkler head locations. Automatic sprinklers shall be installed at 12-foot (3658 mm) intervals in horizontal ducts and at changes in direction. In vertical runs, automatic sprinklers shall be installed at the top and at alternate floor levels.

2703.10.4.4.2 Control valve. A separate indicating control valve shall be provided for sprinklers installed in exhaust ducts.

2703.10.4.4.3 Drainage. Drainage shall be provided to remove sprinkler water discharged in exhaust ducts.

2703.10.4.4.4 Corrosive atmospheres. Where corrosive atmospheres exist, exhaust duct sprinklers and pipe fittings shall be manufactured of corrosion-resistant materials or coated with approved materials.

2703.10.4.4.5 Maintenance and inspection. Sprinklers in exhaust ducts shall be accessible for periodic inspection and maintenance.
**2703.10.5 Sprinkler Suppression system alarms and supervision.** *Automatic sprinkler-suppression systems* shall be electrically supervised and provided with alarms in accordance with Chapter 9. *Automatic sprinkler-suppression system* alarm and supervisory signals shall be transmitted to the emergency control station.

**Reason:** Water mist systems are listed for use in Ordinary Hazard occupancies and approved for use on wet benches or similar processing equipment by UL and FM Global. The spaces described in this section are consistent with the listings/approvals.

Automatic water mist systems provide a water efficient alternative to sprinkler systems. Water mist systems reduce the water supply demand which can be of significance in areas where municipal water supplies may be marginal or inadequate for conventional sprinklers. Reducing the water demand for automatic fire protection systems that are tested in the same manner by recognized laboratories to conventional sprinklers, will encourage the installation of fire protection where water shortages due to drought may be a problem. Furthermore, the reduced discharge from water mist systems, compared to conventional sprinklers, in turn reduces the potential water damage.

Water have been used for years in buildings and on passenger ships specifically as a "sprinkler equivalent system" per Resolution A.800(19), November 1995 (IMO A800). The listings of the systems have been used as design guidance in buildings.

Water mist works to extinguish, suppress or control fires in fully open or enclosed compartments. Water-mist systems tested in environments identical to automatic sprinkler testing and have been found to achieve at least equal performance using less water than conventional sprinklers.

**Cost Impact:** Will not increase the cost of construction
This only provides another suppression option.
F293-16
IBC: [F] 415.11.1.1.1; IFC: 2704.2.2.1.

Proponent: Patrick McLaughlin, representing Semiconductor Industry Association

2015 International Fire Code

TABLE 2704.2.2.1
QUANTITY LIMITS FOR HAZARDOUS MATERIALS IN A SINGLE FABRICATION AREA IN GROUP H-5
(Portions of table not shown remain unchanged)

For SI: 1 pound per square foot = 4.882 kg/m², 1 gallon per square foot = 40.7 L/m², 1 cubic foot @ NTP/square foot = 0.305 m³ @ NTP/m², 1 cubic foot = 0.02832 m³.

a. Hazardous materials within piping shall not be included in the calculated quantities.
b. Quantity of hazardous materials in a single fabrication area shall not exceed the maximum allowable quantities per control area in Tables 5003.1.1(1) and 5003.1.1(2).
c. Densely packed baled cotton that complies with the packing requirements of ISO 8115 shall not be included in this material class.
d. The aggregate quantity of flammable, pyrophoric, toxic and highly toxic gases shall not exceed 9,000 cubic feet or a density of 0.2 ft³ per ft² at NTP.
e. The aggregate quantity of pyrophoric gases in the building shall not exceed the amounts set forth in Table 5003.8.2.

2015 International Building Code

TABLE [F] 415.11.1.1.1
QUANTITY LIMITS FOR HAZARDOUS MATERIALS IN A SINGLE FABRICATION AREA IN GROUP H-5
(Portions of table not shown remain unchanged)

For SI: 1 pound per square foot = 4.882 kg/m², 1 gallon per square foot = 40.7 L/m², 1 cubic foot @ NTP/square foot = 0.305 m³ @ NTP/m², 1 cubic foot = 0.02832 m³.

a. Hazardous materials within piping shall not be included in the calculated quantities.
b. Quantity of hazardous materials in a single fabrication shall not exceed the maximum allowable quantities per control area in Tables 307.1(1) and 307.1(2).
c. Densely packed baled cotton that complies with the packing requirements of ISO 8115 shall not be included in this material class.
d. The aggregate quantity of flammable, pyrophoric, toxic and highly toxic gases shall not exceed 9,000 cubic feet or a density of 0.2 ft³ per ft² at NTP.
e. The aggregate quantity of pyrophoric gases in the building shall not exceed the amounts set forth in Table 415.6.2.

Reason: The Semiconductor Industry Association is proposing a change in the allowable aggregate quantity of specified gases from a cubic feet limit of 9000 cubic feet to also allow a density limit of 0.2 ft³ per ft². This density is equivalent to a 45,000 ft² fabrication area with the current 9000 ft³ limit. Significant increases in building size has occurred with the introduction of the 300 millimeter wafer. Larger fabrication areas safely accomodate these limits due to the restriction being normalized versus an absolute limit.

When the 9000 ft³ limit was added to the Uniform Fire Code in 1988, wafer sizes, buildings and fabrication areas tended to be much smaller. For example, the 1991 Gartner fabrication area database lists 34 manufacturing fabrication areas with an average size of 26,000 ft². Applying the 9000 ft³ aggregate gas limit to this size fabrication area would allow a density of 0.35 cu/ft² which has been demonstrated to be a safe limit for the industry. It is almost a two times greater density than what is being proposed in this code change. Density limits are the norm in these tables for liquids, solids and oxidizing gases, and provide a precedent for what is being proposed.
The industry places these manufacturing gases in the fabrication area because low vapor pressure gases need to be close to the tool due to the inability to deliver these gases with excessive line lengths.

In summary, fabrication areas have an excellent history of safely managed toxic and flammable gases with safety controls such as exhausted gas cabinets, continuously welded gas piping, and gas detection with auto-shutdown. The 9000 ft$^3$ limit was established during the development of the old Uniform Building and Fire Codes Group H-6 classification in the 1980s because it represented the quantity used at the time. The industry used smaller cylinders, but more of them than today. The trend has been toward fewer but larger cylinders, but with more controls such as reduced flow orifices (RFOs), sub-atmospheric gas delivery, better gas and flame detection, as well as other safety features. Also, the fire protection features are much better today and in many cases better codified. The 9,000 ft$^3$ limit is an outdated threshold, based on older technology and design.

**Cost Impact:** Will not increase the cost of construction
It may reduce the cost because the manufacturing gases can continue to be placed near the tools where they are used instead of causing them to be piped in from remote locations.
IFC: 2808.3, 2808.3.1 (New), 2808.4, 2808.4.3.1.1 (New).

Proponent: Robert Davidson, Davidson Code Concepts, LLC, representing Self
(rjd@davidsoncodeconcepts.com)

2015 International Fire Code

2808.3 Size of piles. Piles shall not exceed 25 feet (7620 mm) in height, 150 feet (45 720 mm) in width and 250 feet (76 200 mm) in length.

Exception: The fire code official is authorized to allow the pile size to be increased where a fire protection plan is provided for approval that includes, but is not limited to, the following:

1. Storage yard areas and materials-handling equipment selection, design and arrangement shall be based upon sound fire prevention and protection principles.
2. Factors that lead to spontaneous heating shall be identified in the plan, and control of the various factors shall be identified and implemented, including provisions for monitoring the internal condition of the pile.
3. The plan shall include means for early fire detection and reporting to the public fire department; and facilities needed by the fire department for fire extinguishment including a water supply and fire hydrants.
4. Fire apparatus access roads around the piles and access roads to the top of the piles shall be established, identified and maintained.
5. Regular yard inspections by trained personnel shall be included as part of an effective fire prevention maintenance program.

Additional fire protection called for in the plan shall be provided and shall be installed in accordance with this code. The increase of the pile size shall be based upon the capabilities of the installed fire protection systems and features.

2808.4 Pile separation. Piles shall be separated from adjacent piles by approved fire apparatus access roads.

Add new text as follows:

2808.3.1 Bale Stacks Bale stacks shall not exceed 25 feet (7620 mm) in height, 50 feet (15 240 mm) in width and 150 feet (45 720 mm) in length. Bale stacks shall not be in a grouping more than two bale stacks and shall be separated by not less than 160 feet (48 770 mm) from each other. Each group of two bale stacks shall be separated from the next group of bale stacks by not less than 400 feet (121 900 mm). The storage site shall be reasonably level, on solid ground.

2808.4.3.1.1 Security. Outside bale stack storage yards shall be secured against unauthorized access in an approved manner.

Reason: The purpose of this proposal is to provide for the safe storage of biomass feedstock at biomass to ethanol manufacturing facilities. Existing general requirements for the storage of agricultural products are not sufficient for these types of operations. The storage arrangement dimensions is based upon current operations after shorter separation distances were found to be insufficient to retard fire spread. The requirements for securing the site in an approved manner is in recognition of a main cause of fires in this type of storage being arson.

Cost Impact: Will not increase the cost of construction
The practice is being followed by facilities already.
2015 International Fire Code

SECTION 2810 OUTDOOR STORAGE OF PALLETS AT PALLET MANUFACTURING AND RECYCLING FACILITIES

2810.1 General The outside storage of pallets on the same site as a manufacturing or recycling facility shall comply with Sections 2810.1 through 2810.11.

2810.2 Site Plan Each site shall maintain a current site plan that includes a general description of the property, the boundaries of the lot, the size and location of buildings, and shall include all of the following:

1. Utilities
2. Type of construction and presence of sprinkler protection for other buildings on the site
3. Water supply sources for fire fighting purposes
4. Location of hazardous material storage areas
5. Location of pallet storage
6. Equipment protected with a dust collection system
7. Fire apparatus access roads
8. Designated smoking areas
9. Location of fire alarm control panels

2810.3 Fire Prevention Plan The owner or owners authorized representative shall prepare an approved fire prevention plan that includes all of the following:

1. Frequency of walk through inspections to verify compliance with the plan
2. Hot work permit process in accordance with Chapter 35
3. Preventive maintenance program for equipment associated with pallet activities
4. Inspection, testing, and maintenance of fire protection systems in accordance with Chapter 9

2810.4 Fire Safety and Emergency Evacuation Plan The owner or owners authorized representative shall prepare and train employees in an approved emergency evacuation plan in accordance with Chapter 4.

2810.5 Security Management Plan The owner or owners authorized representative shall prepare a security management plan based on a security risk assessment and shall make the plan and assessment available to the fire code official upon request.

2810.6 Clearance to Property Line Stacks of pallets shall not be stored within 0.75 times the stack height or 8 feet, whichever is greater or shall comply with Section 2810.11.

2810.7 Clearance to Important Buildings Stacks of pallets shall not be stored within 0.75 times the stack height of any important building on site or shall comply with Section 2810.11.
2810.8 **Height** Pallet stacks shall not exceed 20 ft (6 m) in height.

2810.9 **Fire Flow** Fire flow requirements for the site shall be determined by the fire code official.

2810.10 **Portable Fire Extinguishers** Portable fire extinguishers shall be provided with 75 ft (23 m) of any pallet stack.

2810.11 **Alternative Approach.** Where approved by the fire code official pallet stacks located closer to a property line or structure than as required by Sections 2810.6 and 2810.7 shall be provided with additional fire protection including, but not limited to, the following:

1. The storage yard areas and materials-handling equipment selection, design, and arrangement are based upon an approved risk assessment.
2. Automatic fire detection which transmits an alarm to a supervising station in accordance with NFPA 72 is provided.
3. Fire apparatus access roads are provided around all storage areas.

403.6 **Group F occupancies.** An approved fire safety and evacuation plan in accordance with Section 404 shall be prepared and maintained for buildings containing a Group F occupancy where any of the following conditions apply:

1. The Group F occupancy has an occupant load of 500 or more persons.
2. The Group F occupancy has an occupant load more than 100 persons above or below the lowest level of exit discharge.
3. A Group F pallet manufacturing facility as required by Section 2810.

**Reason:** Outdoor pallet storage areas for manufacturing and recyclers of pallets should be exempt from the requirements for the storage of idle pallets because pallets are not idle, nor managed in an idle fashion, at these types facilities. Pallet manufacturers and recyclers have intimate knowledge of their pallet inventory, as it is considered an asset. The storage areas are fluid environments where pallets are being moved and replaced on a daily basis. The outdoor storage area of pallet manufacturing and recycling facilities is an active management environment. Personnel are a constant presence within the storage area so that fire hazards can be identified and reported to take immediate corrective action. Storage yards are organized by pallet type and into recycle streams for high operational efficiency, kept sufficiently free of waste and debris, and perimeters are well maintained. For these reasons, a new section is proposed which would uniquely apply to pallet manufacturing and recycling facilities. The intent of the new section is to reduce the likelihood of fire at pallet manufacturing and recycling facilities through best practices. In the event that a fire does occur, measures are described that will mitigate the spread of fire to adjoining structures and properties through the establishment of pallet pile spacing between buildings and property lines.

"Important building", as used in Chapters 23, 57, and 61, is already a defined term in NFPA 30. It is the same concept as used for tank storage of flammable and combustible liquids.
Cost Impact: Will not increase the cost of construction
The requirements proposed represent best practices of the industry. As such, there will not be an increase in cost for some operators. Others may experience an increased cost to comply with the requirements.
F296-16
IFC: 2906.5, 2906.5.1 (New).
Proponent: William Winslow, representing Self (will-winslow@comcast.net)

2015 International Fire Code

2906.5 Kettle controls. The kettle and thin-down tank shall be instrumented, controlled and interlocked so that any failure of the controls will result in a safe condition. The kettle shall be provided with a pressure-rupture disc in addition to the primary vent. The vent piping from the rupture disc shall be of minimum length and shall discharge to an approved location. The thin-down tank shall be adequately vented. Thinning operations shall be provided with an adequate vapor removal system.

Add new text as follows:

2906.5.1 Testing The interlocks required by Section 2906.5 shall be tested annually and a record shall be kept in accordance with Section 107.3.

Reason: In the IFC, some safety interlocks require testing and others don't. The purpose of this code change is to work towards a consistent approach by requiring safety interlocks to be tested.

Cost Impact: Will not increase the cost of construction
No cost increase is expected from this code change proposal. This code change is for the testing of existing equipment only. As a result, it does not require a change in construction and there is no cost increase.
2015 International Fire Code

3005.1 Shut down. Interlocks shall be provided for Class A ovens so that conveyors or sources of flammable or combustible materials shall shut down if either the exhaust or recirculation air supply fails.

Add new text as follows:

3005.1.1 Testing The interlocks required by Section 3005.1 shall be tested annually and a record shall be kept in accordance with Section 107.3.

Reason: In the IFC, some safety interlocks require testing and others don't. The purpose of this code change is to work towards a consistent approach by requiring safety interlocks to be tested.

Cost Impact: Will not increase the cost of construction
No cost increase is expected from this code change proposal. This code change is for the testing of existing equipment only. As a result, it does not require a change in construction and there is no cost increase.
2015 International Fire Code

Revise as follows:

SECTION 202 DEFINITIONS

MEMBRANE STRUCTURE. An air-inflated, air-supported, cable or frame-covered structure as defined by the International Building Code and not otherwise defined as a tent or umbrella structure. See Chapter 31 of the International Building Code.

[BG] TENT. A structure, enclosure or shelter, with or without sidewalls or drops, constructed of fabric or pliable material supported by any manner except by air or the contents that it protects. (see "Umbrella structure" and "Membrane structure")

Add new definition as follows:

UMBRELLA STRUCTURE. A structure, enclosure or shelter with or without sidewalls or drops, constructed of fabric or pliable material supported by a central pole. (see "Membrane structure" and "Tent")

Revise as follows:

CHAPTER 31 TENTS, UMBRELLA STRUCTURES AND OTHER MEMBRANE STRUCTURES

SECTION 3101 GENERAL

3101.1 Scope. Tents, umbrella structures, temporary stage canopies and membrane structures shall comply with this chapter. The provisions of Section 3103 are applicable only to temporary tents, umbrella structures, and membrane structures. The provisions of Section 3104 are applicable to temporary and permanent tents, umbrella structures, and membrane structures. Other temporary structures shall comply with the International Building Code.

SECTION 3103 TEMPORARY TENTS, UMBRELLA STRUCTURES AND MEMBRANE STRUCTURES

3103.1 General. Tents, umbrella structures and membrane structures used for temporary periods shall comply with this section. Other temporary structures erected for a period of 180 days or less shall comply with the International Building Code.

3103.2 Approval required. Tents, umbrella structures and membrane structures having an area in excess of 400 square feet (37 m²) shall not be erected, operated or maintained for any purpose without first obtaining a permit and approval from the fire code official.

Exceptions:

1. Tents or umbrella structures used exclusively for recreational camping purposes.
2. Tents or umbrella structures open on all sides that comply with all of the
following:

2.1. Individual tents or umbrella structures having a maximum size of 700 square feet (65 m²).

2.2. The aggregate area of multiple tents or umbrella structures placed side by side without a fire break clearance of 12 feet (3658 mm), not exceeding 700 square feet (65 m²) total.

2.3. A minimum clearance of 12 feet (3658 mm) to all structures and other tents or umbrella structures.

3103.3 Place of assembly. For the purposes of this chapter, a place of assembly shall include a circus, carnival, tent show, theater, skating rink, dance hall or other place of assembly in or under which persons gather for any purpose.

3103.4 Permits. Permits shall be required as set forth in Sections 105.6 and 105.7.

3103.5 Use period. Temporary tents, umbrella structures, air-supported, air-inflated or tensioned membrane structures shall not be erected for a period of more than 180 days within a 12-month period on a single premises.

3103.6 Construction documents. A detailed site and floor plan for tents, umbrella structures or membrane structures with an occupant load of 50 or more shall be provided with each application for approval. The tent, umbrella structure or membrane structure floor plan shall indicate details of the means of egress facilities, seating capacity, arrangement of the seating and location and type of heating and electrical equipment.

3103.7 Inspections. The entire tent, umbrella structures, air-supported, air-inflated or tensioned membrane structure system shall be inspected at regular intervals, but not less than two times per permit use period, by the permittee, owner or agent to determine that the installation is maintained in accordance with this chapter.

Exception: Permit use periods of less than 30 days.

3103.7.1 Inspection report. Where required by the fire code official, an inspection report shall be provided and shall consist of maintenance, anchors and fabric inspections.

3103.8 Access, location and parking. Access, location and parking for temporary tents, umbrella structures and membrane structures shall be in accordance with this section.

3103.8.1 Access. Fire apparatus access roads shall be provided in accordance with Section 503.

3103.8.2 Location. Tents, umbrella structures or membrane structures shall not be located within 20 feet (6096 mm) of lot lines, buildings, other tents, umbrella structures or membrane structures, parked vehicles or internal combustion engines. For the purpose of determining required distances, support ropes and guy wires shall be considered as part of the temporary membrane structure, umbrella structures or tent.

Exceptions:

1. Separation distance between membrane structures, umbrella structures and tents not used for cooking is not required where the aggregate floor area does not exceed 15,000 square feet (1394 m²).

2. Membrane structures, umbrella structures or tents need not be separated from buildings when all of the following conditions are met:

   2.1. The aggregate floor area of the membrane structure, umbrella
structures or tent shall not exceed 10,000 square feet (929 m²).

2.2. The aggregate floor area of the building and membrane structure, umbrella structures or tent shall not exceed the allowable floor area including increases as indicated in the *International Building Code*.

2.3. Required *means of egress* are provided for both the building and the membrane structure, umbrella structures or tent including travel distances.

2.4. Fire apparatus access roads are provided in accordance with Section 503.

3103.8.3 Location of structures in excess of 15,000 square feet in area. Membrane structures having an area of 15,000 square feet (1394 m²) or more shall be located not less than 50 feet (15240 mm) from any other tent, umbrella structures or structure as measured from the sidewall of the tent, umbrella structures or membrane structure unless joined together by a corridor.

3103.8.4 Membrane structures on buildings. Membrane structures that are erected on buildings, balconies, decks or other structures shall be regulated as permanent membrane structures in accordance with Section 3102 of the *International Building Code*.

3103.8.5 Connecting corridors. Tents, umbrella structures or membrane structures are allowed to be joined together by means of corridors. *Exit* doors shall be provided at each end of such corridor. On each side of such corridor and approximately opposite each other, there shall be provided openings not less than 12 feet (3658 mm) wide.

3103.8.6 Fire break. An unobstructed fire break passageway or fire road not less than 12 feet (3658 mm) wide and free from guy ropes or other obstructions shall be maintained on all sides of all tents, umbrella structures and membrane structures unless otherwise approved by the fire code official.

3103.9 Anchorage required. Tents, umbrella structures or membrane structures and their appurtenances shall be adequately roped, braced and anchored to withstand the elements of weather and prevent against collapsing. Documentation of structural stability shall be furnished to the fire code official on request.

3103.9.1 Tents and membrane structures exceeding one story. Tents and membrane structures exceeding one story shall be designed and constructed to comply with Chapter 16 of the *International Building Code*.

3103.11 Seating arrangements. Seating in tents, umbrella structures or membrane structures shall be in accordance with Chapter 10.

3103.12 Means of egress. *Means of egress* for temporary tents, umbrella structures and membrane structures shall be in accordance with Sections 3103.12.1 through 3103.12.8.

3103.12.1 Distribution. *Exits* shall be spaced at approximately equal intervals around the perimeter of the tent, umbrella structures or membrane structure, and shall be located such that all points are 100 feet (30480 mm) or less from an *exit*.

3103.12.2 Number. Tents, umbrella structures or membrane structures or a usable portion thereof shall have not less than one exit and not less than the number of exits required by Table 3103.12.2. The total width of *means of egress* in inches (mm) shall be not less than the total
occupant load served by a means of egress multiplied by 0.2 inches (5 mm) per person.

**TABLE 3103.12.2**
MINIMUM NUMBER OF MEANS OF EGRESS AND MEANS OF EGRESS WIDTHS FROM TEMPORARY MEMBRANE STRUCTURES, UMBRELLA STRUCTURES AND TENTS

<table>
<thead>
<tr>
<th>OCCUPANT LOAD</th>
<th>MINIMUM NUMBER OF MEANS OF EGRESS</th>
<th>MINIMUM WIDTH OF EACH MEANS OF EGRESS (inches)</th>
<th>MINIMUM WIDTH OF EACH MEANS OF EGRESS (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Tent or Umbrella Structure</td>
<td>Membrane Structure</td>
</tr>
<tr>
<td>10 to 199</td>
<td>2</td>
<td>72</td>
<td>36</td>
</tr>
<tr>
<td>200 to 499</td>
<td>3</td>
<td>72</td>
<td>72</td>
</tr>
<tr>
<td>500 to 999</td>
<td>4</td>
<td>96</td>
<td>72</td>
</tr>
<tr>
<td>1,000 to 1,999</td>
<td>5</td>
<td>120</td>
<td>96</td>
</tr>
<tr>
<td>2,000 to 2,999</td>
<td>6</td>
<td>120</td>
<td>96</td>
</tr>
<tr>
<td>Over 3,000(^a)</td>
<td>7</td>
<td>120</td>
<td>96</td>
</tr>
</tbody>
</table>

For SI: 1 inch = 25.4 mm.

a. When the occupant load exceeds 3,000, the total width of means of egress (in inches) shall be not less than the total occupant load multiplied by 0.2 inches per person.

**3103.12.3 Exit openings from tents or umbrella structures.** Exit openings from tents or umbrella structures shall remain open unless covered by a flame-resistant curtain. The curtain shall comply with the following requirements:

1. Curtains shall be free sliding on a metal support. The support shall be not less than 80 inches (2032 mm) above the floor level at the exit. The curtains shall be so arranged that, when open, no part of the curtain obstructs the exit.
2. Curtains shall be of a color, or colors, that contrasts with the color of the tent or umbrella structures.

**SECTION 3104 TEMPORARY AND PERMANENT TENTS, UMBRELLA STRUCTURES AND MEMBRANE STRUCTURES**

**3104.1 General.** Tents, umbrella structures and membrane structures, both temporary and permanent, shall be in accordance with this section. Permanent tents, umbrella structures and membrane structures shall also comply with the International Building Code.

**3104.2 Flame propagation performance treatment.** Before a permit is granted, the owner or agent shall file with the fire code official a certificate executed by an approved testing laboratory.
certifying that the tents, umbrella structures and membrane structures and their appurtenances; sidewalls, drops and tarpaulins; floor coverings, bunting and combustible decorative materials and effects, including sawdust where used on floors or passageways, are composed of material meeting the flame propagation performance criteria of Test Method 1 or Test Method 2, as appropriate, of NFPA 701 or shall be treated with a flame retardant in an approved manner and meet the flame propagation performance criteria of Test Method 1 or Test Method 2, as appropriate, of NFPA 701, and that such flame propagation performance criteria are effective for the period specified by the permit.

3104.3 Label. Membrane structures, umbrella structures or tents shall have a permanently affixed label bearing the identification of size and fabric or material type.

3104.4 Certification. An affidavit or affirmation shall be submitted to the fire code official and a copy retained on the premises on which the tent, umbrella structure or air-supported structure is located. The affidavit shall attest to all of the following information relative to the flame propagation performance criteria of the fabric:

1. Names and address of the owners of the tent, umbrella structure or air-supported structure.
2. Date the fabric was last treated with flame-retardant solution.
3. Trade name or kind of chemical used in treatment.
4. Name of person or firm treating the material.
5. Name of testing agency and test standard by which the fabric was tested.

3104.5 Combustible materials. Hay, straw, shavings or similar combustible materials shall not be located within any tent, umbrella structure or membrane structure containing an assembly occupancy, except the materials necessary for the daily feeding and care of animals. Sawdust and shavings utilized for a public performance or exhibit shall not be prohibited provided the sawdust and shavings are kept damp. Combustible materials shall not be permitted under stands or seats at any time.

3104.6 Smoking. Smoking shall not be permitted in tents, umbrella structures or membrane structures. Approved "No Smoking" signs shall be conspicuously posted in accordance with Section 310.

3104.7 Open or exposed flame. Open flame or other devices emitting flame, fire or heat or any flammable or combustible liquids, gas, charcoal or other cooking device or any other unapproved devices shall not be permitted inside or located within 20 feet (6096 mm) of the tent, umbrella structure or membrane structures while open to the public unless approved by the fire code official.

3104.8 Fireworks. Fireworks shall not be used within 100 feet (30 480 mm) of tents, umbrella structures or membrane structures.

3104.10 Safety film. Motion pictures shall not be displayed in tents, umbrella structures or membrane structures unless the motion picture film is safety film.

3104.15.2 Venting. Gas, liquid and solid fuel-burning equipment designed to be vented shall be vented to the outside air as specified in the International Fuel Gas Code and the International Mechanical Code. Such vents shall be equipped with approved spark arresters where required. Where vents or flues are used, all portions of the tent, umbrella structure or membrane structure shall be not less than 12 inches (305 mm) from the flue or vent.
3104.15.5 **Cooking tents or umbrella structures.** Tents or umbrella structures with sidewalls or drops where cooking is performed shall be separated from other tents, umbrella structures or membrane structures by not less than 20 feet (6096 mm).

3104.15.6 **Outdoor cooking.** Outdoor cooking that produces sparks or grease-laden vapors shall not be performed within 20 feet (6096 mm) of a tent, umbrella structure or membrane structure.

3104.16.2 **Location of containers.** LP-gas containers shall be located outside. Safety release valves shall be pointed away from the tent, umbrella structure or membrane structure.

3104.16.3 **Protection and security.** Portable LP-gas containers, piping, valves and fittings that are located outside and are being used to fuel equipment inside a tent, umbrella structure or membrane structure shall be adequately protected to prevent tampering, damage by vehicles or other hazards and shall be located in an **approved** location. Portable LP-gas containers shall be securely fastened in place to prevent unauthorized movement.

3104.17.1 **Use.** Flammable-liquid-fueled equipment shall not be used in tents, umbrella structures or membrane structures.

3104.17.2 **Flammable and combustible liquid storage.** Flammable and combustible liquids shall be stored outside in an **approved** manner not less than 50 feet (15 240 mm) from tents, umbrella structure or membrane structures. Storage shall be in accordance with Chapter 57.

3104.17.3 **Refueling.** Refueling shall be performed in an **approved** location not less than 20 feet (6096 mm) from tents, umbrella structures or membrane structures.

3104.18.2 **Fuel.** Vehicles or equipment shall not be fueled or defueled within the tent, umbrella structure or membrane structure.

3104.18.5 **Competitions and demonstrations.** Liquid and gas-fueled vehicles and equipment used for competition or demonstration within a tent, umbrella structure or membrane structure shall comply with Sections 3104.18.5.1 through 3104.18.5.3.

3104.19 **Separation of generators.** Generators and other internal combustion power sources shall be separated from tents, umbrella structures or membrane structures by not less than 20 feet (6096 mm) and shall be isolated from contact with the public by fencing, enclosure or other approved means.

3104.20 **Standby personnel.** Where, in the opinion of the fire code official, it is essential for public safety in a tent, umbrella structure or membrane structure used as a place of assembly or any other use where people congregate, because of the number of persons, or the nature of the performance, exhibition, display, contest or activity, the owner, agent or lessee shall employ one or more qualified persons, as required and **approved**, to remain on duty during the times such places are open to the public, or when such activity is being conducted.

3104.21 **Combustible vegetation.** Combustible vegetation that could create a fire hazard shall be removed from the area occupied by a tent, umbrella structure or membrane structure, and from areas within 30 feet (9144 mm) of such structures.

3104.22 **Combustible waste material.** The floor surface inside tents, umbrella structures or membrane structures and the grounds outside and within a 30-foot (9144 mm) perimeter shall be kept free of combustible waste and other combustible materials that could create a fire hazard. Such waste shall be stored in **approved** containers and removed from the premises not less than once a day during the period the structure is occupied by the public.

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**F590**
105.6.45 Temporary membrane structures, umbrella structures and tents. An operational permit is required to operate an air-supported temporary membrane structure, a temporary stage canopy, an umbrella structure or a tent having an area in excess of 400 square feet (37 m²).

Exceptions:
1. Tents or umbrella structure used exclusively for recreational camping purposes.
2. Tents or umbrella structure open on all sides, which comply with all of the following:
   2.1. Individual tents or umbrella structures having a maximum size of 700 square feet (65 m²).
   2.2. The aggregate area of multiple tents or umbrella structures placed side by side without a fire break clearance of not less than 12 feet (3658 mm) shall not exceed 700 square feet (65 m²) total.
   2.3. A minimum clearance of 12 feet (3658 mm) to structures and other tents or umbrella structures shall be provided.

[A] 105.7.18 Temporary membrane structures and tents. A construction permit is required to erect an air-supported temporary membrane structure, a temporary stage canopy or a tent or an umbrella structure having an area in excess of 400 square feet (37 m²).

Exceptions:
1. Tents or umbrella structures used exclusively for recreational camping purposes.
2. Funeral tents and curtains, or extensions attached thereto, when used for funeral services.
3. Tents and umbrella structures and awnings open on all sides, which comply with all of the following:
   3.1. Individual tents and umbrella structures shall have a maximum size of 700 square feet (65 m²).
   3.2. The aggregate area of multiple tents or umbrella structures placed side by side without a fire break clearance of not less than 12 feet (3658 mm) shall not exceed 700 square feet (65 m²) total.
   3.3. A minimum clearance of 12 feet (3658 mm) to structures and other tents or umbrella structures shall be maintained.

TABLE 906.1
ADDITIONAL REQUIRED PORTABLE FIRE EXTINGUISHERS

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**2015 International Building Code**

Revise as follows:

**SECTION 202  DEFINITIONS**

**TENT.** A structure, enclosure or shelter, with or without sidewalls or drops, constructed of fabric or pliable material supported in any manner except by air or the contents it protects. *(see "Umbrella structure")*

Add new text as follows:
UMBRELLA STRUCTURE. A structure with or without sidewalls or drops, constructed of fabric or pliable material supported by a central pole. (see "Tent")

SECTION 3103 TEMPORARY STRUCTURES

Revise as follows:

3103.1 General. The provisions of Sections 3103.1 through 3103.4 shall apply to structures erected for a period of less than 180 days. Tents, umbrella structures and other membrane structures erected for a period of less than 180 days shall comply with the International Fire Code. Those erected for a longer period of time shall comply with applicable sections of this code.

Reason: Umbrellas are available that meet or exceed the 400 square foot individual size and have optional accessories that allow multiple umbrellas to be connected to each other for additional size and stability which can offer extended weather protection. These accessories include rain gutter systems, side panels (with or without support poles), and additional electrical wiring for lights and heater attachments. These accessories allow the user to mimic a tent with or without sides and of substantial size to be used as protection over an assembly occupancy. The fabric, however, due to being an "umbrella" may not meet flame retardant standards, yet can be connected together and used as a temporary or permanent cover over an assembly occupancy, outdoor events, rooftop covers and more directly adjacent to buildings. Umbrellas are not typically regulated due to their singular size, but once connected and enlarged, they continue to remain outside of enforcement due to not being included in the definition of a tent. Including the term "umbrella structure" in and as part of definitions, would allow Code Officials clear language to enforce tent regulations when umbrellas reach an individual or collective size to form a structure equivalent to a tent. See photo examples attached.

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Side Panels
Enclose your shades and protect your guests from wind, sun and rain. Not just for classic pavilion models, side panels are customizable to fit any square or rectangular shade. Side panels easily affix to the strut end with grommets and are secured along the edge of the canopy with Velcro tabs. Corners can be zippered together for a complete enclosure effect. Available in solid panel or clear acrylic window options.

Support poles
For added strength, support poles can add stability to side panel installations. Aluminum telescopic poles vertically affix to the struts and are weighted at the bottom to provide additional support to side panels. If additional stability is needed, cross brackets can also be included to connect corner poles. For custom support poles, technical drawing can be provided.
Cost Impact: Will not increase the cost of construction
Adding clarification and new definition to ensure these installations are captured by current code.
F299-16

IFC: 3103.3.1 (New).

Proponent: Tim Earl, representing GBH International (tearl@gbhinternational.com); Jeff Hugo, National Fire Sprinkler Association, representing National Fire Sprinkler Association (hugo@nfsa.org)

2015 International Fire Code

Revise as follows:

3103.3.1 Special Amusement Building Tents and other membrane structures erected as a special amusement building shall be equipped with an automatic sprinkler system in accordance with section 411.4 of the International Building Code.

Reason: Section 411 of the IBC contains requirements for Special Amusement Buildings based on the unique egress challenges they present. Tents and other membrane structures have become a popular option for temporary Special Amusement Buildings. Unfortunately, this means they are governed by Chapter 31 of the IFC and the provisions of the IBC do not apply. A proposal was submitted last cycle to require tents used as Special Amusement Buildings to comply with Section 411 of the IBC. However, the committee felt this was too high of a bar to be met by tents, and the proposal was disapproved.

This proposal would point to only the sprinkler requirement of Section 411 (namely Section 411.4). This will increase occupant safety without introducing the more burdensome requirements of Section 411. For temporary Special Amusement Buildings, Section 411.4 permits an approved temporary water supply, providing some flexibility.

Cost Impact: Will increase the cost of construction
Operators of Special Amusement Buildings using tents or other membrane structures will be required to purchase or rent a fire sprinkler system and the cost depends on the extent of the system.
F300-16
IFC: 3103.6, 3103.9, 3103.9.1, 3103.9.2 (New), 3103.9.3 (New).

Proponent: Michael O’Brien representing the Fire Code Action Committee (FCAC@iccsafe.org)

2015 International Fire Code

Revise as follows:

3103.6 Construction documents. A detailed site and floor plan for tents or membrane structures with an occupant load of 50 or more shall be provided with each application for approval. The tent or membrane structure floor plan shall indicate details of the means of egress facilities, seating capacity, arrangement of the seating and location and type of heating and electrical equipment. The construction documents shall include an analysis of structural stability.

3103.9 Anchorage Structural stability and anchorage required. Tents or membrane structures and their appurtenances shall be adequately roped, braced designed and anchored installed to withstand the elements of weather and prevent against collapsing. Documentation of structural stability shall be furnished to the fire code official on request.

3103.9.1 Tents and membrane structures exceeding one story. Tents and membrane structures exceeding one story shall be designed and constructed to comply with Chapter 16 Sections 1606, 1607, 1608 and 1609 of the International Building Code.

3103.9.2 Tents and membrane structures exceeding 4,000 square feet. Tents and membrane structures exceeding 4,000 square feet shall be designed and constructed to comply with Sections 1606, 1607, 1608 and 1609 of the International Building Code.

3103.9.3 Tents and membrane structures exceeding an occupant capacity greater than 300 persons. Tents and membrane structures exceeding an occupant capacity greater than 300 persons shall be designed and constructed to comply with Sections 1606, 1607, 1608 and 1609 of the International Building Code.

Reason: This is the first proposal in a package of four Chapter 31 proposals submitted by the F-CAC to revise, update and reorganize Chapter 31. These four proposals are intended to improve the minimum level of safety relating to all types of temporary structures and outdoor public gatherings; improve the correlation of requirements in the IBC and IFC for temporary structures and better correlate the applicability of IBC structural requirements for all types of temporary tents, membrane structures and other outdoor structures.

These proposals have been prepared by a F-CAC Work Group comprised of code officials, industry representatives and other stakeholders. The Work Group analyzed several fatal events related to outdoor public gatherings and structural failures in the development of these new code requirements to improve the authority of code officials to ensure public safety and create a level playing field for the owners of tents, outdoor structures and the promoters of outdoor gatherings by providing a reasonable set of code requirements for these structures and events.

1. The Indiana State Fair stage collapse - August 13, 2011
2. Wood Dale Prairie Fest (Chicago area) – August 2, 2015

In coordination with changes to the IBC approved in the Group A cycle by proposal G213 (Modified by Public Comment 6), the existing structural requirements apply to multi-level temporary tents and membrane structures. This proposal correlates the IFC structural requirements with the IBC structural requirements for multi-level tents and membrane structures.
This proposal will add similar structural requirements for the design and installation of large tents and membrane structures based on the increase risk associated with these structures and illustrated by the above incidents causing injury or death. The intent is to require more stringent structural design and installation requirements for tents exceeding 4000 square feet or being occupied by 300 or more persons.

Specifically, this proposal:

Clarifies the current language requiring structural stability for all types of temporary tents and membrane structures; clarifies requirements for anchorage and structural stability by deleting the ambiguous requirement for tents and membrane structures to be “adequately” roped, braced and anchored and instead requires design and installation that withstand the elements of weather and collapse.

Provides correlation with Section 3103.5 of the IBC as modified by G213 Public Comment 6 in the last cycle. By specifying specific sections of IBC Chapter 16 for structural design, the code user is directed specifically to the requirements for dead loads, live loads, snow loads and wind loads. This will eliminate confusion as to which structural requirements are applicable to these temporary structures.

Consistent with existing requirements for multi-level tents and membrane structures, this proposal will add a requirement for compliance with IBC structural requirements located in Chapter 16 for other tents based on risk as determined by size or occupant load.

Existing requirements cover tents and membrane structures exceeding one story - these tents require adequate structural engineering and site inspection to ensure the upper-level is properly designed and installed to prevent collapse.

Tents and membrane structures exceeding 4,000 square feet. The F-CAC and industry Work Group felt that a 40 X 100 square foot tent would typically have the required engineering documents as provided by the tent manufacturer and was of a size that posed a safety risk that warrants structural design, construction, installation and inspection. The Work Group choose this size as the best compromise for ensuring public safety while not creating an unnecessary burden for tent installers or code officials with engineering analysis and site inspection for smaller tents that pose a lower risk of injury in the event of collapse.

Tents and membrane structures exceeding an occupant load of 300 persons. The F-CAC and industry Work Group considered a threshold involving occupant load as well as tent size and determined that tents and membrane structures exceeding an occupant capacity greater than 300 persons (typically the threshold for various fire and life safety requirements for Assembly Occupancies required for permanent buildings) to be appropriate based on the collapse risk to occupants that warrants structural design, construction, installation and inspection. These tents could be smaller than 4000 square feet if occupants were seated or standing and the risk to 300 or more persons was justification for this threshold in addition to a threshold requirement based solely on the size of the tent or membrane structure.

The F-CAC and industry Work Group felt that a tent large enough to be occupied by 300 people would typically have the required engineering documents as provided by the tent manufacturer and was of a size that posed a risk that warrants structural review and construction.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire safety and hazardous materials in new and existing buildings and facilities and the protection of life and property in wildland urban interface areas. In 2014 and 2015 the Fire-CAC has held 5 open meetings. In addition, there were numerous conference calls, Regional Work Group and Task Group meetings for the current code development cycle, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC

Cost Impact: Will increase the cost of construction
The new structural engineering and design requirements may add to the cost of erecting large tents.
2015 International Fire Code

3103.6 Construction documents. A detailed site and floor plan for tents or membrane structures with an occupant load of 50 or more shall be provided with each application for approval. The tent or membrane structure floor plan shall indicate details of the means of egress facilities, seating capacity, arrangement of the seating and location and type of heating, cooking and electrical equipment. Construction documents shall include analysis and anchorage as required in Section 3103.9.

3103.9 Anchorage and Structural Analysis required. Tents or membrane structures and their appurtenances shall be adequately roped, braced and anchored to withstand the elements of weather and prevent against collapsing. Documentation of structural stability—The owner, agent or installer shall furnish to the fire code official on request documentation of anchorage plan and structural stability as follows:

1. For an occupant load less than 50 occupants or an area not greater than 800 square feet (75 m²); anchorage shall be in accordance with the manufacturer's anchorage requirements. Where no manufacturer's anchorage requirements are available an anchorage plan with a minimum of 10 lbs per square foot distributed between all anchor points shall be provided.

2. For an occupant load from 50 to 299 occupants or an area not exceeding 5,000 square feet (464.5 m²) an anchorage and structural analysis plan shall be provided by the manufacturer's or registered design professional with certification for a minimum wind load of 45 MPH (72.4 KPH).

3. For an occupant load from 300 to 999 occupants or an area not exceeding 15,000 square feet (1,393.5 m²) an anchorage and structural analysis plan shall be provided by the manufacturer or registered design professional with a certification for a minimum wind using International Building Code Sections 1606, 1607, 1608 and 1609 or ASCE 7.

4. For an occupant load greater than 1,000 occupants and an area greater than 15,000 square feet (1,393.5 m²):
   4.1. Anchorage and structural analysis plan reviewed by a registered design professional with a certification for compliance with Sections 1606, 1607, 1608 and 1609 of the International Building Code or ASCE 7 for site specific exposure.
   4.2. Manufacturer or registered design professional shall provide a site specific anchorage plan for the installation to meet the requirements of 3103.9-4.

Exception: Ice and snow loads shall be permitted to be omitted for use periods that do not coincide with these environmental condition.

3103.9.1 Tents and membrane structures exceeding one story. Tents and membrane structures exceeding one story shall be designed and constructed to comply with Chapter 16, Section 1606, 1607, 1608 and 1609 of the International Building Code.
**Reason:** Because of a number of tent accidents in the last several years more needs to be done to insure proper installation. Most time the fire code official is the only authority that inspects the installation. Proposed changes will increase the requirements for structural and anchorage and give those in charge of the event need information in order to evacuate if necessary. Most smaller tents, with small occupancy and equal to or less that 800 sqft, although normally not ASCE 7 or IBC 1609 compliant, fair well in windy conditions and are easily evacuated with short inherent travel distance. However occupancy from 300 - 1,000, more is needed to be done without onerous regulation and requirements.

The addition of an anchorage plan provided by the owner, agent or installer for occupancy under 1,000 to demonstrate compliance with the manufacturer or engineer's requirements for an tent installed is a new requirement. Industrial Fabrics Association International - Tent Rental Division (IFAI-TRD) commissioned a study for staking and ballasting tents. The staking information is been widely available for many years and has been adopted by some jurisdictions. The results of the ballast study were more complex and have been made available to IFAI-TRD members as a tool on the association's web site. With information provided by a manufacturer or engineer a owner, agent or installer can create a generic installation plan for a tent based on soils for staking or surfaces for ballasting.

There are currently available tents that do comply with ASCE 7 and IBC 1609 starting at 30 feet in width and greater. However, the type of tent; pole, frame and clearspan, must be installed properly or they can pose a greater risk than non-rated tents or the same size. Using non-rate tents for larger occupancy poses additional risks as well, since under wind loads they will not provide time to evacuate once wind in the range of 40-60 MPH is present.

By increasing the requirements based on occupancy/size and reserving the most requirements for the largest occupancy manages risk as needed without placing the same regulations on every event, even the smallest, where the increased regulation will do little to improve occupant safety.


**Cost Impact:** Will increase the cost of construction

For smaller event there should be no cost increase. For mid range event, equipment changes to wind engineered will increase capital, installation costs and some documentation and operational cost. For many large events rated equipment and required documentation have already been required so very low cost impact for those events.


**2015 International Fire Code**

3103.7 Inspections. The entire tent

Tents, air-supported, air-inflated or tensioned membrane structure system shall be inspected at regular intervals, but not less than two times per permit exceeding once for every 30 day use period, by the permittee, owner or agent to determine that the installation is maintained in accordance with this chapter.

**Exception:** Permit use periods of less than 30 days.

Where required after a severe weather event, the anchorage and structural stability shall be inspected prior to occupancy for an event.

**Exception:** Permit use periods of less than 30 days.

3103.7.1 Inspection Results Deficiencies and unsafe conditions found during an inspection that require remediation shall be reported to the fire code official and corrected before the structure is used or occupied.

3103.7.2 Third Party Inspector The inspection required by Section 3103.7 shall be conducted by the fire code official or where approved by a third party inspector.

3103.7.1 3103.7.3 Inspection report. Where required by the fire code official, an inspection report shall be provided and shall consist of, but not limited to, maintenance, anchors and fabric inspections.

**Reason:** Section 3103.7 is ambiguous with regard to timing for additional inspection. A temporary tent could be installed for 179 days and previously only require 2 inspections, after the initial 30 days, during 149 day period, this proposal creates a minimum requirement of 1 inspection in every additional 30 day period beyond the first 30 days. Therefore a tent installed for 179 days would require 5 inspections, 3 more than before and spaced out during the installation period.

The last sentence was added to suggest inspections after any severe weather event. That inspection would satisfy any required 30 day period.

Section 3103.7.1 is renumber to 3103.7.3 to allow for additional sections to determine who and how of Inspection report is determined.

Section 3103.7.1 is substituted for the original text to define what required reporting to the fire code official

Section 3103.7.2 adds allowance for third party inspection. The fire code official must approve of the inspector. This method is consistence with inspections allowed for vocations like plumbing and electrical. Since there is no license or certification to qualify an inspector; the fire code official must approve the third party inspector.

**Cost Impact:** Will increase the cost of construction

Limited to additional required inspection and/or hiring of a third party inspector. Repairs are a necessary operational cost for safe operation and not a additional cost to construction.
F303-16
IFC: 3104.2.

Proponent: Marcelo Hirschler, representing GBH International (gbhint@aol.com)

2015 International Fire Code

Revise as follows:

3104.2 Flame propagation performance treatment. Before a permit is granted, the owner or agent shall file with the fire code official a certificate executed by an approved testing laboratory certifying that the tents and membrane structures and their appurtenances; sidewalls, drops and tarpaulins; floor coverings, bunting and combustible decorative materials and effects, including sawdust where used on floors or passageways, are composed of material meeting the flame propagation performance criteria of Test Method 1 or Test Method 2, as appropriate, of NFPA 701 or shall be treated with a flame retardant in an approved manner and meet the flame propagation performance criteria of Test Method 1 or Test Method 2, as appropriate, of NFPA 701, and that such flame propagation performance criteria are effective for the period specified by the permit.

Reason: The scope and applicability of NFPA 701 explains that tent fabrics shall be tested using Test Method 2. In fact the information is both in 1.1.2.1 and in 1.1.2.4. Information about the text follows.

NFPA 701 discusses Test Method 2 in 1.1.2.1 and it says that it shall apply to the following:

1. Decorative materials other than fabrics meeting the requirements discussed for Test Method 1
2. Fabrics, including multilayered fabrics, films, and plastic blinds, with or without reinforcement or backing, with areal densities greater than 700 g/m² (21 oz/yd²)
4. Plastic films
5. Fabrics, with or without reinforcement or backing, used for decorative or other purposes inside a building or as temporary or permanent enclosures for buildings under construction
6. Fabrics used in the assembly of awnings, tents, tarps, membrane structures or banners.

NFPA 1124 says that: Test Method 2 shall apply to fabrics used in the assembly of awnings, tents, tarps, and similar architectural fabric structures and banners.

Cost Impact: Will not increase the cost of construction

This clarifies the appropriate test, in accordance with NFPA 701.
2015 International Fire Code

3104.2 Flame propagation performance treatment. Before a permit is granted, the owner, agent or installer shall file with the fire code official a certificate executed by an approved testing laboratory certifying that, the tents and tent or membrane structures, structure and their appurtenances; sidewalls, drops and tarpaulins; floor coverings, bunting and combustible decorative materials and effects, including sawdust where used on floors or passageways, are composed of material—fabric or materials, or treated in an approved manner, meeting the flame propagation performance criteria of Test Method 1 or Test Method 2, as appropriate, of NFPA 701 or shall be treated with a flame retardant in an approved manner and meet the flame propagation performance criteria of Test Method 1 or Test Method 2 standard, such as appropriate, of NFPA 701, and that such flame propagation performance criteria are effective for the period specified by the permit.

3104.3 Label. Membrane Tents, membrane structures or tents, sidewalls, drops, drapes and other installed decorative materials shall have a permanently affixed label bearing the identification of size and fabric or material type as follows:

1. For tents, membrane structures, sidewalls, drops etc. a minimum of one label per section. The label shall display the required information with a minimum text size readable from a distance of 7 feet.
2. For decorative materials, such as drapes, liners etc. a label sufficient in size with a minimum typeface of 14 pica that is available for inspection but not required to be visible during occupancy.
3. Labels shall contain the information as required in Section 3104.4 for certification with the exception of the name of the owners of the structure.

3104.4 Certification. An affidavit or affirmation shall be submitted to the fire code official and for installations over 30 days a copy retained on the premises on which the tent, membrane or air-supported structure is located. The affidavit shall attest to all of the following information relative to the flame propagation performance criteria of the fabric or materials:

1. Names. For tents and membrane structures where the fabric or material requires application of the owners of the tent or air-supported structure, a flame retardant:
   1.1. Names, address and contact information of the owners of the structure.
   1.2. The type or trade name of the flame retardant used.
   1.3. The date of application and expiration of the application.
   1.4. The company or agency that applied the flame retardant.
2. Date. For tents and membrane structures where the fabric was last treated with flame-retardant solution, or material is inherently flame retardant:
   2.1. Names, address of the owners of the structure.
   2.2. The manufacturer of the fabric or material.
   2.3. The standard, such as NFPA 701, the fabric or material was tested.
   2.4. The date the tent or membrane structure was manufactured.
3. **Trade name** For decorative or kind of chemical combustible materials used in treatment, a tent or membrane structure certification from the manufacturer or agency treating the materials:
   
   3.1. Identify the manufacture or the agency that treated the materials.
   3.2. The type or trade name of the flame retardant.
   3.3. The date of manufacture or treatment.
   3.4. The date of expiration of the treatment if applicable.

4. **Name of person or firm treating the material.**

5. **Name of testing agency and test standard by which the fabric was tested.**

**Reason:** Proposed changes to these three sections modernize them based on current available products and technology. The original language was based on the Barnum Circus fire where the tent was made of canvas and waterproofed with a paraffin based product which contributed to the disaster. Most tents and membrane structures are currently manufactured with inherently flame retardant fabric and materials. Many of the larger tents that are wind rated to IBC 1609 and/or ASCE 7 are more costly than similar size, non-rated tents. Removal of sections for field testing, as was done with canvas fabrics, would compromises structural integrity and would deprecate the value.

3104.2 Flame Propagation: There are a number of standards that may be used to certify fabric and/or materials being used. Restricting flame propagation to only NFPA 701 Tent method 1 and/or 2 is therefore limiting. In addition, possible future updating of other standards, such as ASTM E84, could hamper use of superior test methods and require code change to allow for them. Jurisdiction may adopt the test method they choose are appropriate. California has its own standard and ASTM has a number of different test standards that can be applied. This change records the standard used for testing and allow the code official to determine whether it is appropriate for their jurisdiction.

3104.3 Label: The change clarifies the need and size of labels and type face. Many manufacturers currently use ANSI Z535.4-07 normally this creates a label about 6” x 9” in size which is affixed to the tent or sidewall. Other decorative items, such as drape or tent liners, a visible label would be objected to by the end user, such as at a wedding, therefore having a label that can verify the flame certification but not be visible during occupancy does not increase any safety hazard.

3104.4 Certification: The rewrite of 3104.2 - 3104.4 simplifies, modernizes and harmonizes the requirements in these related sections. Separation of treated and inherently flame retardant fabric and materials for testing and label with what is required to be certified.

**Cost Impact:** Will increase the cost of construction

Minor increase in cost for labeling and certification, mostly for record keeping. Fabric manufactures might decided to test material with multiple tests, depending on jurisdiction and/or national or international distribution and therefore increased cost for additional testing.

F304-16 : 3104.2-MARCEL11543
2015 International Fire Code

3104.12 Portable fire extinguishers. Portable fire extinguishers shall be located within 6’ of each exit and be readily accessible. Additional fire extinguishers shall be provided as required by Section 906. The minimum required extinguisher shall be 2A-20B:C.

Reason: This change would clarify requirements to the special event industry as to how many and location of fire extinguishers in tents. The 75 foot rule is not well understood by non-code officials. The required number of exits in Table 3103.12.2 would generally increase the number of required extinguishers required and make consistent their location and by default place extinguishers at 75’ most of the time. Further it locates the extinguisher at egress so any individual fighting a fire can retreat to the exit they acquired the extinguisher from. Lastly stating the minimum required type and “size” of extinguishers also end confusion.

Cost Impact: Will increase the cost of construction
Minor increase in cost based on additional required extinguishers.
IFC: 3104.16, 3104.16.1, 3104.16.2, 3104.16.2.1, 3104.16.2.2, 3104.16.3, 3104.16.4 (New).

Proponent: Bruce Swiecicki, representing National Propane Gas Association (bswiecicki@npga.org)

2015 International Fire Code

3104.16 LP-gas. The storage, handling and use of LP-gas and LP-gas equipment shall be in accordance with Sections 3104.16.1 through 3104.16.3.

Revise as follows:

3104.16.1 General. LP-gas equipment such as containers, tanks, piping, hoses, fittings, valves, tubing and other related components shall be approved and in accordance with Chapter 61 and with the International Fuel Gas Code.

3104.16.2 Location of containers. LP-gas containers and tanks shall be located outside in accordance with Table 6104.3. Safety release relief valves shall be pointed away from the tent or membrane structure.

Delete without substitution:

3104.16.2.1 Containers 500 gallons or less. Portable LP-gas containers with a capacity of 500 gallons (1893 L) or less shall have a minimum separation between the container and structure not less than 10 feet (3048 mm).

3104.16.2.2 Containers more than 500 gallons. Portable LP-gas containers with a capacity of more than 500 gallons (1893 L) shall have a minimum separation between the container and structures not less than 25 feet (7620 mm).

Revise as follows:

3104.16.3 Protection and security. Portable LP-gas containers, tanks, piping, valves and fittings that are located outside and are being used to fuel equipment inside a tent or membrane structure shall be adequately protected to prevent tampering, damage by vehicles or other hazards and shall be located in an approved location. Portable LP-gas containers shall be securely fastened in place to prevent unauthorized movement.

3104.16.4 Support for Containers and Tanks. Portable LP-gas containers and tanks of 1000 lb. water capacity or less shall be installed above ground on a firm foundation or otherwise secured and not in contact with the soil.

Reason: This proposal incorporates "tanks" into the section because by the definitions in Chapter 2, the term "containers" is only valid up to 60 gallons and propane containers, including cylinders, can easily exceed that volume.

Changes to section 3104.16.2 are made to reference existing requirements in Chapter 61 of the standard. Table 6104.3 provides essentially the same information as that provided in the deleted subsections, with one exception that would permit a single tank up to 1,200 gallons being placed not less than 10 feet of the membrane structure. Even so, this installation would be consistent with what is permitted by NFPA 58 and which has shown to perform well over many decades of use.

Deleting Sections 3104.16.2.1 and 3104.16.2.2 is necessary because the appropriate separation requirements are already contained in Chapter 61, Table 6104.3. There is no technical reason to treat a fabric tent any different than a conventional structure from the standpoint of fire safety.

In addition, proposed revisions to section 3104.16.3 were made with respect to securing containers. Containers
and tanks less than 1000 lb. water capacity will be required to be set on a firm foundation or otherwise secured. Containers and tanks greater than 1000 pounds water capacity require no additional consideration. The reason for this threshold is that tanks greater than 1000 pounds water capacity are horizontal containers with a low center of gravity making it much more difficult to tip the container. In addition, the sheer weight of containers of that size is enough to discourage unauthorized movement.

**Cost Impact:** Will not increase the cost of construction
This proposal will not increase the cost of construction and in fact may actually **DECREASE** the cost of construction because it would open up more options to install LP-gas containers at the site of the tent or membrane structure. It also would allow containers to be installed without having to "securely fasten" them in place, which also **DECREASES** the cost of construction.
F307-16
IFC: 3105.1, 3105.4.

Proponent: Michael O’Brian representing the Fire Code Action Committee (FCAC@icc safe.org)

2015 International Fire Code

3105.1 General. Temporary stage canopies shall comply with Section 3104, Sections 3105.2 through 3105.8 and ANSI_E1.21.

Revise as follows:

3105.4 Use period. Temporary stage canopies erected in accordance with ANSI E1.21 shall not be erected for a period of more than 45 days six consecutive weeks.

Reason: This proposal corrects the reference for E1.21 to a ESTA standard that was approved as an ANSI consensus standard and correlates this time period with language contained in ANSI_E1.21. "Six weeks" is consistent with the scope of ANSI E1.21 and the definition of “temporary” as used in this standard. Six weeks does not materially alter the current requirement of 45 days.

It is the intent of the proponent for this proposal to change the term "temporary stage canopies" to special event structures" through a separately submitted code change proposal.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire safety and hazardous materials in new and existing buildings and facilities and the protection of life and property in wildland urban interface areas. In 2014 and 2015 the Fire-CAC has held 5 open meetings. In addition, there were numerous conference calls, Regional Work Group and Task Group meetings for the current code development cycle, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC

Cost Impact: Will not increase the cost of construction

This code change simply correlates the time frame for temporary stage canopies with the language in the ANSI E1.21 standard referenced in this code.
Proponent: Michael O’Brian representing the Fire Code Action Committee (FCAC@iccsafe.org)

2015 International Fire Code

Revise as follows:

105.6.45 Temporary membrane structures and tents. An operational permit is required to operate an air-supported temporary membrane structure, a temporary stage canopy special event structure or a tent having an area in excess of 400 square feet (37 m²).

Exceptions:

1. Tents used exclusively for recreational camping purposes.
2. Tents open on all sides, which comply with all of the following:
   2.1. Individual tents having a maximum size of 700 square feet (65 m²).
   2.2. The aggregate area of multiple tents placed side by side without a fire break clearance of not less than 12 feet (3658 mm) shall not exceed 700 square feet (65 m²) total.
   2.3. A minimum clearance of 12 feet (3658 mm) to structures and other tents shall be provided.

Add new text as follows:

105.7.16 Special event structure A single construction permit is required to erect and take down a temporary special event structure.

Add new definition as follows:

SECTION 202 DEFINITIONS

TEMPORARY SPECIAL EVENT STRUCTURE Any temporary ground supported structure, platform, stage, stage scaffolding or rigging, canopy, tower supporting audio or visual effects equipment or similar structures not regulated within the scope of the International Building Code.

Revise as follows:

CHAPTER 31 TENTS, TEMPORARY SPECIAL EVENT STRUCTURES AND OTHER MEMBRANE STRUCTURES

3101.1 Scope. Tents, temporary stage canopies, temporary special event structures and membrane structures shall comply with this chapter. The provisions of Section 3103 are applicable only to temporary tents and membrane structures. The provisions of Section 3104 are applicable to temporary and permanent tents and membrane structures. The provisions of Section 3105 are applicable to temporary special event structures. Other temporary structures shall comply with the International Building Code.

3102.1 Definitions. The following terms are defined in Chapter 2:

   AIR-INFLATED STRUCTURE.
   AIR-SUPPORTED STRUCTURE.
   MEMBRANE STRUCTURE.
SECTION 3105 TEMPORARY STAGE-CANOPIES SPECIAL EVENT STRUCTURES

3105.1 General. Temporary stage canopies—special event structures shall comply with Section 3104, Sections 3105.2 through 3105.8 and ANSI E1.21.

3105.2 Approval. Temporary stage canopies—special event structures in excess of 400 square feet (37 m²) shall not be erected, operated or maintained for any purpose without first obtaining approval and a permit from the fire code official and the building official.

3105.3 Permits. Permits shall be required as set forth in Sections 105.6 and 105.7.

3105.4 Use period. Temporary stage canopies—special event structures shall not be erected for a period of more than 45 days.

3105.5 Required documents. The following documents shall be submitted to the fire code official and the building official for review before a permit is approved:

1. Construction documents: Construction documents shall be prepared by a registered design professional in accordance with the International Building Code by a registered design professional and ANSI E1.21 where applicable. Construction documents shall include:
   1.1. A summary sheet showing the building code used, design criteria, loads and support reactions.
   1.2. Detailed construction and installation drawings.
   1.3. Design calculations.
   1.4. Operating limits of the structure explicitly outlined by the registered design professional including environmental conditions and physical forces.
   1.5. Effects of additive elements such as video walls, supported scenery, audio equipment, vertical and horizontal coverings.
   1.6. Means for adequate stability including specific requirements for guying and cross-bracing, ground anchors or ballast for different ground conditions.

2. Designation of responsible party: The owner of the temporary stage canopy—special event structure shall designate in writing a person to have responsibility for the temporary stage canopy—special event structure on the site. The designated person shall have sufficient knowledge of the construction documents, manufacturer's recommendations and operations plan to make judgments regarding the structure's safety and to coordinate with the fire code official.

3. Operations plan: The operations plan shall reflect manufacturer's operational guidelines, procedures for environmental monitoring and actions to be taken under specified conditions consistent with the construction documents.

3105.6 Inspections. Inspections shall comply with Section 106 and Sections 3105.6.1 and 3105.6.2.

3105.6.1 Independent inspector. The owner of a temporary stage canopy—special event structure shall employ a qualified, independent approved agency or individual to inspect the installation of a temporary stage canopy—special event structure.
3105.6.2 Inspection report. The inspecting agency or individual shall furnish an inspection report to the fire code official. The inspection report shall indicate that the temporary stage canopy special event structure was inspected and was or was not installed in accordance with the approved construction documents. Discrepancies shall be brought to the immediate attention of the installer for correction. Where any discrepancy is not corrected, it shall be brought to the attention of the fire code official and the designated responsible party.

3105.7 Means of egress. The means of egress for temporary stage canopies special event structures shall comply with Chapter 10.

3105.8 Location. Temporary stage canopies special event structures shall be located a distance from property lines and buildings to accommodate distances indicated in the construction drawings for guy wires, cross-bracing, ground anchors or ballast. Location shall not interfere with egress from a building or encroach on fire apparatus access roads.

Add new text as follows:

3105.9 Portable fire extinguishers Portable fire extinguishers shall be provided as required by Section 906.

Reference standards type: This is an update to reference standard(s) already in the ICC Code Books

Add new standard(s) as follows:
ANSI E1.21-2013 Entertainment Technology - Temporary Structures Used for Technical Production of Outdoor Entertainment Events

Reason: This is the second proposal in a package of four Chapter 31 proposals submitted by the F-CAC to revise, update and reorganize Chapter 31. These four proposals are intended to improve the minimum level of safety relating to all types of temporary structures and outdoor public gatherings; improve the correlation of requirements in the IBC and IFC for temporary structures and better correlate the applicability of IBC structural requirements for all types of temporary tents, membrane structures and other outdoor structures.

These proposals have been prepared by a F-CAC Work Group comprised of code officials, industry representatives and other stakeholders. The Work Group analyzed several fatal events related to outdoor public gatherings and structural failures in the development of these new code requirements to improve the authority of code officials to ensure public safety and create a level playing field for the owners of tents, outdoor structures and the promoters of outdoor gatherings by providing a reasonable set of code requirements for these structures and events.

1. The Indiana State Fair stage collapse - August 13, 2011
2. Wood Dale Prairie Fest (Chicago area) – August 2, 2015

Specifically, this proposal:
1. Changes the title and scope of Section 3105 and replaces the term "temporary stage canopy" with "special event structure". This change in correlation with the proposed new definition for temporary special event structures is intended to expand the scope of Chapter 31 to include all structures related to temporary structures, typically used in outdoor situations.

2. Adds a definition for special event structure to the IFC.

3. Adds the requirement for a construction permit for all temporary special event structures

The effect of this change is to expand the scope of this section beyond strictly "temporary stage canopies" which currently excludes many types of temporary structures that should be regulated by this Chapter of the IFC. The change will ensure that structures covered by ANSI E1.21 will be structurally engineered. This change will ensure that all temporary structures not regulated by the IBC will be regulated by this chapter of the IFC. The addition of the construction permit requirement will ensure that all temporary special event structures will be subject to a plan review and site inspection to ensure structural stability and reliability for public safety. The permit will also cover the safe dismantling of these structures to ensure public and worker safety.
A requirement to provide an approved fire extinguisher was to ensure a minimum level of fire safety at or near all special event structures. This is consistent with the existing requirement in this chapter for providing fire extinguishers in tents and membrane structures. A portable fire extinguisher at each structure would decrease travel distance to obtain a portable fire extinguisher and would ensure availability to extinguish a fire in its incipient stage.

With these package of proposals submitted by the F-CAC, any temporary structure not regulated by the IBC would be covered by Chapter 31 of the IFC.

A new definition was added to describe "temporary special event structures" to be regulated by this section. This requirement will ensure that all outdoor structures are regulated by the IFC with the requirements for structural engineering or analysis that is necessary to prevent collapse of these structures.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire safety and hazardous materials in new and existing buildings and facilities and the protection of life and property in wildland urban interface areas. In 2014 and 2015 the Fire-CAC has held 5 open meetings. In addition, there were numerous conference calls, Regional Work Group and Task Group meetings for the current code development cycle, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC.

**Cost Impact:** Will not increase the cost of construction

This proposal only addresses temporary structures and therefore does not increase the cost of building construction.

**Analysis:** An update to ANSI E1.21-2013 Entertainment Technology - Temporary Structures Used for Technical Production of Outdoor Entertainment Events, is part of the existing standards update proposal, ADM94-16.
2015 International Fire Code
CHAPTER 31 TENTS AND OTHER MEMBRANE STRUCTURES
Revise as follows:

3101.1 Scope. Tents, temporary stage canopies and membrane structures shall comply with this chapter. The provisions of Section 3103 are applicable only to temporary tents and membrane structures. The provisions of Section 3104 and 3106 are applicable to temporary and permanent tents and membrane structures. Other temporary structures shall comply with the International Building Code.

3103.1 General. Tents and membrane structures used for temporary periods shall comply with this section and Section 3106. Other temporary structures erected for a period of 180 days or less shall comply with the International Building Code.

SECTION 3104 TEMPORARY AND PERMANENT TENTS AND MEMBRANE STRUCTURES
Add new text as follows:

3104.1 General. Tents and membrane structures, both temporary and permanent, shall be in accordance with this section and Section 3106. Permanent tents and membrane structures shall also comply with the International Building Code.

SECTION 3106 OPERATIONAL REQUIREMENTS

3106.1 General Temporary and permanent tents and membrane structures shall comply with this section.

Revise as follows:

3106.5 3106.2 Combustible materials. No change to text.
3106.6 3106.3 Smoking. No change to text.
3106.7 3106.4 Open or exposed flame. No change to text.
3106.8 3106.5 Fireworks. No change to text.
3106.9 3106.6 Spot lighting. No change to text.
3106.10 3106.7 Safety film. No change to text.
3106.11 3106.8 Clearance. No change to text.
3106.12 3106.9 Portable fire extinguishers. No change to text.
3106.13 3106.10 Fire protection equipment. No change to text.
3106.14 3106.11 Occupant load factors. No change to text.
3106.15 3106.12 Heating and cooking equipment. No change to text.
3104.15.1 3106.12.1 Installation. No change to text.
3104.15.2 3106.12.2 Venting. No change to text.
3104.15.3 3106.12.3 Location. No change to text.
3104.15.4 3106.12.4 Operations. No change to text.
3104.15.5 3106.12.5 Cooking tents. No change to text.
3104.15.6 3106.12.6 Outdoor cooking. No change to text.
3104.15.7 3106.12.7 Electrical heating and cooking equipment. No change to text.
3104.16 3106.13 LP-gas. No change to text.
3104.16.1 3106.13.1 General. No change to text.
3104.16.2 3106.13.2 Location of containers. No change to text.
3104.16.2.1 3106.13.2.1 Containers 500 gallons or less. No change to text.
3104.16.2.2 3106.13.2.2 Containers more than 500 gallons. No change to text.
3104.16.3 3106.13.3 Protection and security. No change to text.
3104.17 3106.14 Flammable and combustible liquids. No change to text.
3104.17.1 3106.14.1 Use. No change to text.
3104.17.2 3106.14.2 Flammable and combustible liquid storage. No change to text.
3104.17.3 3106.14.3 Refueling. No change to text.
3104.18 3106.15 Display of motor vehicles. No change to text.
3104.18.1 3106.15.1 Batteries. No change to text.
3104.18.2 3106.15.2 Fuel. No change to text.
3104.18.2.1 3106.15.2.1 Quantity limit. No change to text.
3104.18.2.2 3106.15.2.2 Inspection. No change to text.
3104.18.2.3 3106.15.2.3 Closure. No change to text.
3104.18.3 3106.15.3 Location. No change to text.
3104.18.4 3106.15.4 Places of assembly. No change to text.
3104.18.5 3106.15.5 Competitions and demonstrations. No change to text.
3104.18.5.1 3106.15.5.1 Fuel storage. No change to text.
3104.18.5.2 3106.15.5.2 Fueling. No change to text.
3104.18.5.3 3106.15.5.3 Spills. No change to text.
3104.19 3106.16 Separation of generators. No change to text.
3104.20 3106.17 Standby personnel. No change to text.
3104.20.1 3106.17.1 Duties. No change to text.

3104.20.2 3106.17.2 Crowd managers. No change to text.

3104.21 3106.18 Combustible vegetation. No change to text.

3104.22 3106.19 Combustible waste material. No change to text.

Reason: This is the forth proposal in a package of four Chapter 31 proposals submitted by the F-CAC to revise, update and reorganize Chapter 31. These proposals have been prepared by a F-CAC Work Group comprised of code officials, industry representatives and other stakeholders.
A straw man of the reorganized Chapter 31 based on approval of all four proposals is provided at the end of this reason statement to allow the IFC Committee and stakeholders to see the collective effect of what the F-CAC is trying to accomplish to enhance Chapter 31.

These four proposals are intended to improve the minimum level of safety relating to all types of temporary structures and outdoor public gatherings; improve the correlation of requirements in the IBC and IFC for temporary structures and better correlate the applicability of IBC structural requirements for all types of temporary tents, membrane structures and other outdoor structures.

Specifically, this proposal:

Separates the construction, flame propagation performance treatment, flame testing and labeling requirements from the operational requirements by placing operational requirements into a separate section of this chapter.
The purpose of relocating these requirements is to make this Chapter easier to understand and enforce. This change is editorial only; there are no new requirements being introduced.

Straw man of reorganized Chapter 31 based on approval of all four proposals in this package

TENTS, OTHER MEMBRANE STRUCTURES, TEMPORARY SPECIAL EVENT STRUCTURES AND OUTDOOR ASSEMBLY EVENTS

3101.1 Scope.
Tents, temporary special event structures and membrane structures shall comply with this chapter. The provisions of Section 3103 are applicable only to temporary tents and membrane structures. The provisions of Section 3104 are applicable to temporary and permanent tents and membrane structures. The provisions of Section 3105 are applicable to temporary special event structures. The provisions of Section 3106 are applicable to outdoor assembly events. Other temporary structures shall comply with the International Building Code.

3102.1 Definitions. The following terms are defined in Chapter 2:
AIR-INFLATED STRUCTURE.
AIR-SUPPORTED STRUCTURE.
MEMBRANE STRUCTURE.
OUTDOOR ASSEMBLY EVENT. An outdoor gathering of persons for purposes such as civic, social, or religious functions; recreation, entertainment, food or drink consumption or under which persons gather for any purpose.
TEMPORARY SPECIAL EVENT STRUCTURE. Any temporary ground supported structure, platform, stage, stage scaffolding or rigging, canopy, tower supporting audio or visual effects equipment or similar structures not regulated within the scope of the International Building Code or otherwise addressed in this Chapter.
TENT.
3103.1 General. Tents and membrane structures used for temporary periods shall comply with this section. Other temporary structures erected for a period of 180 days or less shall comply with the International Building Code.

3103.2 Approval required. Tents and membrane structures having an area in excess of 400 square feet (37 m²) shall not be erected, operated or maintained for any purpose without first obtaining a permit and approval from the fire code official.

Exceptions:
1. Tents used exclusively for recreational camping purposes.
2. Tents open on all sides that comply with all of the following:
   2.1. Individual tents having a maximum size of 700 square feet (65 m²).
   2.2. The aggregate area of multiple tents placed side by side without a fire break clearance of 12 feet (3658 mm), not exceeding 700 square feet (65 m²) total.
   2.3. A minimum clearance of 12 feet (3658 mm) to all structures and other tents.

3103.3 Outdoor assembly events. For the purposes of this chapter, an outdoor assembly event shall include a circus, carnival, tent show, theater, skating rink, dance hall or other place of assembly in or under which persons gather for any purpose.

3103.4 Permits. Permits shall be required as set forth in Sections 105.6 and 105.7.

3103.5 Use period. Temporary tents, air-supported, air-inflated or tensioned membrane structures shall not be erected for a period of more than 180 days within a 12-month period on a single premises.

3103.6 Construction documents. A detailed site and floor plan for tents or membrane structures with an occupant load of 50 or more shall be provided with each application for approval. The tent or membrane structure floor plan shall indicate details of the means of egress facilities, seating capacity, arrangement of the seating and location and type of heating and electrical equipment. The construction documents shall include an analysis of structural stability.

3103.7 Inspections. The entire tent, air-supported, air-inflated or tensioned membrane structure system shall be inspected at regular intervals, but not less than two times per permit use period, by the permittee, owner or agent to determine that the installation is maintained in accordance with this chapter.

Exception: Permit use periods of less than 30 days.

3103.7.1 Inspection report. Where required by the fire code official, an inspection report shall be provided and shall consist of maintenance, anchors and fabric inspections.

3103.8 Access, location and parking. Access, location and parking for temporary tents and membrane structures shall be in accordance with this section.

3103.8.1 Access. Fire apparatus access roads shall be provided in accordance with Section 503.

3103.8.2 Location. Tents or membrane structures shall not be located within 20 feet (6096 mm) of lot lines, buildings, other tents or membrane structures, parked vehicles or internal combustion engines. For the purpose of determining required distances, support ropes and guy wires shall be considered as part of the temporary membrane structure or tent.

Exceptions:
1. Separation distance between membrane structures and tents not used for cooking is not required where the aggregate floor area does not exceed 15,000 square feet (1394 m²).
2. Membrane structures or tents need not be separated from buildings when all of the following conditions are met:
   2.1. The aggregate floor area of the membrane structure or tent shall not exceed 10,000 square feet (929 m²).
   2.2. The aggregate floor area of the building and membrane structure or tent shall not exceed the allowable floor area including increases as indicated in the International Building Code.
2.3. Required means of egress are provided for both the building and the membrane structure or tent including travel distances.

2.4. Fire apparatus access roads are provided in accordance with Section 503.

3103.8.3 Location of structures in excess of 15,000 square feet in area. Membrane structures having an area of 15,000 square feet (1394 m²) or more shall be located not less than 50 feet (15 240 mm) from any other tent or structure as measured from the side wall of the tent or membrane structure unless joined together by a corridor.

3103.8.4 Membrane structures on buildings. Membrane structures that are erected on buildings, balconies, decks or other structures shall be regulated as permanent membrane structures in accordance with Section 3102 of the International Building Code.

3103.8.5 Connecting corridors. Tents or membrane structures are allowed to be joined together by means of corridors. Exit doors shall be provided at each end of such corridor. On each side of such corridor and approximately opposite each other, there shall be provided openings not less than 12 feet (3658 mm) wide.

3103.8.6 Fire break. An unobstructed fire break passage way or fire road not less than 12 feet (3658 mm) wide and free from guy ropes or other obstructions shall be maintained on all sides of all tents and membrane structures unless otherwise approved by the fire code official.

3103.9 Structural stability and anchorage required. Tents or membrane structures and their appurtenances shall be designed and installed to withstand the elements of weather and prevent against collapsing. Documentation of structural stability shall be furnished to the fire code official.

3103.9.1 Tents and membrane structures exceeding one story. Tents and membrane structures exceeding one story shall be designed and constructed in accordance with Sections 1606, 1607, 1608 and 1609 of the International Building Code.

3103.9.2 Tents and membrane structures exceeding 4,000 square feet. Tents and membrane structures exceeding 4,000 square feet shall be designed and constructed in accordance with Sections 1606, 1607, 1608 and 1609 of the International Building Code.

3103.9.3 Tents and membrane structures exceeding an occupant capacity greater than 300 persons. Tents and membrane structures exceeding an occupant capacity greater than 300 persons shall be designed and constructed in accordance with Sections 1606, 1607, 1608 and 1609 of the International Building Code.

3103.10 Temporary air-supported and air-inflated membrane structures. Temporary air-supported and air-inflated membrane structures shall be in accordance with Sections 3103.10.1 through 3103.10.4.

3103.10.1 Door operation. During high winds exceeding 50 miles per hour (22 m/s) or in snow conditions, the use of doors in air-supported structures shall be controlled to avoid excessive air loss. Doors shall not be left open.

3103.10.2 Fabric envelope design and construction. Air-supported and air-inflated structures shall have the design and construction of the fabric envelope and the method of anchoring in accordance with Architectural Fabric Structures Institute ASI 77.

3103.10.3 Blowers. An air-supported structure used as a place of assembly shall be furnished with not less than two blowers, each of which has adequate capacity to maintain full inflation pressure with normal leakage. The design of the blower shall be so as to provide integral limiting pressure at the design pressure specified by the manufacturer.

3103.10.4 Auxiliary inflation systems. Places of public assembly for more than 200 persons shall be furnished with an auxiliary inflation system capable of powering a blower with the capacity to maintain full inflation pressure with normal leakage in accordance with Section 3103.10.3 for a minimum duration of 4 hours. The auxiliary inflation system shall be either a fully automatic auxiliary engine-generator set or a supplementary blower powered by an internal combustion engine that shall be automatic in operation. The system shall be capable of automatically operating the required blowers at full power within 60 seconds of a commercial power failure.

3103.11 Seating arrangements. Seating in tents or membrane structures shall be in accordance with Chapter 10.

3103.12 Means of egress. Means of egress for temporary tents and membrane structures shall be in accordance with Sections 3103.12.1 through 3103.12.8.

3103.12.1 Distribution. Exits shall be spaced at approximately equal intervals around the perimeter of the tent or membrane structure, and shall be located such that all points are 100 feet (30 480 mm) or less from an exit.

3103.12.2 Number. Tents, or membrane structures or a usable portion thereof shall have not less than one exit and not less than the number of exits required by Table 3103.12.2. The total width of means of egress in inches
shall be not less than the total occupant load served by a means of egress multiplied by 0.2 inches (5 mm) per person.

**TABLE 3103.12.2**

**MINIMUM NUMBER OF MEANS OF EGRESS AND MEANS OF EGRESS WIDTHS FROM TEMPORARY MEMBRANE STRUCTURES AND TENTS**

<table>
<thead>
<tr>
<th>OCCUPANT LOAD</th>
<th>MINIMUM NUMBER OF MEANS OF EGRESS</th>
<th>MINIMUM WIDTH OF EACH MEANS OF EGRESS (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 to 199</td>
<td>2</td>
<td>Tent 72</td>
</tr>
<tr>
<td>200 to 499</td>
<td>3</td>
<td>Tent 72</td>
</tr>
<tr>
<td>599 to 999</td>
<td>4</td>
<td>Tent 96</td>
</tr>
<tr>
<td>1,000 to 1,999</td>
<td>5</td>
<td>Tent 120</td>
</tr>
<tr>
<td>2,000 to 2,999</td>
<td>6</td>
<td>Tent 120</td>
</tr>
<tr>
<td>Over 3,000\textsuperscript{a}</td>
<td>7</td>
<td>Tent 120</td>
</tr>
</tbody>
</table>

For SI: 1 inch = 25.4 mm.

1. When the occupant load exceeds 3,000, the total width of means of egress (in inches) shall be not less than the total occupant load multiplied by 0.2 inches per person.

**3103.12.3 Exit openings from tents.** Exit openings from tents shall remain open unless covered by a flame-resistant curtain. The curtain shall comply with the following requirements:

1. Curtains shall be free sliding on a metal support. The support shall be not less than 80 inches (2032 mm) above the floor level at the exit. The curtains shall be so arranged that, when open, no part of the curtain obstructs the exit.
2. Curtains shall be of a color, or colors, that contrasts with the color of the tent.

**3103.12.4 Doors.** Exit doors shall swing in the direction of exit travel. To avoid hazardous air and pressure loss in air-supported membrane structures, such doors shall be automatic closing against operating pressures. Opening force at the door edge shall not exceed 15 pounds (66 N).

**3103.12.5 Aisle.** The width of aisles without fixed seating shall be in accordance with the following:

1. In areas serving employees only, the minimum aisle width shall be 24 inches (610 mm) but not less than the width required by the number of employees served.
2. In public areas, smooth-surfaced, unobstructed aisles having a minimum width of not less than 44 inches (1118 mm) shall be provided from seating areas, and aisles shall be progressively increased in width to provide, at all points, not less than 1 foot (305 mm) of aisle width for each 50 persons served by such aisle at that point.

**3103.12.5.1 Arrangement and maintenance.** The arrangement of aisles shall be subject to approval by the fire code official and shall be maintained clear at all times during occupancy.

**3103.12.6 Exit signs.** Exits shall be clearly marked. Exit signs shall be installed at required exit doorways and where otherwise necessary to indicate clearly the direction of egress where the exit serves an occupant load of 50 or more.

**3103.12.6.1 Exit sign illumination.** Exit signs shall be either listed and labeled in accordance with UL 924 as the internally illuminated type and used in accordance with the listing or shall be externally illuminated by luminaires supplied in either of the following manners:

1. Two separate circuits, one of which shall be separate from all other circuits, for occupant loads of 300 or less.
2. Two separate sources of power, one of which shall be an approved emergency system, shall be provided where the occupant load exceeds 300. Emergency systems shall be supplied from storage batteries or from the on-site generator set, and the system shall be installed in accordance with NFPA 70. The emergency system provided shall have a minimum duration of 90 minutes when operated at full design demand.

3103.12.7 Means of egress illumination. Means of egress shall be illuminated with light having an intensity of not less than 1 footcandle (11 lux) at floor level while the structure is occupied. Fixtures required for means of egress illumination shall be supplied from a separate circuit or source of power.

3103.12.8 Maintenance of means of egress. The required width of exits, aisles and passageways shall be maintained at all times to a public way. Guy wires, guy ropes and other support members shall not cross a means of egress at a height of less than 8 feet (2438 mm). The surface of means of egress shall be maintained in an approved manner.

TEMPORARY AND PERMANENT TENTS
AND MEMBRANE STRUCTURES

3104.1 General. Tents and membrane structures, both temporary and permanent, shall be in accordance with this section and Section 3107. Permanent tents and membrane structures shall also comply with the International Building Code.

3104.2 Flame propagation performance treatment. Before a permit is granted, the owner or agent shall file with the fire code official a certificate executed by an approved testing laboratory certifying that the tents and membrane structures and their appurtenances; sidewalls, drops and tarpaulins; floor coverings, bunting and combustible decorative materials and effects, including saw dust where used on floors or passageways, are composed of material meeting the flame propagation performance criteria of Test Method 1 or Test Method 2, as appropriate, of NFPA 701 or shall be treated with a flame retardant in an approved manner and meet the flame propagation performance criteria of Test Method 1 or Test Method 2, as appropriate, of NFPA 701, and that such flame propagation performance criteria are effective for the period specified by the permit.

3104.3 Label. Membrane structures or tents shall have a permanently affixed label bearing the identification of size and fabric or material type.

3104.4 Certification. An affidavit or affirmation shall be submitted to the fire code official and a copy retained on the premises on which the tent or air-supported structure is located. The affidavit shall attest to all of the following information relative to the flame propagation performance criteria of the fabric:

1. Names and address of the owners of the tent or air-supported structure.
2. Date the fabric was last treated with flame-retardant solution.
3. Trade name or kind of chemical used in treatment.
4. Name of person or firm treating the material.
5. Name of testing agency and test standard by which the fabric was tested.

SECTION 3105
TEMPORARY SPECIAL EVENT STRUCTURES

3105.1 General. Temporary special event structures shall comply with Section 3104, Sections 3105.2 through 3105.8 and ANSI E1.21.

3105.2 Approval. Temporary special event structures in excess of 400 square feet shall not be erected, operated or maintained for any purpose without first obtaining approval and a construction permit from the fire code official and the building official.

3105.3 Permits. Permits shall be required as set forth in Sections 105.6 and 105.7.

3105.4 Use period. Temporary special event structures shall not be erected for a period of more than 45 days.
3105.5 **Required documents.** The following documents shall be submitted to the fire code official and the building official for review before a permit is approved:

1. **Construction documents:** Construction documents shall be prepared by a registered design professional in accordance with the International Building Code and ANSI E1.21, where applicable. Construction documents shall include:
   
   1.1. A summary sheet showing the building code used, design criteria, loads and support reactions.
   1.2. Detailed construction and installation drawings.
   1.3. Design calculations.
   1.4. Operating limits of the structure explicitly outlined by the registered design professional including environmental conditions and physical forces.
   1.5. Effects of additive elements such as video walls, supported scenery, audio equipment, vertical and horizontal coverings.
   1.6. Means for adequate stability including specific requirements for guying and cross-bracing, ground anchors or ballast for different ground conditions.

2. **Designation of responsible party:** The owner of the temporary special event structure shall designate in writing a person to have responsibility for the temporary special event structure on the site. The designated person shall have sufficient knowledge of the construction documents, manufacturer's recommendations and operations plan to make judgments regarding the structure's safety and to coordinate with the fire code official.

3. **Operations plan:** The operations plan shall reflect manufacturer's operational guidelines, procedures for environmental monitoring and actions to be taken under specified conditions consistent with the construction documents.

3105.6 **Inspections.** Inspections shall comply with Section 106 and Sections 3105.6.1 and 3105.6.2.

3105.6.1 **Independent inspector.** The owner of a temporary special event structure shall employ a qualified, independent approved agency or individual to inspect the installation of a temporary special event structure.

3105.6.2 **Inspection report.** The inspecting agency or individual shall furnish an inspection report to the fire code official. The inspection report shall indicate that the temporary special event structure was inspected and was or was not installed in accordance with the approved construction documents. Discrepancies shall be brought to the immediate attention of the installer for correction. Where any discrepancy is not corrected, it shall be brought to the attention of the fire code official and the designated responsible party.

3105.7 **Means of egress.** The means of egress for a temporary special event structure shall comply with Chapter 10.

3105.8 **Location.** Temporary special event structures shall be located a distance from property lines and buildings to accommodate distances indicated in the construction drawings for guy wires, cross-bracing, ground anchors or ballast. Location shall not interfere with egress from a building or encroach on fire apparatus access roads.

3105.9 **Portable fire extinguishers.** Portable fire extinguisher shall be provided as required by Section 906.

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**SECTION 3106**

**OUTDOOR ASSEMBLY EVENTS**

3106.1 **Scope.** All outdoor assembly events shall comply with this Section.

3106.2 **General.** Outdoor assembly events shall be in accordance with this Section and Section 403.12. Temporary structures erected for outdoor assembly events shall comply with this Chapter.

3106.2.1 **Approval required.** Outdoor assembly events shall be approved by the fire code official.

3106.2.2 **Permits.** An operational permit shall be required as set forth in Sections 105.6.

3106.2.3 **Access.** Fire apparatus access roads shall be provided in accordance with Section 503.
3106.2.3.1 Fire Service Features. Unobstructed access to fire hydrants, drafting sources and other fire protection features shall be maintained at all times.

3106.3 Occupancy and means of egress. The number and location of emergency egress and escape routes shall be approved by the fire code official.

3106.3.1 Occupant load. The fire code official shall establish an occupant load for the event site.

3106.3.2 Maintenance of emergency egress and escape routes. Emergency egress and escape routes shall be maintained at all times.

3106.4 Public Safety for Events. All outdoor assembly events shall comply with sections 3106.4.1 through 3106.4.7

3106.4.1 Public safety plan for gatherings. A public safety plan shall be prepared in accordance with section 403.12.2. The public safety plan shall be submitted for approval by the fire code official with the application for an operational permit as required by section 3106.2.2

Exception: Where the fire code official determines that the nature of the outdoor assembly event does not pose an increased hazard to public safety.

3106.4.2 Weather monitoring person. When required by the fire code official, the event operator or agent shall designate one qualified individual to continuously monitor local weather reports, forecasts and conditions. Said person will be responsible to order the suspension or cancellation of the outdoor assembly event and issue the evacuation signal in accordance with the approved all-hazard safety and evacuation plan.

3106.4.3 Crowd managers. Where events involve a gathering of more than 1,000 people, trained crowd managers shall be provided in accordance with Section 403.12.3.

3106.4.5 Fire Extinguishers. Fire extinguishers shall be provided in accordance with Section 906 and placed in locations approved by the fire code official.

3106.4.6 Smoking. Smoking shall be permitted only in designated areas. All other areas shall have approved "No Smoking" signs conspicuously posted and maintained in accordance with Section 310.

3106.4.7 Combustible vegetation. Combustible vegetation that could create a fire hazard shall be removed from the outdoor assembly event area.

3106.4.8 Combustible refuse. Combustible refuse shall be kept in noncombustible containers with tight-fitting or self-closing lids. Combustible refuse shall be removed from the event site at regular intervals to prevent an unsafe accumulation within the event site.

3106.5 Concession stands, food and merchandise booths. Outdoor assembly events with concession stands, food booths and merchandise booths shall comply with Sections 3106.5.1 and 3106.6.

3106.5.1 Separation distances. A minimum of 20 feet (6096 mm) shall be provided between every 150 linear feet (45,720 mm) of booth space. A minimum of 30 feet (9144 mm) shall be provided between booths used for cooking, display of vehicles or containing generators or any other internal combustion engines. A minimum of 30 feet (9144 mm) shall be provided between booths used for cooking and amusement rides or devices.

3106.6 Cooking appliances or devices. Outdoor assembly events with concession stands or booth using cooking appliances or devices shall comply with Sections 3106.6.1 through 3106.6.4.

3106.6.1 Public isolation. Cooking appliances or devices shall be isolated from the public by not less than 4 feet (1219 mm) or by a non-combustible 3-sided barrier between the equipment or devices and the public.

3106.6.2 Separation from tents or structures. Cooking appliances or devices that produces sparks or grease-laden vapors or flying embers (firebrands) shall not be performed within 20 feet (6096 mm) of a tent or temporary structure.

Exception:

1. Designated cooking tents not occupied by the public when approved by the fire code official
2. Tents or structures where cooking appliances are protected with an automatic fire extinguishing system in accordance with Section 904.12

3106.6.3 Protection. Single-well cooking equipment using combustible oils or solids shall meet the following:

1. A noncombustible lid shall be immediately available. The lid shall be of sufficient size to cover the cooking well completely.
2. The equipment shall be placed on a noncombustible surface.
3. An approved portable fire extinguisher for the protection of cooking grease fires shall be provided at a location approved by the fire code official.

3106.6.4 Liquefied petroleum gas (LP-gas). The use of liquefied petroleum gas (LP-gas) shall be in accordance with Chapter 61.

3106.7 Electrical equipment and wiring. Outdoor assembly events with concession stands or booths using electrical equipment and temporary wiring for electrical power or lighting shall comply with the applicable provisions of NFPA 70 and Sections 3106.7.1 through 3106.7.3.

3106.7.1 General. All electrical equipment and wiring shall be listed and labeled for outdoor use.

3106.7.2 Generators. Generators shall be installed at least 10 feet (3048 mm) from combustible materials, and shall be isolated from the public by physical guard, fence, or enclosure installed at least 3 feet (914 mm) away from the internal combustion power source.

3106.7.3 Fire Extinguishers. Each generator shall be provided with an approved portable fire extinguisher in accordance with Section 906.

3107.1 General. Temporary and permanent tents and membrane structures shall comply with this section.

Note: (relocated from Section 3104)

3107.2 Combustible materials. Hay, straw, shavings or similar combustible materials shall not be located within any tent or membrane structure containing an assembly occupancy, except the materials necessary for the daily feeding and care of animals. Sawdust and shavings utilized for a public performance or exhibit shall not be prohibited provided the sawdust and shavings are kept damp. Combustible materials shall not be permitted under stands or seats at any time.

3107.3 Smoking. Smoking shall not be permitted in tents or membrane structures. Approved “No Smoking” signs shall be conspicuously posted in accordance with Section 310.

3107.4 Open or exposed flame. Open flame or other devices emitting flame, fire or heat or any flammable or combustible liquids, gas, charcoal or other cooking device or any other unapproved devices shall not be permitted inside or located within 20 feet (6096 mm) of the tent or membrane structures while open to the public unless approved by the fire code official.

3107.5 Fireworks. Fireworks shall not be used within 100 feet (30480 mm) of tents or membrane structures.

3107.6 Spot lighting. Spot or effect lighting shall only be by electricity, and all combustible construction located within 6 feet (1829 mm) of such equipment shall be protected with approved noncombustible insulation not less than 91/4 inches (235 mm) thick.

3107.7 Safety film. Motion pictures shall not be displayed in tents or membrane structures unless the motion picture film is safety film.

3107.8 Clearance. There shall be a minimum clearance of at least 3 feet (914 mm) between the fabric envelope and all contents located inside membrane structures.

3107.9 Portable fire extinguishers. Approved portable fire extinguishers complying with Section 906 shall be provided at each exit and other locations as required by the fire code official.

3107.10 Fire protection equipment. Fire hose lines, water supplies and other auxiliary fire equipment shall be maintained at the site in such numbers and sizes as required by the fire code official.

3107.11 Occupant load factors. The occupant load allowed in an assembly structure, or portion thereof, shall be determined in accordance with Chapter 10.

3107.12 Heating and cooking equipment. Heating and cooking equipment shall be in accordance with Sections 3104.15.1 through 3104.15.7.

3107.12.1 Installation. Heating or cooking equipment, tanks, piping, hoses, fittings, valves, tubing and other related components shall be installed as specified in the International Mechanical Code and the International Fuel Gas
Code, and shall be approved by the fire code official.

3107.12.2 Venting. Gas, liquid and solid fuel-burning equipment designed to be vented shall be vented to the outside air as specified in the International Fuel Gas Code and the International Mechanical Code. Such vents shall be equipped with approved spark arresters where required. Where vents or flues are used, all portions of the tent or membrane structure shall be not less than 12 inches (305 mm) from the flue or vent.

3107.12.3 Location. Cooking and heating equipment shall not be located within 10 feet (3048 mm) of exits or combustible materials.

3107.12.4 Operations. Operations such as warming of foods, cooking demonstrations and similar operations that use solid flammables, butane or other similar devices that do not pose an ignition hazard, shall be approved.

3107.12.5 Cooking tents. Tents with sidewalls or drops where cooking is performed shall be separated from other tents or membrane structures by not less than 20 feet (6096 mm).

3107.12.6 Outdoor cooking. Outdoor cooking that produces sparks or grease-laden vapors shall not be performed within 20 feet (6096 mm) of a tent or membrane structure.

3107.12.7 Electrical heating and cooking equipment. Electrical cooking and heating equipment shall comply with NFPA 70.

3107.13 LP-gas. The storage, handling and use of LP-gas and LP-gas equipment shall be in accordance with Sections 3104.16.1 through 3104.16.3.

3107.13.1 General. LP-gas equipment such as tanks, piping, hoses, fittings, valves, tubing and other related components shall be approved and in accordance with Chapter 61 and with the International Fuel Gas Code.

3107.13.2 Location of containers. LP-gas containers shall be located outside. Safety release valves shall be pointed away from the tent or membrane structure.

3107.13.2.1 Containers 500 gallons or less. Portable LP-gas containers with a capacity of 500 gallons (1893 L) or less shall have a minimum separation between the container and structure not less than 10 feet (3048 mm).

3107.13.2.2 Containers more than 500 gallons. Portable LP-gas containers with a capacity of more than 500 gallons (1893 L) shall have a minimum separation between the container and structures not less than 25 feet (7620 mm).

3107.13.3 Protection and security. Portable LP-gas containers, piping, valves and fittings that are located outside and are being used to fuel equipment inside a tent or membrane structure shall be adequately protected to prevent tampering, damage by vehicles or other hazards and shall be located in an approved location. Portable LP-gas containers shall be securely fastened in place to prevent unauthorized movement.

3107.14 Flammable and combustible liquids. The storage of flammable and combustible liquids and the use of flammable-liquid-fueled equipment shall be in accordance with Sections 3104.17.1 through 3104.17.3.

3107.14.1 Use. Flammable-liquid-fueled equipment shall not be used in tents or membrane structures.

3107.14.2 Flammable and combustible liquid storage. Flammable and combustible liquids shall be stored outside in an approved manner not less than 50 feet (15 240 mm) from tents or membrane structures. Storage shall be in accordance with Chapter 57.

3107.14.3 Refueling. Refueling shall be performed in an approved location not less than 20 feet (6096 mm) from tents or membrane structures.

3107.15 Display of motor vehicles. Liquid- and gas-fueled vehicles and equipment used for display within tents or membrane structures shall be in accordance with Sections 3104.18.1 through 3104.18.5.3.

3107.15.1 Batteries. Batteries shall be disconnected in an appropriate manner.

3107.15.2 Fuel. Vehicles or equipment shall not be fueled or defueled within the tent or membrane structure.

3107.15.2.1 Quantity limit. Fuel in the fuel tank shall not exceed one-quarter of the tank capacity or 5 gallons (19 L), whichever is less.

3107.15.2.2 Inspection. Fuel systems shall be inspected for leaks.

3107.15.2.3 Closure. Fuel tank openings shall be locked and sealed to prevent the escape of vapors.

3107.15.3 Location. The location of vehicles or equipment shall not obstruct means of egress.

3107.15.4 Places of assembly. When a compressed natural gas (CNG) or liquefied petroleum gas (LP-gas) powered vehicle is parked inside a place of assembly, all the following conditions shall be met:
1. The quarter-turn shutoff valve or other shutoff valve on the outlet of the CNG or LP-gas container shall be closed and the engine shall be operated until it stops. Valves shall remain closed while the vehicle is indoors.

2. The hot lead of the battery shall be disconnected.

3. Dual-fuel vehicles equipped to operate on gasoline and CNG or LP-gas shall comply with this section and Sections 3104.18.1 through 3104.18.5.3 for gasoline-powered vehicles.

3107.15.5 Competitions and demonstrations. Liquid and gas-fueled vehicles and equipment used for competition or demonstration within a tent or membrane structure shall comply with Sections 3104.18.5.1 through 3104.18.5.3.

3107.15.5.1 Fuel storage. Fuel for vehicles or equipment shall be stored in approved containers in an approved location outside of the structure in accordance with Section 3104.17.2.

3107.15.5.2 Fueling. Refueling shall be performed outside of the structure in accordance with Section 3104.17.3.

3107.15.5.3 Spills. Fuel spills shall be cleaned up immediately.

3107.16 Separation of generators. Generators and other internal combustion power sources shall be separated from tents or membrane structures by not less than 20 feet (6096 mm) and shall be isolated from contact with the public by fencing, enclosure or other approved means.

3107.17 Standby personnel. Where, in the opinion of the fire code official, it is essential for public safety in a tent or membrane structure used as a place of assembly or any other use where people congregate, because of the number of persons, or the nature of the performance, exhibition, display, contest or activity, the owner, agent or lessee shall employ one or more qualified persons, as required and approved, to remain on duty during the times such places are open to the public, or when such activity is being conducted.

3107.17.1 Duties. Before each performance or the start of such activity, standby personnel shall keep diligent watch for fires during the time such place is open to the public or such activity is being conducted and take prompt measures for extinguishment of fires that occur and assist in the evacuation of the public from the structure.

3107.17.2 Crowd managers. There shall be trained crowd managers or crowd manager/supervisors at a ratio of one crowd manager/supervisor for every 250 occupants, as approved.

3107.18 Combustible vegetation. Combustible vegetation that could create a fire hazard shall be removed from the area occupied by a tent or membrane structure, and from areas within 30 feet (9144 mm) of such structures.

3107.19 Combustible waste material. The floor surface inside tents or membrane structures and the grounds outside and within a 30-foot (9144 mm) perimeter shall be kept free of combustible waste and other combustible materials that could create a fire hazard. Such waste shall be stored in approved containers and removed from the premises not less than once a day during the period the structure is occupied by the public.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire safety and hazardous materials in new and existing buildings and facilities and the protection of life and property in wildland urban interface areas. In 2014 and 2015 the Fire-CAC has held 5 open meetings. In addition, there were numerous conference calls, Regional Work Group and Task Group meetings for the current code development cycle, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC.

Cost Impact: Will not increase the cost of construction
This proposal is just a reorganization of existing requirements into a new section.
2015 International Fire Code

Add new text as follows:

105.6.36 Outdoor assembly event An operational permit is required to conduct an outdoor assembly event where planned attendance exceeds 1000 persons. Application for said permit shall be made no less than ten days prior to the planned start date of the event.

Add new definition as follows:

SECTION 202 OUTDOOR ASSEMBLY EVENT
An outdoor gathering of persons for purposes such as civic, social, or religious functions; recreation, entertainment, food or drink consumption or under which persons gather for any purpose.

Revise as follows:

CHAPTER 31 TENTS AND OTHER MEMBRANE STRUCTURES AND OUTDOOR ASSEMBLY EVENTS

3101.1 Scope. Tents, temporary stage canopies and membrane structures shall comply with this chapter. The provisions of Section 3103 are applicable only to temporary tents and membrane structures. The provisions of Section 3104 are applicable to temporary and permanent tents and membrane structures. The provisions of Section 3106 are applicable to outdoor assembly events. Other temporary structures shall comply with the International Building Code.

3103.3 Place of Outdoor assembly event. For the purposes of this chapter, a place of an outdoor assembly event shall include a circus, carnival, tent show, theater, skating rink, dance hall or other place of assembly in or under which persons gather for any purpose.

3104.1 General. Tents and membrane structures, both temporary and permanent, shall be in accordance with this section and Section 3106. Permanent tents and membrane structures shall also comply with the International Building Code.

3104.12 Portable fire extinguishers. Portable Approved portable fire extinguishers complying with Section 906 shall be provided at each exit and other locations as required by Section 906 the fire code official.

Add new text as follows:

SECTION 3106 OUTDOOR ASSEMBLY EVENTS

3106.1 Scope All outdoor assembly events shall comply with this Section.

3106.2 General Outdoor assembly events shall be in accordance with this Section and Section 403.12. Temporary structures erected for outdoor assembly events shall comply with this Chapter.

3106.2.1 Approval required. Outdoor assembly events shall be approved by the fire code official.
3106.2.2 Permits An operational permit shall be required as set forth in Section 105.6.

3106.2.3 Access Fire apparatus access roads shall be provided in accordance with Section 503.

3106.2.3.1 Fire service features Unobstructed access to fire hydrants, drafting sources and other fire protection features shall be maintained at all times.

3106.3 Occupancy and means of egress The number and location of emergency egress and escape routes shall be approved by the fire code official.

3106.3.1 Occupant load The fire code official shall establish an occupant load for the event site.

3106.3.2 Maintenance of emergency egress and escape routes. Emergency egress and escape routes shall be maintained at all times.

3106.4 Public safety for events All outdoor assembly events shall comply with Sections 3106.4.1 through 3106.4.7.

3106.4.1 Public safety plan for gatherings A public safety plan shall be prepared in accordance with section 403.12.2. The public safety plan shall be submitted for approval by the fire code official with the application for an operational permit as required by Section 3106.2.2.

Exception: Where the fire code official determines that the nature of the outdoor assembly event does not pose an increased hazard to public safety.

3106.4.2 Weather monitoring person Where required by the fire code official, the event operator or agent shall designate one qualified individual to continuously monitor local weather reports, forecasts and conditions. Said person will be responsible to order the suspension or cancellation of the outdoor assembly event and issue the evacuation signal in accordance with the approved all-hazard safety and evacuation plan.

3106.4.3 Crowd managers Where events involve a gathering of more than 1,000 people, trained crowd managers shall be provided in accordance with Section 403.12.3.

3106.4.4 Fire Extinguishers Fire extinguishers shall be provided in accordance with Section 906 and placed in locations approved by the fire code official.

3106.4.5 Smoking Smoking shall be permitted only in designated areas. All other areas shall have approved "No Smoking" signs conspicuously posted and maintained in accordance with Section 310.

3106.4.6 Combustible vegetation Combustible vegetation that could create a fire hazard shall be removed from the outdoor assembly event area.

3106.4.7 Combustible refuse Combustible refuse shall be kept in noncombustible containers with tight-fitting or self-closing lids. Combustible refuse shall be removed from the event site at regular intervals to prevent an unsafe accumulation within the event site.

3106.5 Cooking appliances or devices. Outdoor assembly events with concession stands or booths using cooking appliances or devices shall comply with Sections 3106.5.1 through 3106.5.4.

3106.5.1 Public isolation Cooking appliances or devices shall be isolated from the public by not less than 4 feet (1219 mm) or by a non-combustible 3-sided barrier between the cooking appliances or devices and the public.
3106.5.2 **Separation from tents or structures** Cooking appliances or devices that produces sparks or grease-laden vapors or flying embers (firebrands) shall not be performed within 20 feet (6096 mm) of a tent or temporary structure.

**Exceptions:**
1. Designated cooking tents not occupied by the public when approved by the fire code official
2. Tents or structures where cooking appliances are protected with an automatic fire extinguishing system in accordance with Section 904.12

3106.5.3 **Protection** Cooking equipment using combustible oils or solids shall meet the following:

1. A noncombustible lid shall be immediately available. The lid shall be of sufficient size to cover the cooking well completely.
2. The equipment shall be placed on a noncombustible surface.
3. An approved portable fire extinguisher for the protection of cooking grease fires shall be provided at a location approved by the fire code official.

3106.5.4 **Liquefied petroleum gas (LP-gas)** The use of liquefied petroleum gas (LP-gas) shall be in accordance with Chapter 61.

3106.6 **Electrical equipment and wiring** Outdoor assembly events with concession stands or booths using electrical equipment and temporary wiring for electrical power or lighting shall comply with the applicable provisions of NFPA 70 and Sections 3106.6.1 through 3106.6.3.

3106.6.1 **Outdoor use** All electrical equipment and wiring shall be listed and labeled for outdoor use.

3106.6.2 **Generators** Generators shall be installed at least 10 feet (3048 mm) from combustible materials, and shall be isolated from the public by physical guard, fence, or enclosure installed at least 3 feet (914 mm) away from the internal combustion power source.

3106.6.3 **Fire Extinguishers** Each generator shall be provided with an approved portable fire extinguisher in accordance with Section 906.

**Reason:** This is the third proposal in a package of four Chapter 31 proposals submitted by the F-CAC to revise, update and reorganize Chapter 31.

These four proposals are intended to improve the minimum level of safety relating to all types of temporary structures and outdoor public gatherings; improve the correlation of requirements in the IBC and IFC for temporary structures and better correlate the applicability of IBC structural requirements for all types of temporary tents, membrane structures and other outdoor structures.

These proposals have been prepared by a F-CAC Work Group comprised of code officials, industry representatives and other stakeholders. The Work Group analyzed several fatal events related to outdoor public gatherings and structural failures in the development of these new code requirements to improve the authority of code officials to ensure public safety and create a level playing field for the owners of tents, outdoor structures and the promoters of outdoor gatherings by providing a reasonable set of code requirements for these structures and events.

1. The Indiana State Fair stage collapse - August 13, 2011
2. Wood Dale Prairie Fest (Chicago area) – August 2, 2015

Specifically, this proposal:

1. Adds a new definition for "outdoor assembly event" which is needed to explain the types of outdoor gatherings intended to be regulated by the new Section 3106.
2. Adds a new requirement for an operational permit requirement to Chapter 1. This will give the fire code official the necessary authority to receive advanced plans and other required documentation to ensure the
public safety and fire code compliance for outdoor assembly events.

3. Adds a new section for requirements pertaining to outdoor assembly events. This new section is needed to add requirements that provide a minimum level of public and firefighter safety at outdoor events attended by more than 1,000 people. Current requirements in Chapter 31 address outdoor temporary structures that are typically part of outdoor gatherings, but there are no current IFC requirements that address outdoor public gatherings in a comprehensive fashion that evaluates all aspects of public safety. This new section adds the necessary public safety requirements needed for outside public gatherings and requires a public safety plan that correlates to the current emergency planning and preparedness requirements in Chapter 4 of the IFC.

Occupancy and means of egress - ensures that adequate provisions are in place for normal and emergency egress of attendees at special outdoor events.

Public safety for events - ensures that emergency planning involves all the necessary stakeholders (such as the fire code official, site owner, event promoter and other public safety officials) and address the appropriate level of public safety planning based on an all-hazards and all-discipline approach.

Concession stands, food and merchandise booths - ensures a minimum level of safety requirements for fire and public safety of all types and sizes of concession stands.

Cooking appliances or devices - ensures a minimum level safety of temporary cooking operations and appliances and the hazards associated with temporary cooking such as fire and LP-gas storage and use.

Electrical equipment and wiring - ensures a minimum level of safety for electrical equipment, wiring, generators and generator fuel storage.
This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire safety and hazardous materials in new and existing buildings and facilities and the protection of life and property in wildland urban interface areas. In 2014 and 2015 the Fire-CAC has held 5 open meetings. In addition, there were numerous conference calls, Regional Work Group and Task Group meetings for the current code development cycle, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC.
Cost Impact: Will increase the cost of construction
This code change proposal establishes minimum requirements for outdoor public assembly events and does not impact any construction requirements.
F311-16
IFC: 105.6.23, 105.7.11 (New), 3201.2.

Proponent: Michael O'Brian representing the Fire Code Action Committee (FCAC@iccsafe.org)

2015 International Fire Code

Revise as follows:

105.6.23 High-piled storage. An operational permit is required to use a building or portion thereof as a high-piled storage area exceeding with more than 500 square feet (46 m²), including aisles, of high-piled storage.

Add new text as follows:

105.7.11 High-piled combustible storage. A construction permit is required for installation of or modification to a structure exceeding 500 square feet (46 m²), including aisles, for high-piled combustible storage rack. Maintenance performed in accordance with this code is not considered to be a modification and does not require a construction permit.

Revise as follows:

3201.2 Permits. A permit shall be required as set forth in Section Sections 105.6 and 105.7.

Reason: The permit is intended to apply when the high-piled storage exceeds 500 square feet, not when the building exceeds 500 square feet. The current has been misinterpreted, therefore this minor change focuses the 500 square feet on the size of the high-piled storage area to eliminate the confusion and misapplication to the size of the building. This requirement is also clarified to state that the high-piled storage area includes the aisles. Also, a new permit is added for construction of high-piled storage areas.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire safety and hazardous materials in new and existing buildings and facilities and the protection of life and property in wildland urban interface areas. In 2014 and 2015 the Fire-CAC has held 5 open meetings. In addition, there were numerous conference calls, Regional Work Group and Task Group meetings for the current code development cycle, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC

Cost Impact: Will not increase the cost of construction
No additional construction requirements are included, but there may be a fee for an operating permit.
Proponent: Michael O'Brien representing the Fire Code Action Committee (FCAC@iccsafe.org)

2015 International Fire Code

Revise as follows:

3201.3 Construction documents. At the time of building permit application for new structures designed to accommodate high-piled storage or for requesting a change of occupancy/use, and at the time of application for a storage permit, plans and specifications shall be submitted for review and approval. In addition to the information required by the *International Building Code*, the storage permit submittal shall include the information specified in this section. Following approval of the plans, a copy of the approved plans shall be maintained on the premises in an approved location. The plans construction documents shall include all of the following:

1. Floor plan of the building showing locations and dimensions of high-piled storage areas.
2. Usable storage height for each storage area.
3. Number of tiers within each rack, if applicable.
4. Commodity clearance between top of storage and the sprinkler deflector for each storage arrangement.
5. Aisle dimensions between each storage array.
6. Maximum pile volume for each storage array.
7. Location and classification of commodities in accordance with Section 3203.
8. Location of commodities that are banded or encapsulated.
9. Location of required fire department access doors.
10. Type of fire suppression and fire detection systems.
11. Location of valves controlling the water supply of ceiling and in-rack sprinklers.
12. Type, location and specifications of smoke removal and curtain board systems.
14. Additional information regarding required design features, commodities, storage arrangement and fire protection features within the high-piled storage area shall be provided at the time of permit, when required by the fire code official.

Add new text as follows:

3201.3.1 Approved construction documents. Following approval of the construction documents, a copy of the approved plans shall be maintained on the premises in an approved location.

3201.3.2 Approved storage layout. A floor plan, of 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 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 in accordance with Section 3203.
8. Location of required fire department access doors.
9. Location of valves controlling the water supply of ceiling and in-rack sprinklers.

**Reason:** The revision in Section 3201.3 changes a word from plans to construction documents. Many of the items in the list are not always included on the plans, but are included in the associated construction documents. This revision provides a correct reference to the construction documents.

The sentence requiring the maintenance of the approved plans at the facility in Section 3201.3 is relocated to a new Section 3201.3.1. The approved construction documents are required to be on the site and new Section 3201.3.2 requires that a floor plan be mounted at the facility showing the storage configurations and commodity locations. The storage layout can be referred to during inspection of the facility. As the stored commodity changes and the operating permit is revised, the storage layout would also change.

A sample storage layout is shown below.

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**Cost Impact:** Will not increase the cost of construction
The plans are already required to be maintained at the facility. Mounting the storage layout will be an insignificant cost.
Add new text as follows:

**403.11.5 Buildings with high-piled storage.** An approved fire safety and evacuation plan in accordance with Section 404 shall be prepared for buildings with high-piled combustible storage in any of the following situations:

1. The high-piled storage area exceeds 500,000 square feet (46 450 m²) for Class I-IV commodities.
2. The high-piled storage area exceeds 300,000 square feet (27 870 m²) for high-hazard commodities.
3. The high-piled storage is located in a Group H occupancy.
4. The high-piled storage is located in a Group F occupancy with an occupant load of 500 or more persons or more than 100 persons above or below the lowest level of exit discharge.
5. The high-piled storage is located in a Group M occupancy with an occupant load of 500 or more persons or more than 100 persons above or below the lowest level of exit discharge.
6. Where required by the fire code official for other high-piled storage areas.

Revise as follows:

**3201.4 Evacuation Fire safety and evacuation plan.** Where required by the fire code official, Section 403, an approved fire safety and evacuation plan for public accessible areas and a separate set of plans indicating location and width of aisles, location of exits, exit access doors, exit signs, height of storage, and locations of hazardous materials shall be submitted at the time of permit application for review and approval. Following approval of the plans, a copy of the approved plans fire safety and evacuation plan shall be maintained on the premises in an approved location.

**Reason:** This proposal correlates the requirement for a fire safety and evacuation plan for high-piled storage with the current requirements in Section 403. There is no need to have conflicting requirements between Chapter 32 and Section 403. This proposal refers to Section 403 which already establishes the contents of the plan. Currently, the IBC requires the fire safety and evacuation plan to be submitted at the time of construction when such a plan is required by IFC Section 403. Therefore, the plan for high-piled storage areas will also fall into this requirement. The new Section 403.11.5 is added to list the criteria when a fire safety and evacuation plan is required. The thresholds for the 5 items were determined as follows:

1. In IFC Table 3206.2, high-piled storage areas of Class I-IV commodities over 300,000 square feet currently require additional fire protection measures. This becomes one of those measures.
2. In IFC Table 3206.2, high-piled storage areas of high-hazard commodities over 500,000 square feet currently require additional fire protection measures. This becomes one of those measures.
3. In Section 403.6, Group F occupancies are required to provide a fire safety and evacuation plan when the facility has an occupant load of 500 or more persons or more than 100 persons above or below the lowest level of exit discharge. When high-piled storage exists in these occupancies, the plan is already required.
4. In Section 403.9, Group M occupancies are required to provide a fire safety and evacuation plan when the facility has an occupant load of 500 or more persons or more than 100 persons above or below the lowest level of exit discharge. When high-piled storage exists in these occupancies, the plan is already required.
5. Section 3201.4 currently states “when required by the fire code official”. This statement is removed from Section 3201.4 and relocated to this new section as Item 5.

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Cost Impact: Will not increase the cost of construction
If evacuation plans were being required for smaller facilities, this eliminates that requirement and will therefore will reduce the cost of construction.

F313-16 : 3201.4-O'BRIAN10653
2015 International Fire Code

Revising as follows:

3203.1 Classification of commodities. Commodities shall be classified as Class I, II, III, IV or high hazard in accordance with this section Sections 3203.2 through 3203.10.3. Materials listed within each commodity classification are assumed to be unmodified for improved combustibility characteristics. Use of flame-retarding modifiers or the physical form of the material could change the classification. See Section 3203.7 for classification of Group A, B and C plastics.

3203.2 Class I commodities. Class I commodities are essentially noncombustible products on wooden pallets, in ordinary corrugated cartons with or without single-thickness dividers, or in ordinary paper wrappings with or without wood pallets. Class I commodities are allowed to contain a limited amount of Group A plastics shall be limited in accordance with Section 3203.7.4. Examples of Class I commodities include, but are not limited to, the following:
- Alcohol beverages not exceeding 20% alcohol
- Appliances noncombustible, electrical
- Cement in bags
- Ceramics
- Dairy products in nonwax coated containers (excluding bottles)
- Dry insecticides
- Foods in noncombustible containers
- Fresh fruits and vegetables in nonplastic trays or containers
- Frozen foods
- Glass
- Glycol in metal cans
- Gypsum board
- Inert materials, bagged
- Insulation, noncombustible
- Noncombustible liquids in plastic containers having less than a 5-gallon (19 L) capacity
- Noncombustible metal products

3203.3 Class II commodities. Class II commodities are Class I products in slatted wooden crates, solid wooden boxes, multiple-thickness paperboard cartons or equivalent combustible packaging material with or without wood pallets. Class II commodities are allowed to contain a limited amount of Group A plastics shall be limited in accordance with Section 3203.7.4. Examples of Class II commodities include, but are not limited to, the following:
- Alcohol beverages not exceeding 20 percent alcohol, in combustible containers
- Foods in combustible containers
- Incandescent or fluorescent light bulbs in cartons
- Thinly coated fine wire on reels or in cartons

3203.4 Class III commodities. Class III commodities are commodities of wood, paper, natural
fiber cloth, or Group C plastics or products thereof, with or without wood pallets. Products are allowed to contain limited amounts. The amount of Group A or B plastics, such as metal bicycles with plastic handles, pedals, seats and tires. Group A plastics shall be limited in accordance with Section 3203.7.4 3203.9. Examples of Class III commodities include, but are not limited to, the following:

- Aerosol, Level 1 (see Chapter 51)
- Biomass briquettes, bagged, and static piles
- Biomass pellets, bagged, and static piles
- Charcoal
- Combustible fiberboard
- Cork, baled
- Corn cobs, static-piles
- Corn stover, baled and chopped
- Feed, bagged
- Fertilizers, bagged
- Firewood
- Food in plastic containers
- Forest residue, round wood or chipped (branches, bark, cross cut ends, edgings and treetops)
- Furniture: wood, natural fiber, upholstered, nonplastic, wood or metal with plastic-padded and covered armrests
- Glycol in combustible containers not exceeding 25 percent
- Lubricating or hydraulic fluid in metal cans
- Lumber
- Mattresses, excluding foam rubber and foam plastics
- Noncombustible liquids in plastic containers having a capacity of more than 5 gallons (19 L)
- Paints, oil base, in metal cans
- Paper, waste, baled
- Paper and pulp, horizontal storage, or vertical storage that is banded or protected with approved wrap
- Paper in cardboard boxes
- Peanut hulls, bagged, and static piles
- Pillows, excluding foam rubber and foam plastics
- Plastic-coated paper food containers
- Plywood
- Rags, baled
- Recovered construction wood
- Rice hulls, bagged, and static piles
- Rugs, without foam backing
- Seasonal grasses, baled and chopped
- Straw, baled
- Sugar, bagged
- Wood, baled
- Wood chips, bagged, and static piles
- Woody biomass, round wood or chipped (vase shaped stubby bushes, bamboo, willows; branches, bark and stem wood)
- Wood doors, frames and cabinets
- Wood pellets, bagged, and static piles
- Yarns of natural fiber and viscose

3203.5 Class IV Commodities. Class IV commodities are Class I, II or III products containing Group A plastics in ordinary corrugated cartons and Class I, II and III products with Group A
3203.6 High-hazard commodities. High-hazard commodities are high-hazard products presenting special fire hazards beyond those of Class I, II, III or IV. Group A plastics not otherwise classified are included in this class. Examples of high-hazard commodities include, but are not limited to, the following:

- Aerosol, Level 3 (see Chapter 51)
- Alcoholic beverages, exceeding 80 percent alcohol, in bottles or cartons
- Commodities of any class in plastic containers in carousel storage
- Flammable solids (except solid combustible metals)
- Glycol in combustible containers (50 percent or greater)
- Lacquers that dry by solvent evaporation, in metal cans or cartons
- Lubricating or hydraulic fluid in plastic containers
- Mattresses, foam rubber or foam plastics
- Pallets and flats that are idle combustible
- Paper and pulp, rolled, in vertical storage that is unbanded or not protected with an approved wrap
- Paper, asphalt, rolled, horizontal storage
- Paper, asphalt, rolled, vertical storage
- Pillows, foam rubber and foam plastics
- Pyroxylin
- Rubber tires
- Vegetable oil and butter in plastic containers

3203.7 Classification of plastics. Plastics shall be designated as Group A, B or C in accordance with Sections 3203.7.1 through 3203.7.4 3203.7.3.

3203.7.1 Group A plastics. Group A plastics are plastic materials having a heat of combustion that is much higher than that of ordinary combustibles, and a burning rate higher than that of Group B plastics. Examples of Group A plastics include, but are not limited to, the following:

- ABS (acrylonitrile-butadiene-styrene copolymer)
- Acetal (polyformaldehyde)
- Acrylic (polymethyl methacrylate)
- Butyl rubber
- EPDM (ethylene-propylene rubber)
- FRP (fiberglass-reinforced polyester)
Natural rubber (expanded)
Nitrile rubber (acrylonitrile butadiene rubber)
PET or PETE (polyethylene terephthalate)
Polybutadiene
Polycarbonate
Polyester elastomer
Polyethylene
Polypropylene
Polystyrene (expanded and unexpanded)
Polyurethane (expanded and unexpanded)
PVC (polyvinyl chloride greater than 15-percent plasticized, e.g., coated fabric unsupported film)
SAN (styrene acrylonitrile)
SBR (styrene butadiene rubber)

3203.7.2 Group B plastics. Group B plastics are plastic materials having a heat of combustion and a burning rate higher than that of ordinary combustibles, but not as high as those of Group A plastics. Examples of Group B plastics include, but are not limited to, the following:
Cellulosics (cellulose acetate, cellulose acetate butyrate, ethyl cellulose)
Chloroprene rubber
Fluoroplastics (ECTFE, ethylene chlorotrifluoroethylene copolymer; ETFE, ethylene-tetrafluoroethylene copolymer; FEP, fluorinated ethylene-propylene copolymer)
Natural rubber (nonexpanded)
Nylon (Nylon 6, Nylon 6/6)
PVC (polyvinyl chloride greater than 5-percent, but not exceeding 15-percent plasticized)
Silicone rubber

3203.7.3 Group C plastics. Group C plastics are plastic materials having a heat of combustion and a burning rate similar to those of ordinary combustibles. Examples of Group C plastics include, but are not limited to, the following:
Fluoroplastics (PCTFE, polychlorotrifluoroethylene; PTFE, polytetrafluoroethylene)
Melamine (melamine formaldehyde)
Phenol
PVC (polyvinyl chloride, rigid or plasticized less than 5 percent, e.g., pipe, pipe fittings)
PVDC (polyvinylidene chloride)
PVDF (polyvinylidene fluoride)
PVF (polyvinyl fluoride)
Urea (urea formaldehyde)

Add new text as follows:

3203.8 Examples of commodity classification. Table 3203.8 shall be used to determine the commodity classification for various products and materials. Products not found in the list shall be classified based on the classification descriptions in Sections 3203.2 through 3203.6 and the products they most nearly represent in Table 3203.8. Table 3203.8 considers the product and the packaging if listed with the item. Products with additional packaging consisting of Group A plastics shall be classified in accordance with Section 3203.9.

The commodity classifications are based on products with, or without, wood pallets. Where plastic pallets are used, the commodity classification shall be modified in accordance with Section 3203.10.

<table>
<thead>
<tr>
<th>TABLE 3203.8</th>
<th>EXAMPLES OF COMMODITY CLASSIFICATION</th>
</tr>
</thead>
</table>

ICC COMMITTEE ACTION HEARINGS ::: April, 2016

F646
<table>
<thead>
<tr>
<th>PRODUCT CATEGORY</th>
<th>PRODUCT</th>
<th>CLASSIFICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aerosols</td>
<td>Aerosol; Level 1</td>
<td>Class III (See Chapter 51)</td>
</tr>
<tr>
<td></td>
<td>Aerosol; Level 2</td>
<td>Class IV (See Chapter 51)</td>
</tr>
<tr>
<td></td>
<td>Aerosol; Level 3</td>
<td>High-hazard (See Chapter 51)</td>
</tr>
<tr>
<td>Batteries</td>
<td>Dry cells (excludes lithium, lithium-ion, and other similar exotic metals or combustible electrolyte); without blister packing(if blister packed refer to commodity classification definitions)</td>
<td>Class I</td>
</tr>
<tr>
<td></td>
<td>Dry cells (non-lithium or similar exotic metals; in blister packing, cartoned)</td>
<td>Class II</td>
</tr>
<tr>
<td></td>
<td>Vehicle; any size (e.g. automobile or truck); empty plastic casing</td>
<td>High-hazard (Group A Unexpanded)</td>
</tr>
<tr>
<td></td>
<td>Vehicle; large (e.g. truck or larger); dry or wet (excludes lithium-ion and other cells containing combustible electrolyte) cells</td>
<td>High-hazard (Group A Unexpanded)</td>
</tr>
<tr>
<td></td>
<td>Vehicle; small (e.g. automobile); wet (excludes lithium-ion and other cells containing combustible electrolyte) cells</td>
<td>Class I</td>
</tr>
<tr>
<td>Biomass</td>
<td>Circular Baled Corn Stover</td>
<td>Class IV</td>
</tr>
<tr>
<td></td>
<td>Rectangular Baled Corn Stover</td>
<td>Class III</td>
</tr>
<tr>
<td></td>
<td>Rectangular Baled Switchgrass</td>
<td>High-hazard</td>
</tr>
<tr>
<td>Empty containers</td>
<td>Noncombustible</td>
<td>Class I</td>
</tr>
<tr>
<td></td>
<td>PET</td>
<td>Class IV</td>
</tr>
<tr>
<td></td>
<td>Rigid plastic (not including PET)</td>
<td>High-hazard</td>
</tr>
<tr>
<td>Class</td>
<td>Description</td>
<td></td>
</tr>
<tr>
<td>-------</td>
<td>-------------</td>
<td></td>
</tr>
<tr>
<td>Class I</td>
<td>Wood; solid sided (e.g. crates, boxes)</td>
<td></td>
</tr>
<tr>
<td>Class II</td>
<td>Film rolls, including photographic&lt;br&gt;  - Film (polypropylene, polyester, polyethylene); rolled on any reel type&lt;br&gt;  - Film: 35 mm metal film cartridges in polyethylene cans; cartoned&lt;br&gt;  - Film: motion picture or bulk rolls in polycarbonate, polyethylene or in metal cans; polyethylene bagged; cartoned&lt;br&gt;  - Film; rolls in polycarbonate plastic cassettes; cartoned&lt;br&gt;  - Photographic paper; sheets; bagged in polyethylene; cartoned</td>
<td></td>
</tr>
<tr>
<td>Class III</td>
<td>Flammable and combustible&lt;br&gt;  - Glycol in combustible containers (50-percent or greater)&lt;br&gt;  - Lacquers, which dry by solvent evaporation, in metal cans or cartons&lt;br&gt;  - Lighters: butane; blister-packed; cartoned&lt;br&gt;  - Liquids; over 20 and up to 50-percent alcohol (e.g. alcoholic beverages, hair spray); up to 1 gallon (3.8 L) glass bottles or jars; in racks; cartoned&lt;br&gt;  - Liquids; over 20 and up to 50-percent alcohol (e.g. alcoholic beverages, hair spray); up to 1 gallon (3.8 L) glass bottles or jars; palletized; cartoned&lt;br&gt;  - Liquids; over 20 and up to 50-percent alcohol (e.g. alcoholic beverages, hair spray); up to 1 gallon (3.8 L) plastic bottles or jars; cartoned</td>
<td></td>
</tr>
<tr>
<td>Class IV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Category</td>
<td>Description</td>
<td>Class</td>
</tr>
<tr>
<td>-----------------------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>--------</td>
</tr>
<tr>
<td>Liquids; up to 20-percent alcohol (e.g. alcoholic beverages, flavoring extracts); greater than 5 gallon (18.9 L) plastic containers with wall thickness greater than ¼ inch (6 mm)</td>
<td>High-hazard (Group A Unexpanded)</td>
<td></td>
</tr>
<tr>
<td>Liquids; up to 20-percent alcohol (e.g. alcoholic beverages, flavoring extracts); metal, glass or ceramic containers</td>
<td>Class I</td>
<td></td>
</tr>
<tr>
<td>Liquids; up to 20-percent alcohol (e.g. alcoholic beverages, flavoring extracts); plastic containers greater than 5 gallons (18.9 L) and wall thickness up to ¼ inch (6 mm)</td>
<td>Class II</td>
<td></td>
</tr>
<tr>
<td>Liquids; up to 20-percent alcohol (e.g. alcoholic beverages, flavoring extracts); up to 5 gallons (18.9 L) plastic bottles or jars</td>
<td>Class I</td>
<td></td>
</tr>
<tr>
<td>Liquids; up to 20-percent alcohol (e.g. alcoholic beverages, flavoring extracts); wood containers</td>
<td>Class II</td>
<td></td>
</tr>
<tr>
<td>Lubricating or hydraulic fluid in plastic containers</td>
<td>High-hazard</td>
<td></td>
</tr>
<tr>
<td>Nail polish; up to 2 oz (59 ml) glass bottles or jars; cartoned</td>
<td>Class IV</td>
<td></td>
</tr>
<tr>
<td>Nail polish; up to 2 oz (59 ml) plastic bottles or jars; cartoned</td>
<td>High-hazard (Group A Unexpanded)</td>
<td></td>
</tr>
<tr>
<td>Flammable Solids</td>
<td>Flammable solids (except solid combustible metals)</td>
<td>High-hazard</td>
</tr>
<tr>
<td>Frozen foods - frozen</td>
<td>Frozen foods; nonwaxed or nonplastic packaging</td>
<td>Class I</td>
</tr>
<tr>
<td></td>
<td>Frozen foods; plastic trays</td>
<td>Class III</td>
</tr>
<tr>
<td></td>
<td>Frozen foods; waxed or plastic-coated paper packaging</td>
<td>Class II</td>
</tr>
<tr>
<td>Frozen foods - non-frozen</td>
<td>Butter (stick or whipped spread) or margarine (up to 50-percent oil)</td>
<td>Class III</td>
</tr>
<tr>
<td></td>
<td>Butter, whipped spread</td>
<td>Class III</td>
</tr>
<tr>
<td></td>
<td>Dry foods (such as baked goods, candy, cereals, cheese, chocolate, cocoa, coffee, grains, granular sugar, nuts, etc.)</td>
<td>Class III</td>
</tr>
<tr>
<td>Item</td>
<td>Class</td>
<td></td>
</tr>
<tr>
<td>----------------------------------------------------------------------</td>
<td>--------------</td>
<td></td>
</tr>
<tr>
<td>bagged or cartoned</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Foods (e.g. coffee, fish products, fruit, meat products, nuts, poultry, etc.); metal cans</td>
<td>Class I</td>
<td></td>
</tr>
<tr>
<td>Fruits and vegetables (noncombustible semi-liquids); crushed; plastic containers up to 5 gallons (18.9 L)</td>
<td>Class I</td>
<td></td>
</tr>
<tr>
<td>Fruits and vegetables; fresh; wood spacers, non-plastic trays or containers</td>
<td>Class I</td>
<td></td>
</tr>
<tr>
<td>Margarine; over 50 and up to 80-percent oil</td>
<td>High-hazard</td>
<td></td>
</tr>
<tr>
<td>(Group A Unexpanded)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meat; fresh; no plastic packaging; uncartoned</td>
<td>Class I</td>
<td></td>
</tr>
<tr>
<td>Meat; fresh; no plastic packaging; cartoned</td>
<td>Class II</td>
<td></td>
</tr>
<tr>
<td>Meat; fresh; plastic trays</td>
<td>Class III</td>
<td></td>
</tr>
<tr>
<td>Milk; any container; stored in solid plastic crates</td>
<td>High-hazard</td>
<td></td>
</tr>
<tr>
<td>(Group A Unexpanded)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Milk; paper containers, or plastic bottles or jars up to 5 gallons (18.9 L) plastic bottles or jars</td>
<td>Class I</td>
<td></td>
</tr>
<tr>
<td>Salt; bagged</td>
<td>Class I</td>
<td></td>
</tr>
<tr>
<td>Salt; cartoned</td>
<td>Class II</td>
<td></td>
</tr>
<tr>
<td>Snack foods (e.g. potato chips); plasticized aluminum bags; cartoned</td>
<td>High-hazard</td>
<td></td>
</tr>
<tr>
<td>(Group A Unexpanded)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Syrup; wooden container</td>
<td>Class II</td>
<td></td>
</tr>
<tr>
<td>Furniture and bedding</td>
<td>Class III</td>
<td></td>
</tr>
<tr>
<td>Box spring; standard (minimal plastic materials)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Box spring; wrapped in plastic cover                                 | Class IV
<table>
<thead>
<tr>
<th>Item</th>
<th>Class/Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Furniture and bedding; with foam cushioning</td>
<td>High-hazard (Group A Expanded)</td>
</tr>
<tr>
<td>Furniture; metal (e.g. file cabinets or desks with minimal plastic trim); cartoned</td>
<td>Class I</td>
</tr>
<tr>
<td>Furniture; wood (e.g. doors, windows, cabinets, etc.); no plastic coverings or foam cushioning</td>
<td>Class III</td>
</tr>
<tr>
<td>Furniture; wood; plastic coverings; nonexpanded plastic trim</td>
<td>Class IV</td>
</tr>
<tr>
<td>Mattress; foam (in finished form)</td>
<td>High-hazard (Group A Expanded)</td>
</tr>
<tr>
<td>Pillows, foam rubber and foam plastics</td>
<td>High-hazard (Group A Expanded)</td>
</tr>
<tr>
<td>Appliances; major (e.g. stoves, refrigerators); no appreciable plastic interior or exterior trim; cartoned</td>
<td>Class II</td>
</tr>
<tr>
<td>Appliances; major (e.g. stoves, refrigerators); no appreciable plastic interior or exterior trim; uncartoned</td>
<td>Class I</td>
</tr>
<tr>
<td>Appliances; no appreciable plastic exterior trim (interior of unit can have appreciable plastic)</td>
<td>Class III</td>
</tr>
<tr>
<td>Carpet tiles; cartoned</td>
<td>High-hazard (Group A Unexpanded)</td>
</tr>
<tr>
<td>Fiberglass insulation; paper-backed rolls; bagged or unbagged</td>
<td>Class IV</td>
</tr>
<tr>
<td>Floor coverings; vinyl, stacked tiles</td>
<td>Class IV</td>
</tr>
<tr>
<td>Floor coverings; vinyl; rolled</td>
<td>High-hazard (Group A)</td>
</tr>
<tr>
<td>Class</td>
<td>Description</td>
</tr>
<tr>
<td>-------</td>
<td>-------------</td>
</tr>
<tr>
<td>I</td>
<td>Gypsum board</td>
</tr>
<tr>
<td>II</td>
<td>Housing materials (such as sinks, countertops, etc.); noncombustible, cartoned or crated</td>
</tr>
<tr>
<td>II</td>
<td>Light fixtures; nonplastic; cartoned</td>
</tr>
<tr>
<td>IV</td>
<td>Paint; oil-based; friction-top metal containers; cartoned</td>
</tr>
<tr>
<td>I</td>
<td>Paint; water-based (latex); friction-top metal containers; cartoned</td>
</tr>
<tr>
<td>III</td>
<td>Paper, asphalt, rolled, horizontal or vertical storage</td>
</tr>
<tr>
<td>IV</td>
<td>Roofing shingles; asphalt-coated fiberglass</td>
</tr>
<tr>
<td>IV</td>
<td>Roofing shingles; asphalt-impregnated felt</td>
</tr>
<tr>
<td>IV</td>
<td>Ammunition; small arms and shotgun; cartoned</td>
</tr>
<tr>
<td>High-hazard</td>
<td>Charcoal; mineral spirit impregnated; bagged</td>
</tr>
<tr>
<td>Group A Expanded</td>
<td>Charcoal; standard (non-mineral spirit impregnated); bagged</td>
</tr>
<tr>
<td>III</td>
<td>Fertilizers; nitrates; bagged</td>
</tr>
<tr>
<td>I</td>
<td>Fertilizers; phosphates; bagged</td>
</tr>
<tr>
<td>II</td>
<td>Leather hides; baled</td>
</tr>
<tr>
<td>III</td>
<td>Leather; finished products (e.g. shoes, jackets, gloves, bags, luggage, belts)</td>
</tr>
<tr>
<td>I</td>
<td>Motors; electric</td>
</tr>
<tr>
<td>High-hazard</td>
<td>Pallets and flats which are idle; combustible</td>
</tr>
<tr>
<td>Description</td>
<td>Class</td>
</tr>
<tr>
<td>-----------------------------------------------------------------------------</td>
<td>-------</td>
</tr>
<tr>
<td>Shock absorbers; metal dust cover</td>
<td>Class II</td>
</tr>
<tr>
<td>Shock absorbers; plastic dust cover</td>
<td>Class III</td>
</tr>
<tr>
<td>Skis, wood</td>
<td>Class III</td>
</tr>
<tr>
<td>Skis; composite materials (plastic, fiberglass, foam, etc.)</td>
<td>Class IV</td>
</tr>
<tr>
<td>Tobacco products; cartoned</td>
<td>Class III</td>
</tr>
<tr>
<td>Toys; stuffed; foam or synthetic</td>
<td>High-hazard (Group A Expanded)</td>
</tr>
<tr>
<td>Transformer; dry or empty (i.e. void of oil)</td>
<td>Class I</td>
</tr>
</tbody>
</table>

**Noncombustible liquids**

<table>
<thead>
<tr>
<th>Description</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liquids or semi liquids; PET containers greater than 5 gallon (18.9 L) having a nominal wall thickness greater than 0.25 inch (6 mm)</td>
<td>Class IV</td>
</tr>
<tr>
<td>Liquids or semi liquids; PET containers up to 5 gallon (18.9 L) having a nominal wall thickness less than 0.25 inch (6 mm)</td>
<td>Class I</td>
</tr>
<tr>
<td>Liquids or semi-liquids (e.g. crushed fruits and vegetables); plastic containers up to 5 gallon (18.9 L) capacity</td>
<td>Class I</td>
</tr>
<tr>
<td>Liquids or semi-liquids; plastic (except PET) containers greater than 5 gallon (18.9 L) capacity having a nominal wall thickness greater than 0.25 inch (6 mm)</td>
<td>High-hazard (Group A Unexpanded)</td>
</tr>
<tr>
<td>Liquids or semi-liquids; plastic (except PET) containers greater than 5 gallon (18.9 L) capacity having a nominal wall thickness up to 0.25 inch (6 mm)</td>
<td>Class II</td>
</tr>
<tr>
<td>Liquids; cardboard drink boxes, plastic-coated, wax-coated, and/or aluminum-lined; uncartoned or on corrugated carton trays with plastic sheeting</td>
<td>Class I</td>
</tr>
<tr>
<td>Liquids; cardboard drink boxes, plastic-coated, wax-coated, and/or aluminum-lined; stored in plastic containers</td>
<td>High-hazard (Group A)</td>
</tr>
<tr>
<td>Category</td>
<td>Description</td>
</tr>
<tr>
<td>--------------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Liquids; glass bottles or jars; cartoned</td>
<td></td>
</tr>
<tr>
<td>Liquids; less than 5 gallon (18.9 L) plastic containers</td>
<td></td>
</tr>
<tr>
<td>Liquids; pharmaceuticals (nonflammable); glass bottles or jars; cartoned</td>
<td></td>
</tr>
<tr>
<td>Liquids; plastic bottles or jars; stored in open or solid plastic crates</td>
<td></td>
</tr>
<tr>
<td>Paper products</td>
<td>Book signatures (paper part of book without hard cover)</td>
</tr>
<tr>
<td></td>
<td>Cartons (i.e. cardboard flats); corrugated; partially assembled</td>
</tr>
<tr>
<td></td>
<td>Cartons (i.e. cardboard flats); corrugated; unassembled in neat piles</td>
</tr>
<tr>
<td></td>
<td>Cartons; wax-coated, single-walled corrugated</td>
</tr>
<tr>
<td></td>
<td>Cellulosic paper products; nonwax-coated (e.g. books, cardboard games, cartoned tissue products, magazines, newspapers, paper cups, paper plates, paper towels, plastic-coated paper food containers, stationary)</td>
</tr>
<tr>
<td></td>
<td>Cellulosic paper products; wax-coated (e.g. paper plates, cups, etc.); loosely packed; cartoned</td>
</tr>
<tr>
<td></td>
<td>Cellulosic paper products; wax-coated (e.g. paper plates, cups, etc.); nested; cartoned</td>
</tr>
<tr>
<td></td>
<td>Matches; paper-type; cartoned</td>
</tr>
</tbody>
</table>
|                         | Matches; wooden; cartoned                                                       | High-hazard (Group A)
<table>
<thead>
<tr>
<th>Plastic, rubber</th>
<th>ABS (Acrylonitrile-butadiene-styrene copolymer)</th>
<th>High-hazard (Group A Unexpanded)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Acetal (polyformaldehyde)</td>
<td>High-hazard (Group A Unexpanded)</td>
</tr>
<tr>
<td></td>
<td>Acrylic (poly methyl methacrylate)</td>
<td>High-hazard (Group A Unexpanded)</td>
</tr>
<tr>
<td></td>
<td>Automobile bumpers and dashboards</td>
<td>High-hazard (Group A Expanded)</td>
</tr>
<tr>
<td></td>
<td>Butyl rubber</td>
<td>High-hazard (Group A Unexpanded)</td>
</tr>
<tr>
<td></td>
<td>Cellulose Acetate</td>
<td>Class IV (Group B Plastic)</td>
</tr>
<tr>
<td>Rolled; lightweight; in storage racks</td>
<td>Class IV</td>
<td></td>
</tr>
<tr>
<td>Rolled; medium or heavy weight; in storage racks or on-side</td>
<td>Class III</td>
<td></td>
</tr>
<tr>
<td>Paper, rolled, in horizontal storage, or vertical storage that is banded or protected with an approved wrap</td>
<td>Class III</td>
<td></td>
</tr>
<tr>
<td>Paper, rolled, in vertical storage which is unbanded or not protected with an approved wrap</td>
<td>High-hazard</td>
<td></td>
</tr>
<tr>
<td>Tissue products; plastic-wrapped; cartoned</td>
<td>Class III</td>
<td></td>
</tr>
<tr>
<td>Tissue products; plastic-wrapped; uncartoned</td>
<td>High-hazard (Group A Unexpanded)</td>
<td></td>
</tr>
</tbody>
</table>

**Plastic, rubber**

ABS (Acrylonitrile-butadiene-styrene copolymer)

- High-hazard (Group A Unexpanded)
- Acetal (polyformaldehyde)
- High-hazard (Group A Unexpanded)
- Acrylic (poly methyl methacrylate)
- High-hazard (Group A Unexpanded)
- Automobile bumpers and dashboards
- High-hazard (Group A Expanded)
- Butyl rubber
- High-hazard (Group A Unexpanded)
- Cellulose Acetate
- Class IV (Group B Plastic)
<table>
<thead>
<tr>
<th>Material</th>
<th>Hazard Level</th>
<th>Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cellulose Acetate Butyrate</td>
<td>High-hazard</td>
<td>(Group A Unexpanded)</td>
</tr>
<tr>
<td>Chloroprene rubber</td>
<td>Class IV</td>
<td>(Group B Plastic)</td>
</tr>
<tr>
<td>Containers; Nonexpanded plastic gridded or solid; collapsed or nested with no air spaces</td>
<td>High-hazard</td>
<td>(Group A Unexpanded)</td>
</tr>
<tr>
<td>ECTFE (ethylene-chlorotrifluoro-ethylene copolymer)</td>
<td>Class IV</td>
<td>(Group B Plastic)</td>
</tr>
<tr>
<td>EPDM (ethylene-propylene rubber)</td>
<td>High-hazard</td>
<td>(Group A Unexpanded)</td>
</tr>
<tr>
<td>ETFE (ethylene-tetrafluoroethylene copolymer)</td>
<td>Class IV</td>
<td>(Group B Plastic)</td>
</tr>
<tr>
<td>Ethyl Cellulose</td>
<td>High-hazard</td>
<td>(Group A Unexpanded)</td>
</tr>
<tr>
<td>FEP (fluorinated ethylene-propylene copolymer)</td>
<td>Class IV</td>
<td>(Group B Plastic)</td>
</tr>
<tr>
<td>FRP (fiberglass-reinforced polyester)</td>
<td>High-hazard</td>
<td>(Group A Unexpanded)</td>
</tr>
<tr>
<td>Melamine (melamine formaldehyde)</td>
<td>Class III</td>
<td>(Group C Plastic)</td>
</tr>
<tr>
<td>Nitrile Rubber (acrylonitrile-butadiene rubber)</td>
<td>High-hazard</td>
<td>(Group A Unexpanded)</td>
</tr>
<tr>
<td>Material</td>
<td>Hazard Level</td>
<td>Group/Unexpanded</td>
</tr>
<tr>
<td>-----------------------------------------------</td>
<td>--------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>Nylon (nylon 6, nylon 6/6)</td>
<td>High-hazard</td>
<td>(Group A Unexpanded)</td>
</tr>
<tr>
<td>PCTFE (poly chlorotrifluoroethylene)</td>
<td>Class III</td>
<td>(Group C Plastic)</td>
</tr>
<tr>
<td>PET (Polyethylene Terephthalate - thermoplastic poly ester)</td>
<td>High-hazard</td>
<td>(Group A Unexpanded)</td>
</tr>
<tr>
<td>Phenolic</td>
<td>Class III</td>
<td>(Group C Plastic)</td>
</tr>
<tr>
<td>Plastics: stored in fully closed and solid (no openings) metal containers</td>
<td>Class I</td>
<td></td>
</tr>
<tr>
<td>Poly butadiene</td>
<td>High-hazard</td>
<td>(Group A Unexpanded)</td>
</tr>
<tr>
<td>Poly carbonate</td>
<td>High-hazard</td>
<td>(Group A Unexpanded)</td>
</tr>
<tr>
<td>Poly ester elastomer</td>
<td>High-hazard</td>
<td>(Group A Unexpanded)</td>
</tr>
<tr>
<td>Poly ethylene</td>
<td>High-hazard</td>
<td>(Group A Unexpanded)</td>
</tr>
<tr>
<td>Poly propylene</td>
<td>High-hazard</td>
<td>(Group A Unexpanded)</td>
</tr>
<tr>
<td>Polystyrene; foam products (e.g. plates, cups, etc.)</td>
<td>High-hazard</td>
<td>(Group A Unexpanded)</td>
</tr>
<tr>
<td>Material</td>
<td>Classification</td>
<td></td>
</tr>
<tr>
<td>-----------------------------------------------</td>
<td>---------------------------------</td>
<td></td>
</tr>
<tr>
<td>Polystyrene; rigid products</td>
<td>High-hazard (Group A Unexpanded)</td>
<td></td>
</tr>
<tr>
<td>Polyurethane</td>
<td>High-hazard (Group A Expanded)</td>
<td></td>
</tr>
<tr>
<td>PTFE (polytetrafluoroethylene)</td>
<td>Class III (Group C Plastic)</td>
<td></td>
</tr>
<tr>
<td>PVC (polyvinyl chloride) products; plasticizer content 20-percent or less</td>
<td>Class III (Group C Plastic)</td>
<td></td>
</tr>
<tr>
<td>PVC (polyvinyl chloride) products; plasticizer content greater than 20-percent</td>
<td>High-hazard (Group A Unexpanded)</td>
<td></td>
</tr>
<tr>
<td>PVC resins; bagged</td>
<td>Class III (Group C Plastic)</td>
<td></td>
</tr>
<tr>
<td>PVDC (polyvinylidene chloride)</td>
<td>Class III (Group C Plastic)</td>
<td></td>
</tr>
<tr>
<td>PVDF (polyvinylidene fluoride)</td>
<td>Class III (Group C Plastic)</td>
<td></td>
</tr>
<tr>
<td>PVF (polyvinyl fluoride)</td>
<td>High-hazard (Group A Unexpanded)</td>
<td></td>
</tr>
<tr>
<td>Pyroxylin</td>
<td>High-hazard</td>
<td></td>
</tr>
<tr>
<td>Rubber, natural in blocks; cartoned</td>
<td>High-hazard (Group A Unexpanded)</td>
<td></td>
</tr>
<tr>
<td>Rubber, natural; expanded</td>
<td>High-hazard</td>
<td></td>
</tr>
<tr>
<td>Material</td>
<td>Group and Class</td>
<td></td>
</tr>
<tr>
<td>----------</td>
<td>----------------</td>
<td></td>
</tr>
<tr>
<td>Rubber, natural; Nonexpanded</td>
<td>High-hazard (Group A Unexpanded)</td>
<td></td>
</tr>
<tr>
<td>Rubber, synthetic (santoprene)</td>
<td>High-hazard (Group A Unexpanded)</td>
<td></td>
</tr>
<tr>
<td>Rubber Tires</td>
<td>High-hazard</td>
<td></td>
</tr>
<tr>
<td>SAN (styrene acrylonitrile)</td>
<td>High-hazard (Group A Unexpanded)</td>
<td></td>
</tr>
<tr>
<td>SBR (styrene-butadiene rubber)</td>
<td>High-hazard (Group A Unexpanded)</td>
<td></td>
</tr>
<tr>
<td>Silicone rubber</td>
<td>Class IV (Group B Plastic)</td>
<td></td>
</tr>
<tr>
<td>Urea (urea formaldehyde)</td>
<td>Class III (Group C Plastic)</td>
<td></td>
</tr>
<tr>
<td><strong>Plastic containers</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bottles or jars greater than 1 gallon (3.8 L) containing noncombustible solids</td>
<td>High-hazard (Group A Unexpanded)</td>
<td></td>
</tr>
<tr>
<td>Bottles or jars up to 1 gallon (3.8 L) containing noncombustible solids</td>
<td>High-hazard (Group A Unexpanded)</td>
<td></td>
</tr>
<tr>
<td><strong>Powders, pills</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pharmaceutical pills; glass bottles or jars; cartoned</td>
<td>Class II</td>
<td></td>
</tr>
<tr>
<td>Pharmaceuticals pills; plastic bottles or jars; cartoned</td>
<td>Class IV</td>
<td></td>
</tr>
<tr>
<td>Polyvinyl Alcohol (PVA) resins; bagged</td>
<td>Class IV</td>
<td></td>
</tr>
<tr>
<td>Class</td>
<td>Description</td>
<td></td>
</tr>
<tr>
<td>-------</td>
<td>-------------</td>
<td></td>
</tr>
<tr>
<td>II</td>
<td>Powders; combustible (ordinary - such as sugar or flour); free-flowing; bagged</td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>Powders; noncombustible free-flowing powdered or granular materials (e.g. cement, calcium chloride, clay, iron oxide, sodium chloride, sodium silicate, etc.); bagged</td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>Powders; noncombustible; glass bottles or jars; cartoned</td>
<td></td>
</tr>
<tr>
<td>II</td>
<td>Powders; noncombustible; PET bottles or jars</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Powders; noncombustible; plastic (other than PET) bottles or jars; uncartoned</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Powders; noncombustible; plastic bottles or jars greater than 1 gallon (3.8 L) capacity</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Powders; noncombustible; plastic bottles or jars up to 1 gallon (3.8 L) capacity; cartoned</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cloth; natural fibers; baled</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cloth; synthetic cloth</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Clothing; natural fibers (e.g. wool, cotton) and viscose</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cotton; cartoned</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Diapers; cotton or linen</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Diapers; plastic or nonwoven fabric; cartoned</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Diapers; plastic or nonwoven fabric; plastic-wrapped; uncartoned</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fabric; rayon and nylon</td>
<td></td>
</tr>
<tr>
<td></td>
<td>High-hazard (Group A Unexpanded)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>High-hazard (Group A Unexpanded)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>High-hazard (Group A Unexpanded)</td>
<td></td>
</tr>
</tbody>
</table>

### Textile materials and products

<table>
<thead>
<tr>
<th>Class</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>III</td>
<td>Cloth; natural fibers; baled</td>
</tr>
<tr>
<td>IV</td>
<td>Cloth; synthetic cloth</td>
</tr>
<tr>
<td>III</td>
<td>Clothing; natural fibers (e.g. wool, cotton) and viscose</td>
</tr>
<tr>
<td>III</td>
<td>Cotton; cartoned</td>
</tr>
<tr>
<td>III</td>
<td>Diapers; cotton or linen</td>
</tr>
<tr>
<td>IV</td>
<td>Diapers; plastic or nonwoven fabric; cartoned</td>
</tr>
<tr>
<td></td>
<td>Diapers; plastic or nonwoven fabric; plastic-wrapped; uncartoned</td>
</tr>
<tr>
<td>IV</td>
<td>Fabric; rayon and nylon</td>
</tr>
<tr>
<td>Item</td>
<td>Class/Group</td>
</tr>
<tr>
<td>------</td>
<td>-------------</td>
</tr>
<tr>
<td>Fabric: synthetic (except rayon and nylon); greater than 50/50 blend</td>
<td>High-hazard (Group A Unexpanded)</td>
</tr>
<tr>
<td>Fabric: synthetic (except rayon and nylon); up to 50/50 blend</td>
<td>Class III</td>
</tr>
<tr>
<td>Fabric; vinyl-coated (e.g. tablecloth); cartoned</td>
<td>High-hazard (Group A Unexpanded)</td>
</tr>
<tr>
<td>Fibers; rayon and nylon; baled</td>
<td>Class IV</td>
</tr>
<tr>
<td>Fibers; synthetic (except rayon and nylon); baled</td>
<td>High-hazard (Group A Unexpanded)</td>
</tr>
<tr>
<td>Thread or yarn; rayon and nylon; wood or paper spools</td>
<td>Class IV</td>
</tr>
<tr>
<td>Thread or yarn; rayon or nylon; plastic spools</td>
<td>High-hazard (Group A Unexpanded)</td>
</tr>
<tr>
<td>Thread or yarn; synthetic (except rayon and nylon); greater than 50/50 blend; paper or wood spools</td>
<td>Class IV</td>
</tr>
<tr>
<td>Thread or yarn; synthetic (except rayon and nylon); greater than 50/50 blend; plastic spools</td>
<td>High-hazard (Group A Unexpanded)</td>
</tr>
<tr>
<td>Thread or yarn; synthetic (except rayon and nylon); up to 50/50 blend; plastic spools</td>
<td>High-hazard (Group A Unexpanded)</td>
</tr>
<tr>
<td>Thread or yarn; synthetic (except rayon and nylon); up to 50/50 blend; wood or paper spools</td>
<td>Class III</td>
</tr>
</tbody>
</table>

Wax products: Candles

High-hazard (Group A Expanded)
<table>
<thead>
<tr>
<th>Item Description</th>
<th>Hazard Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paraffin or petroleum wax; blocks</td>
<td>High-hazard (Group A Expanded)</td>
</tr>
<tr>
<td>Wire, cable, spools</td>
<td></td>
</tr>
<tr>
<td>Spools; plastic; empty</td>
<td>High-hazard (Group A Unexpanded)</td>
</tr>
<tr>
<td>Spools; wood; empty</td>
<td>Class III</td>
</tr>
<tr>
<td>Wire or cable; PVC insulated; metal or wood spools</td>
<td>Class II</td>
</tr>
<tr>
<td>Wire or cable; PVC insulated; plastic spools</td>
<td>Class IV</td>
</tr>
<tr>
<td>Wire; bare; metal spools, uncartoned</td>
<td>Class I</td>
</tr>
<tr>
<td>Wire; bare; metal spools; cartoned</td>
<td>Class II</td>
</tr>
<tr>
<td>Wire; bare; plastic spools; cartoned</td>
<td>Class IV</td>
</tr>
<tr>
<td>Wire; bare; plastic spools; uncartoned</td>
<td>High-hazard (Group A Unexpanded)</td>
</tr>
<tr>
<td>Wire; bare; wood or cardboard spools</td>
<td>Class II</td>
</tr>
<tr>
<td>Wood products</td>
<td></td>
</tr>
<tr>
<td>Wood patterns</td>
<td>Class IV</td>
</tr>
<tr>
<td>Wood products (e.g. fiberboard, lumber, particle board, plywood, pressboard with smooth ends and edges); bundled solid blocks</td>
<td>Class II</td>
</tr>
<tr>
<td>Wood products (e.g. fiberboard, lumber, particle board, plywood, pressboard with smooth ends and edges); unbundled or non-solid blocks</td>
<td>Class III</td>
</tr>
<tr>
<td>Wood products (e.g. toothpicks, clothespins and hangers)</td>
<td>Class III</td>
</tr>
</tbody>
</table>

Revise as follows:

3203.7.4 3203.9 Limited quantities of Group A plastics in mixed commodities. Figure
3203.7.4 Figures 3203.9(1) and 3203.9(2) shall be used to determine the commodity classification based on the quantity of Group A plastics allowed to be stored in the following situations:

1. The product is not listed on Table 3203.8 and contains Group A plastics.
2. The commodity contains Group A plastics and is not classified as High-hazard in a package or carton or on a pallet without increasing Table 3203.8.
3. The product listing in Table 3203.8 does not specifically include packaging, and the commodity classification packaging material includes Group A plastics.

**FIGURE 3203.7.4 3203.9(1)**

**EVALUATION BY VOLUME OF GROUP A EXPANDED PLASTICS MIXED COMMODITIES**

![Diagram](image)
a. This figure is intended to determine the commodity classification of a mixed commodity with Group A plastics in a package, carton or on a pallet where plastics are involved.

b. The following is an example of how to apply the figure: A package containing a Class III commodity has 12-percent Group A expanded plastic by volume. The weight of the unexpanded Group A plastic is 10 percent. This commodity is classified as a Class IV commodity. If the weight of the unexpanded plastic is increased to 14 percent, the classification changes to a high-hazard commodity.

c. The following is an example of how to apply Figure 3203.9(1): A pallet load consists of a Class III commodity with components of unexpanded Group A plastic and packing material of expanded Group A plastic. Using Equation 32-1, the weight of unexpanded Group A plastic is 5 percent. Using Equation 32-2, the volume of expanded Group A plastic is 15 percent. This commodity is classified as a Class IV commodity. If the volume of the expanded Group A plastic is increased to 20 percent, the classification changes to a High-hazard commodity. Compare this result with the result from Figure 3203.9(2), and the highest classification will apply. Where the load is stored on a plastic pallet, the requirements in Section 3203.10 also apply.
c. Percent by volume
   
   d. Percent by weight

Add new text as follows:

FIGURE 3203.9(2)
EVALUATION BY WEIGHT OF GROUP A EXPANDED PLASTICS IN MIXED COMMODITIES\textsuperscript{a, b, c}
a. This figure is used to determine the commodity classification of a mixed commodity with Group A plastics in a package, carton or on a pallet.  
b. This results from this figure must be compared to the results from Figure 3203.9(1). The highest classification will apply.  
c. The following is an example of how to apply Figure 3203.9(2): A pallet load consists of a Class III commodity with components of unexpanded Group A plastic and packing material of expanded Group A plastic. Using Equation 32-1, the weight of unexpanded Group A plastic is 5-percent. Using Equation 32-3, the weight of expanded Group A plastic is 6-percent. This commodity is classified as a High-hazard commodity. Compare this result with the result from Figure 3203.9(2), and the highest classification will apply. Where the load is stored on a plastic pallet, the requirements in Section 3203.10 also apply.  

### 3203.9.1 Classifying mixed commodities with limited Group A plastics

The percentage of
Group A plastics determined in accordance with Section 3203.9.2 shall be used in Figures 3203.9(1) and 3203.9(2). Results from Figure 3203.9(1) must be compared to results from Figure 3203.9(2) and the commodity will be classified with the highest commodity classification. Figures 3203.9(1) and 3203.9(2) shall not be used to reduce the commodity classification shown in Table 3203.8.

3203.9.2 Percentage of Group A plastics. The pallet, if any, shall not be included when measuring weight of the commodity \((W_{PU} \text{ or } W_{PE})\) or the volume of the commodity \((V_{PE})\). The pallet, if any, shall be included when measuring weight of the entire load \((W_L)\) or the volume of the entire load \((V_L)\).

**Exception:** Where noncombustible pallets are used, the pallets shall not be included in the volume and weight calculations.

The percentage by weight of Group A unexpanded plastics in the load shall be calculated in accordance with Equation 32-1.

The percentage by volume of Group A expanded plastics in the load shall be calculated in accordance with Equation 32-2.

The percentage by weight of Group A expanded plastics in the load shall be calculated in accordance with Equation 32-3.

\[ P_{WU} = \frac{W_{PU}}{W_L} \text{ (Equation 32-1)} \]

where:

- \(P_{WU}\) = Percentage by weight of Group A unexpanded plastic
- \(W_{PU}\) = Weight of Group A unexpanded plastic in the commodity, not including the weight of the pallet, if any
- \(W_L\) = Weight of the entire load, including the weight of the pallet, if any

\[ P_{VE} = \frac{V_{PE}}{V_L} \text{ (Equation 32-2)} \]

where:

- \(P_{VE}\) = Percentage by volume of Group A expanded plastic
- \(V_{PE}\) = Volume of Group A expanded plastic in the commodity, not including the volume of the pallet, if any
- \(V_L\) = Volume of the entire load, including the volume of the pallet, if any

\[ P_{WE} = \frac{W_{PE}}{W_L} \text{ (Equation 32-3)} \]

where:

- \(P_{WE}\) = Percentage by weight of Group A expanded plastic
- \(W_{PE}\) = Weight of Group A expanded plastic in the commodity, not including the weight of the pallet, if any
- \(W_L\) = Weight of the entire load, including the weight of the pallet, if any

3203.10 Plastic pallets. The commodity classification determined in Sections 3203.7 or 3203.8 shall be modified in accordance with Sections 3203.9.1 through 3203.9.3 where plastic pallets are used.

**Exception:** The commodity classification is not modified where any of the following conditions occur:

1. Group A plastic commodities are stored on plastic pallets.
2. Sprinkler protection consists of sprinklers at the ceiling only, using sprinklers with a minimum K-factor of K-16.8 (240).
3. The plastic pallets are listed and labeled in accordance with Section 3206.4.1.1.

3203.10.1 Unreinforced plastic pallets. For Class I through IV commodities, where
unreinforced polypropylene or unreinforced high-density polyethylene plastic pallets are used, the commodity classification shall be increased one class. To be considered unreinforced plastic pallets, the pallets shall be marked with a permanent symbol indicating the pallet is unreinforced.

3203.10.2 Reinforced plastic pallets. For Class I through IV commodities, where reinforced polypropylene or reinforced high-density polyethylene plastic pallets are used, the commodity classification shall be increased two classes except for Class IV commodity, which shall be increased to a High-hazard (Group A plastic, cartoned, unexpanded) commodity.

3203.10.3 Other pallets. For Class I through IV commodities stored on plastic pallets other than polypropylene or high-density polyethylene plastic pallets, the commodity classification shall be increased two classes unless specific testing is conducted by a testing laboratory.

Reason: This proposal revises the commodity classification criteria in the IFC. This reason statement is broken down into three main subjects to help clarify the revisions. These subjects are Commodity Classification, Limited Group A Plastics and Plastic Pallets.

Commodity Classification
The current list in the IFC has had minimal revision since the 2000 IFC. However, NFPA 13 has expanded and revised its commodity classification list, so this proposal is intended to improve consistency with NFPA 13.

The commodity classifications need to be included in the IFC since commodity classification is utilized for other requirements in the code. Items such as smoke and heat removal, fire department access doors, fire detection systems are based on commodity classifications.

The individual lists for Class I through IV, high-hazard and plastic commodities have been replaced with Table 3203.7. Table 3203.7 contains the items classified in NFPA 13. NFPA 13 does not use the term "high-hazard" commodity, so the items which have been determined to be high-hazard in the IFC are also added. All of the items in the current code are contained in the revised list. A new item is added under the category of "biomass". These specific three types of biomass have undergone fire testing to determine the appropriate classification. The testing and results are available in the report "Commodity Classification of Corn Stover and Switchgrass Biomass Fuels on Wire Mesh Decking and Wood Pallets, UL Project 4786932019".

Limited Group A Plastics
This proposal replaces the current Figure 3203.7.4 with two revised figures. This revision is proposed to provide improved consistency with NFPA 13 and to remove confusion on how to apply this figure.

The figure has been reformatted in two ways to eliminate confusion. First, the figure in the 2015 IFC uses three axis – the bottom, left and right. The right axis has been confusing for many code users, and in many cases simply ignored. Therefore, the single figure was split into two separate figures, each one utilizing only the bottom and left axis.

Second, the orientation of the figure has been reversed. In other words, the current left axis is now shown on the bottom and the bottom is on the left axis for Figure 3203.9(1). This is a consistent format with the new figures which will appear in the 2016 edition of NFPA 13. For Figure 3203.9(2), the current right axis is now shown on the bottom and the bottom is on the left axis. This is also a consistent format with the new figure in NFPA 13. Slight differences in the IFC figures occur because some of the terminology in the IFC is different than NFPA 13. For example, the term high-hazard commodity is not used in NFPA 13, but is used in the IFC.

There are some slight differences between the current curves and the curves in the proposed figures. NFPA 13 classifies all commodities with even a miniscule amount of plastic as Class III commodities. For example, this would mean that a stack of metal chairs with plastic feet, stored on a wooden pallet, would be classified as Class III. This seems too restrictive and was not substantiated with actual fire testing, so the proposed IFC curves have been modified to add a curve allowing Class I and II commodities to contain a maximum of 5% of plastic by weight or volume.

Additionally, the formulae to calculate percentages of plastic have been relocated from Footnotes c and d to code text in Section 3203.9.2. The footnotes are replaced with formulae to simplify and clarify their application. The resulting solutions are then plugged into the appropriate locations on the two figures. There has often been confusion as to whether to include the pallet in the formulae. It is specified that the pallet, if one is used in the storage, is included when calculating the total weight or volume of a pallet load without regard to whether the pallet is wood or plastic. This is also consistent with NFPA 13 since it contains specific criteria to address the pallet when
it is plastic based on the level of combustibility of the pallet. See discussion below on Plastic Pallets.

The upper boundary of Class IV commodities is now a straight line from 15% to 25% which is consistent with revisions made to the NFPA 13 Figure 5.6.3.3.3.1.

Footnote b in both figures is new. It specifies that calculations must be made using both figures and the highest commodity classification will apply. This is consistent with application of the current code, but the calculations were just done on a single figure.

Plastic Pallets

The new Section 3203.10 addresses the issue of the additional fuel load created by certain plastic pallets. NFPA 13 requires that the commodity classification be modified in certain situations where plastic pallets are utilized. The provisions in these sections mirror the NFPA 13 requirements and will ensure that the appropriate commodity classification is applied when using Table 3206.2 to determine the fire protection features for the high-piled storage area.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire safety and hazardous materials in new and existing buildings and facilities and the protection of life and property in wildland urban interface areas. In 2014 and 2015 the Fire-CAC has held 5 open meetings. In addition, there were numerous conference calls, Regional Work Group and Task Group meetings for the current code development cycle, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC

**Cost Impact:** Will not increase the cost of construction

This proposal updates and clarifies the current code requirements.
2015 International Fire Code

Revise as follows:

3204.1 General. *High-piled storage areas*, and portions of *high-piled storage areas* intended for storage of a different commodity class than adjacent areas, shall be designed and specifically designated to contain Class I, Class II, Class III, Class IV or high-hazard commodities. The designation of a *high-piled combustible* storage area, or portion thereof intended for storage of a different commodity class, shall be based on the highest hazard commodity class stored except as provided in Section 3204.2.

**Reason:** This proposal is merely editorial. The defined term in the code is "high-piled storage area" when referring to the area used for storage of high-piled combustible storage. This proposal corrects the terminology to maintain consistency in the code.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire safety and hazardous materials in new and existing buildings and facilities and the protection of life and property in wildland urban interface areas. In 2014 and 2015 the Fire-CAC has held 5 open meetings. In addition, there were numerous conference calls, Regional Work Group and Task Group meetings for the current code development cycle, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: [FCAC](http://www.iccsafe.org)

**Cost Impact:** Will not increase the cost of construction

Editorial. Does not change requirements.
2015 International Fire Code

Revise as follows:

**3206.1 General.** Fire protection and life safety features for high-piled storage areas shall be in accordance with Sections 3206.2 through 3206.10 3206.11.

**3206.6 Building access.** Where building access is required by Table 3206.2, fire apparatus access roads in accordance with Section 503 shall be provided within 150 feet (45,720 mm) of all portions of the exterior walls of buildings used for high-piled storage.

**Exception:** Where fire apparatus access roads cannot be installed because of topography, railways, waterways, nonnegotiable grades or other similar conditions, the fire code official is authorized to require additional fire protection.

### TABLE 3206.2
GENERAL FIRE PROTECTION AND LIFE SAFETY REQUIREMENTS

<table>
<thead>
<tr>
<th>COMMODITY CLASS</th>
<th>SIZE OF HIGH-PILED STORAGE AREA (square feet) (see Sections 3206.2 and 3206.4)</th>
<th>ALL STORAGE AREAS (See Sections 3206, 3207 and 3208)</th>
<th>SOLID-PILED STORAGE, SHELF STORAGE AND PALLETIZED STORAGE (see Section 3207.3)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Automatic fire-extinguishing system (see Section 3206.4)</td>
<td>Fire detection system (see Section 3206.5)</td>
<td>Building department access doors (see Section 3206.7)</td>
</tr>
<tr>
<td>0-500</td>
<td>Not Required&lt;sup&gt;a&lt;/sup&gt;</td>
<td>Not Required&lt;sup&gt;e&lt;/sup&gt;</td>
<td>Not Required&lt;sup&gt;e&lt;/sup&gt;</td>
</tr>
<tr>
<td>501-2,500</td>
<td>Not Required&lt;sup&gt;a&lt;/sup&gt;</td>
<td>Yes&lt;sup&gt;b&lt;/sup&gt;</td>
<td>Not Required&lt;sup&gt;e&lt;/sup&gt;</td>
</tr>
<tr>
<td>2,501-12,000 Public accessible</td>
<td>Yes</td>
<td>Not Required&lt;sup&gt;e&lt;/sup&gt;</td>
<td>Not Required&lt;sup&gt;e&lt;/sup&gt;</td>
</tr>
<tr>
<td>2,501-12,000 Nonpublic</td>
<td>Not</td>
<td>Not</td>
<td>Not</td>
</tr>
<tr>
<td>High hazard</td>
<td>Accessible (Option 1)</td>
<td>Yes</td>
<td>Required</td>
</tr>
<tr>
<td>-------------</td>
<td>-----------------------</td>
<td>-----</td>
<td>----------</td>
</tr>
<tr>
<td>0-500</td>
<td>Not Required</td>
<td>Not</td>
<td>Not</td>
</tr>
<tr>
<td>501-2,500</td>
<td>Public accessible</td>
<td>Yes</td>
<td>Not</td>
</tr>
<tr>
<td>501-2,500</td>
<td>Nonpublic accessible</td>
<td>Yes</td>
<td>Not</td>
</tr>
<tr>
<td>2,501-300,000</td>
<td>Yes</td>
<td>Not</td>
<td>Not</td>
</tr>
<tr>
<td>300,001-500,000</td>
<td>Yes</td>
<td>Not</td>
<td>Not</td>
</tr>
</tbody>
</table>

For SI: 1 foot = 304.8 mm, 1 cubic foot = 0.02832 m³, 1 square foot = 0.0929 m².

a. Where automatic sprinklers are required for reasons other than those in Chapter 32, the portion of the sprinkler system protecting the high-piled storage area shall be designed and installed in accordance with Sections 3207 and 3208.

b. For aisles, see Section 3206.9.

c. Piles shall be separated by aisles complying with Section 3206.9.

d. For storage in excess of the height indicated, special fire protection shall be provided in accordance with Note g where required by the fire code official. See Chapters 51 and 57 for special limitations for aerosols and flammable and combustible liquids, respectively.

e. Section 503 shall apply for fire apparatus access. For storage exceeding 30 feet in height, Option 1 shall be used.

f. Special fire protection provisions including, but not limited to, fire protection of exposed steel columns; increased sprinkler density; additional in-rack sprinklers, without associated reductions in ceiling sprinkler density; or additional fire department hose connections shall be provided required by the fire code official.

h. High-piled storage areas shall not exceed 500,000 square feet. A 2-hour fire wall constructed in accordance with Section 706 the International Building Code shall be used to divide high-piled storage exceeding 500,000 square feet in area.

i. Not required where an automatic fire-extinguishing system is designed and installed to protect the high-piled storage area in accordance with Sections 3207 and 3208.

j. Not required where storage areas are protected by either early suppression fast response (ESFR) sprinkler systems or control mode special application sprinklers with a response time index of 50 (m • s)¹/₂ or less that are listed to control a fire in the stored commodities with 12 or fewer sprinklers, installed in accordance with NFPA 13.

3206.6.1 Access Fire department access doors. Where building fire department access is required by Table 3206.2, fire department access doors shall be provided in
accordance with this section Sections 3206.7.1 through 3206.7.7. Access doors shall be accessible without the use of a ladder.

Add new text as follows:

3206.7.1 Exterior walls without fire department access doors. Fire department access doors are not required in an exterior wall that does not face a fire apparatus access road provided all of the following conditions occur:

1. The opposite exterior wall faces a fire apparatus access road.
2. The opposite exterior wall is provided with fire department access doors.
3. All portions of the interior surface of the exterior wall are less than 150 feet (45 720 mm) away from a fire department access door.
4. The building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.

3206.7.2 Where located. Where exterior walls surrounding high-piled storage areas face fire apparatus access roads, such walls shall be provided with fire department access doors.

3206.7.3 Access to doors. Fire department access doors shall be accessible without the use of a ladder.

3206.7.4 Marking on fire department access doors. Fire department access doors shall be labeled on the exterior side with the following sign or other approved sign:

FIRE DEPARTMENT ACCESS DOOR
DO NOT BLOCK

The lettering shall be in a contrasting color to the background. Letters shall have a minimum height of 2-inches (51 mm) with a minimum stroke of 3/8-inch (10 mm).

Revise as follows:

3206.6.1.1 3206.7.5 Number of doors required. Not less than one access door shall be provided in each 100 linear feet (30 480 mm), or fraction thereof, of the exterior walls that face fire apparatus access roads. The required department access doors shall be distributed such that the lineal distance between adjacent fire department access doors does not exceed 100 125 feet (30 480 38 100 mm) measured center to center.

Exception: The linear distance between adjacent access doors is allowed to shall not exceed 100 200 feet (30 480 60 960 mm) in existing buildings where no change in occupancy is proposed. The number and distribution of access doors in existing buildings shall be approved.

3206.6.1.2 3206.7.6 Door size and type. Access doors shall be not less than 3 feet (914 mm) in width and 6 feet 8 inches (2032 mm) in height. Roll-up doors shall not be used unless approved.

3206.6.1.3 3206.7.7 Locking devices. Only approved locking devices on fire department access doors shall be used approved.

Add new text as follows:
3206.7.8 **Key box.** Where fire department access doors are required, a key box shall be installed in accordance with Section 506.1. The key box shall contain keys or devices to allow for entry through the fire department access doors.

**Reason:** This proposal revises the requirements for fire department access doors to address new construction methods and larger buildings.

The first modification is to have Section 3206.6 stand alone as a requirement for apparatus access roads. The reference in Table 3206.2 is revised by changing the title to "Fire Department Access Doors" and referencing Section 3206.7. The requirement for fire apparatus access roads is applicable to all high-piled storage buildings as it currently is in Section 503. Since Table 3206.2 no longer references to the fire apparatus access road requirements, Footnote e is deleted because it is no longer needed.

Section 3206.6 is revised to correlate with Chapter 5 of the IFC. With some exceptions, fire apparatus access roads are required for all new buildings, not just when Table 3206.2 requires access. When those buildings contain high-piled combustible storage this section will override the exceptions in Section 503 and not allow an increase beyond the 150' access distance.

Section 3206.6.1 is revised to 3206.7 to deal specifically with fire department access doors. The requirements for where such doors are required are moved into this section. Fire department access doors are still required in exterior walls around high-piled storage areas where the walls face a fire apparatus access road.

The requirement that the walls face a required fire apparatus access road has been removed. Many situations occur where a side of the building is adjacent to a railroad track. The argument has been made that there is no fire apparatus access road, therefore access doors are not required. Fire department operations can consist of hand carrying hose along the building to the access doors to make entry into that side of the building. Fire hose can be carried across railroad tracks to make entry through these access doors. Providing fire department access doors along all exterior walls is critical, especially since the number of access doors will be reduced as a result of the revision which allows increased spacing of access doors to 200'.

With regard to FD access doors, the following changes occur:

1. Section 3206.7.3 – an allowance has been added whereby FD access doors can be eliminated along an exterior wall if it does not face a fire apparatus access road, the opposite wall has FD access doors, and the entire building is sprinklered.
2. Section 3206.7.4 – FD access door spacing is revised from 100' to 125'. A common dimension for concrete tilt-up construction is a panel width of 52'. So when a FD access door is provided in the form for every other panel, the doorways are spaced at 104' on center. In an ideal world, the code would provide for doors every 50' to provide the most options for firefighting. Also, Table 3206.2 allows a pile dimension for solid-piled storage of 100'. If the piles are designed with a 100' dimension along the exterior wall, how can the FD access doors also be spaced at 100'. In order to have each door provide access into the aisle separating the piles, the doors would need to be at least 106' on center, which the code does not allow. This revision allows all of the code requirements and current construction technology to work together.

A requirement for a key box is added. This key box will contain keys for access into the fire department access doors.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire safety and hazardous materials in new and existing buildings and facilities and the protection of life and property in wildland urban interface areas. In 2014 and 2015 the Fire-CAC has held 5 open meetings. In addition, there were numerous conference calls, Regional Work Group and Task Group meetings for the current code development cycle, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: [FCAC](https://www.icc-es.com)

**Cost Impact:** Will not increase the cost of construction

This proposal allows FD access doors to be an additional 25' apart, so it will reduce the cost of construction.
# TABLE 3206.2

## GENERAL FIRE PROTECTION AND LIFE SAFETY REQUIREMENTS

<table>
<thead>
<tr>
<th>COMMODITY CLASS</th>
<th>SIZE OF HIGH-PILED STORAGE AREA (square feet)</th>
<th>ALL STORAGE AREAS</th>
<th>SOLID-PILED STORAGE, SHELF STORAGE AND PALLETTIZED STORAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(See Sections 3206, 3207 and 3208)</td>
<td>(see Section 3206.4)</td>
<td>(see Section 3207.3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Automatic fire-extinguishing system (see Section 3206.4)</td>
<td>Fire detection system (see Section 3206.5)</td>
</tr>
<tr>
<td>I-IV</td>
<td>0-500</td>
<td>Not Required⁠^a</td>
<td>Not Required</td>
</tr>
<tr>
<td></td>
<td>501-2,500</td>
<td>Not Required⁠^a</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>2,501-12,000 Public accessible</td>
<td>Yes</td>
<td>Not Required</td>
</tr>
<tr>
<td></td>
<td>2,501-12,000 Nonpublic accessible (Option 1)</td>
<td>Yes</td>
<td>Not Required</td>
</tr>
<tr>
<td></td>
<td>2,501-12,000 Nonpublic accessible (Option 2)</td>
<td>Not Required</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>12,001-20,000</td>
<td>Yes</td>
<td>Not Required</td>
</tr>
<tr>
<td></td>
<td>20,001-500,000</td>
<td>Yes</td>
<td>Not Required</td>
</tr>
<tr>
<td></td>
<td>Greater than 500,000⁢^g</td>
<td>Yes</td>
<td>Not Required</td>
</tr>
<tr>
<td>High hazard</td>
<td>0-500</td>
<td>Not Required</td>
<td>Not Required</td>
</tr>
<tr>
<td></td>
<td>501-2,500 Public accessible</td>
<td>Yes</td>
<td>Not Required</td>
</tr>
<tr>
<td></td>
<td>501-2,500 Nonpublic accessible (Option 1)</td>
<td>Yes</td>
<td>Not Required</td>
</tr>
</tbody>
</table>

---

*Figures and text adapted for clarity.*
For SI: 1 foot = 304.8 mm, 1 cubic foot = 0.02832 m³, 1 square foot = 0.0929 m².

a. Where automatic sprinklers are required for reasons other than those in Chapter 32, the portion of the sprinkler system protecting the high-piled storage area shall be designed and installed in accordance with Sections 3207 and 3208.

b. For aisles, see Section 3206.9.

c. Piles shall be separated by aisles complying with Section 3206.9.

d. For storage in excess of the height indicated, special fire protection shall be provided in accordance with Note g where required by the fire code official. See Chapters 51 and 57 for special limitations for aerosols and flammable and combustible liquids, respectively.

e. Section 503 shall apply for fire apparatus access.

f. For storage exceeding 30 feet in height, Option 1 shall be used.

g. Special fire protection provisions including, but not limited to, fire protection of exposed steel columns; increased sprinkler density; additional in-rack sprinklers, without associated reductions in ceiling sprinkler density; or additional fire department hose connections shall be provided required by the fire code official.

h. High-piled storage areas shall not exceed 500,000 square feet. A 2-hour fire wall constructed in accordance with Section 706 the International Building Code shall be used to divide high-piled storage exceeding 500,000 square feet in area.

i. Not required where an automatic fire-extinguishing system is designed and installed to protect the high-piled storage area in accordance with Sections 3207 and 3208.

j. Not required where storage areas are protected by either early suppression fast response (ESFR) sprinkler systems or control mode special application sprinklers with a response time index of 50 (m • s)¹⁄² or less that are listed to control a fire in the stored commodities with 12 or fewer sprinklers, installed in accordance with NFPA 13.

K. Not required in frozen food warehouses used solely for storage of Class I and II commodities where protected by an approved automatic sprinkler system.

Reason: By adding footnote K it will ensure that the AHJ knows that frozen food warehouses that are used solely for the storage of Class I and II commodities and are protected by an approved automatic sprinkler system do not require smoke and heat vents.

Some AHJs may state that table 3206.2 would require smoke and heat vents since section 910.2 exemption 1 is not shown in the table. Note that there is already a footnote J for ESPR sprinkler systems and control mode specific application sprinklers matching exceptions 2 and 3 of section 910.2.

Cost Impact: Will not increase the cost of construction
This will not increase cost, since this is allowed now by the code.
F318-16
IFC: 202, 3206.2, 3206.2.1 (New), 3206.3, 3206.3.1, 3206.3.1 (New), 3206.3.2, 3206.3.2.1, 3206.3.2.2.

Proponent: Michael O'Brian representing the Fire Code Action Committee (FCAC@iccsafe.org)

2015 International Fire Code
Revise as follows:

SECTION 202 DEFINITIONS

HIGH-PILED STORAGE AREA. An area within a building which is designated, intended, proposed or actually used for high-piled combustible storage, including operating aisles.

3206.2 Extent and type Type of protection. Where required by Table 3206.2, fire detection systems, smoke and heat removal and automatic sprinkler design densities shall extend be provided to protect the lesser of 15 feet (4572 mm) beyond the high-piled storage area or to a permanent partition. Where portions of high-piled storage areas have different fire protection requirements because of commodity, method of high-piled storage or storage height, the fire protection features required by Table 3206.2 within this area shall be based on the most restrictive design requirements.

Add new text as follows:

3206.2.1 Extent of protection. The fire safety features required in Table 3206.2 shall extend the lesser of 15 feet (4572 mm) beyond the high-piled storage area or to a full height wall. Where portions of high-piled storage areas have different fire protection requirements because of commodity, method of storage or storage height, the fire protection features required by Table 3206.2 within this area shall be based on the most restrictive design requirements.

Revise as follows:

3206.3 Separation of high-piled High-piled storage areas. For application of Table 3206.2, the size of the high-piled high-piled storage areas shall be separated from other portions of the building where required by determined in accordance with Sections 3206.3.1 through 3206.3.2.2 3206.3.3.

Delete without substitution:

3206.3.1 Separation from other uses. Mixed occupancies shall be separated in accordance with the International Building Code.

Add new text as follows:

3206.3.1 Size of high-piled storage area. The size of each high-piled storage area shall include the footprint of the actual high-piled storage racks, shelves or piles including the following aisles:

1. All interior aisles within the footprint of the storage area.
2. An aisle around the perimeter of the footprint with a minimum width as required in Section 3206.9.1 or the dimension to a wall or full height wall, whichever is less.
Revise as follows:

3206.3.2 Multiple high-piled storage areas. Multiple
Where a building contains multiple high-piled storage areas, the aggregate of all high-piled storage areas shall be used for the application of Table 3206.2 unless the high-piled storage areas are separated in accordance with Section 3206.3.2.1 or 3206.3.2.2, one of the following:

1. High-piled storage areas separated by fire barriers with a minimum fire-resistance-rating of 1-hour constructed in accordance with Section 707 of the International Building Code.
2. In buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.1, high-piled storage areas separated by 100 feet (30 480 mm) or more. The area providing the separation shall not contain high-piled combustible storage.

Delete without substitution:

3206.3.2.1 Aggregate area. The aggregate of all high-piled storage areas within a building shall be used for the application of Table 3206.2 unless such areas are separated from each other by 1-hour fire barriers constructed in accordance with Section 707 of the International Building Code. Openings in such fire barriers shall be protected by opening protectives having a 1-hour fire protection rating.

Revise as follows:

3206.3.2.2 3206.3.3 Multiclass Multiple class high-piled storage areas. High-piled storage areas classified as Class I through IV not separated from high-piled storage areas classified as high hazard shall utilize the aggregate of all high-piled storage areas as high hazard for the purposes of the application of Table 3206.2. To Multiple class high-piled storage areas meeting the separation requirements in Section 3206.3.2 shall be considered as separated, 1-hour fire barriers. The fire safety features in Table 3206.2 shall be constructed extended beyond the higher hazard storage area in accordance with Section 707 of the International Building Code 3206.2.1. Openings in such fire barriers shall be protected by opening protectives having a 1-hour fire protection rating.

Exception: As provided for, Multiple class high-piled storage areas do not need to be separated where in accordance with Section 3204.2.

Reason: 3206.2 – deals only with type of protection and makes specific reference to Table 3206.2
3206.2.1 – separated from 3206.2 and now deals only with protection extending 15’ beyond the high-piled storage area
3206.3 – specifies to follow the subsequent sections to determine the area of the area of high-piled storage to use with Table 3206.2
3206.3.1 – evaluates the individual high-piled storage area and addresses inclusion of aisles

This graphic shows revisions in Sections 3260.2.1, 3260.3 and 3260.3.1:
3206.3.2 – specifies that you consider the aggregate of all high-piled storage areas for use with Table 3206.2, unless the high-piled storage are separated by one of the three options.

3206.3.3 – specifies that when one high-piled storage area is high hazard and the other is Class I-IV, that they are considered in the aggregate except when separated by 1-HR fire barrier. Refers back to 3206.2.1 for extent of protection.

This graphic shows the separation of high-piled storage areas allowed by Section 3206.3.2, Item 3:
This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire safety and hazardous materials in new and existing buildings and facilities and the protection of life and property in wildland urban interface areas. In 2014 and 2015 the Fire-CAC has held 5 open meetings. In addition, there were numerous conference calls, Regional Work Group and Task Group meetings for the current code development cycle, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC

Cost Impact: Will not increase the cost of construction
This proposal may eliminate the need to construct a fire barrier to separate high-piled storage areas.
**F319-16**  
**IFC: 3206.2.**  
**Proponent:** Michael O'Brian representing the Fire Code Action Committee (FCAC@iccsafe.org)

2015 International Fire Code  
Revise as follows:

**TABLE 3206.2**  
**GENERAL FIRE PROTECTION AND LIFE SAFETY REQUIREMENTS**

<table>
<thead>
<tr>
<th>COMMODITY CLASS</th>
<th>SIZE OF HIGH-PILE STORAGE AREA (square feet) (see Sections 3206.2 and 3206.4)</th>
<th>ALL STORAGE AREAS (See Sections 3206, 3207 and 3208)</th>
<th>SOLID-PILE STORAGE, SHELF STORAGE AND PALLETTIZED STORAGE (see Section 3207.3)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Automatic fire-extinguishing system (see Section 3206.4)</td>
<td>Fire detection system (see Section 3206.5)</td>
<td>Smoke and heat removal (see Section 3206.7)</td>
</tr>
<tr>
<td></td>
<td>Building access (see Section 3206.6)</td>
<td></td>
<td>Maximum pile dimension (feet)</td>
</tr>
<tr>
<td></td>
<td>Maximum permissible storage height (feet)</td>
<td>Maximum pile volume (cubic feet)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I-IV</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>0-500</td>
<td>Not Required^a</td>
<td>Not Required</td>
<td>Not Required</td>
</tr>
<tr>
<td></td>
<td>Not Required^a</td>
<td>Not Required</td>
<td>Not Required</td>
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<td></td>
</tr>
<tr>
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<td></td>
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<tr>
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<td>400,000</td>
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<tr>
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<td></td>
<td>400,000</td>
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<tr>
<td>2,501-12,000</td>
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<td>100</td>
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<td>Nonpublic accessible (Option 2)</td>
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<td>Not Required</td>
<td>100</td>
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<tr>
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<td></td>
<td>400,000</td>
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<td>20,001-500,000</td>
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<td>Not Required</td>
<td>100</td>
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<tr>
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<tr>
<td></td>
<td></td>
<td></td>
<td>400,000</td>
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<tr>
<td>Greater than 500,000</td>
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<td>Yes</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Yes</td>
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</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High hazard</td>
<td>0-500</td>
<td>Required</td>
<td>Required</td>
</tr>
<tr>
<td>--------------</td>
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<tr>
<td>501-2,500 Public accessible</td>
<td>Yes</td>
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<td>Not</td>
</tr>
<tr>
<td>501-2,500 Nonpublic accessible (Option 1)</td>
<td>Yes</td>
<td>Not</td>
<td>Not</td>
</tr>
<tr>
<td>High hazard</td>
<td>501-2,500 Nonpublic accessible (Option 2)</td>
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<td>2,501-300,000</td>
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<td>Not Required</td>
<td>Yes</td>
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<tr>
<td>Greater than</td>
<td>300,000</td>
<td>Yes</td>
<td>Not Required</td>
</tr>
<tr>
<td>500,000</td>
<td>Not Required</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

For SI: 1 foot = 304.8 mm, 1 cubic foot = 0.02832 m³, 1 square foot = 0.0929 m².

a. Where automatic sprinklers are required for reasons other than those in Chapter 32, the portion of the sprinkler system protecting the high-piled storage area shall be designed and installed in accordance with Sections 3207 and 3208.
b. For aisles, see Section 3206.9.
c. Piles shall be separated by aisles complying with Section 3206.9.
d. For storage in excess of the height indicated, special fire protection shall be provided in accordance with Note g where required by the fire code official. See Chapters 51 and 57 for special limitations for aerosols and flammable and combustible liquids, respectively.
e. Section 503 shall apply for fire apparatus access.
f. For storage exceeding 30 feet in height, Option 1 shall be used.
g. Special fire protection provisions including, but not limited to, fire protection of exposed steel columns; increased sprinkler density; additional in-rack sprinklers, without associated reductions in ceiling sprinkler density; or additional fire department hose connections shall be provided required by the fire code official.
h. High-piled storage areas shall not exceed 500,000 square feet. A 2-hour fire wall constructed in accordance with Section 706 of the International Building Code shall be used to divide high-piled storage exceeding 500,000 square feet in area.
i. Not required where an automatic fire-extinguishing system is designed and installed to protect the high-piled storage area in accordance with Sections 3207 and 3208.
j. Not required where storage areas are protected by either early suppression fast response (ESFR) sprinkler systems or control mode special application sprinklers with a response time index of \(50 \text{ (m} \cdot \text{s}^{1/2})\) or less that are listed to control a fire in the stored commodities with 12 or fewer sprinklers, installed in accordance with NFPA 13.

**Reason:** This proposal deletes the requirement for a 2-hour wall when the size of the high-piled combustible storage area exceeds 500,000 square feet.

This provision has been a requirement for nearly two decades. The concept behind this provision was to provide a maximum size of fire when the sprinkler system did not control the fire.

This provision does not need to continue in the code for the following reasons:

1. Since the time this requirement went into the codes, fire sprinkler designs and capabilities have increased immensely.
2. The building is protected by a fire sprinkler system that is designed to handle the fire load and control the fire.
3. If the sprinkler system does not control the fire, and the fire spreads to the fire-rated wall, there are very few fire departments that can handle a fire of 500,000 square feet. So if the fire department has difficulty
with 500,000 square feet, why not 700,000 square feet? When a building exists of this size, it is also surrounded by a fire separation distance of 60 feet in width.

4. The IBC allows buildings with an occupancy of Group B, F, M or S to have unlimited area when adequate frontage is provided and fire sprinklers are installed.

Footnote h is added to the requirement for a fire detection system in nonpublic accessible high-hazard storage with an area between 501 and 2,500 square feet. The footnote is not currently shown for high-hazard, but is allowed for Class I-IV. This footnote indicates that the fire detection system is not required if a fire sprinkler system is installed. Footnote a requires that where a fire sprinkler system is installed, it must be designed in accordance with the hazard presented by the commodity and storage methods. Therefore, even though a fire sprinkler system is not required for 501-2,500 square feet, if one is installed it must be designed for the hazard; and if the fire sprinkler system is installed, the fire detection system is not needed.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire safety and hazardous materials in new and existing buildings and facilities and the protection of life and property in wildland urban interface areas. In 2014 and 2015 the Fire-CAC has held 5 open meetings. In addition, there were numerous conference calls, Regional Work Group and Task Group meetings for the current code development cycle, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: [FCAC](#)

**Cost Impact:** Will not increase the cost of construction

This proposal will reduce the cost of construction when high-piled storage areas exceed 500,000 square feet by deleting the current requirement for a 2-hour wall.
## TABLE 3206.2
GENERAL FIRE PROTECTION AND LIFE SAFETY REQUIREMENTS

<table>
<thead>
<tr>
<th>COMMODITY CLASS</th>
<th>SIZE OF HIGH-PILED STORAGE AREA (square feet)</th>
<th>ALL STORAGE AREAS (See Sections 3206, 3207 and 3208b)</th>
<th>SOLID-PILED STORAGE, SHELF STORAGE AND PALLETIZED STORAGE (see Section 3207.3)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Automatic fire-extinguishing system (see Section 3206.4)</td>
<td>Fire detection system (see Section 3206.5)</td>
<td>Building access (see Section 3206.6)</td>
</tr>
<tr>
<td>0-500</td>
<td>Not Required&lt;sup&gt;a&lt;/sup&gt;</td>
<td>Not Required</td>
<td>Not Required</td>
</tr>
<tr>
<td>501-2,500</td>
<td>Not Required&lt;sup&gt;a&lt;/sup&gt;</td>
<td>Yes&lt;sup&gt;j&lt;/sup&gt;</td>
<td>Not Required</td>
</tr>
<tr>
<td>2,501-12,000</td>
<td>Public accessible</td>
<td>Yes</td>
<td>Not Required</td>
</tr>
<tr>
<td>2,501-12,000</td>
<td>Nonpublic accessible (Option 1)</td>
<td>Yes</td>
<td>Not Required</td>
</tr>
<tr>
<td>2,501-12,000</td>
<td>Nonpublic accessible (Option 2)</td>
<td>Not Required&lt;sup&gt;a&lt;/sup&gt;</td>
<td>Yes</td>
</tr>
<tr>
<td>12,001-20,000</td>
<td>Yes</td>
<td>Not Required</td>
<td>Yes</td>
</tr>
<tr>
<td>20,001-500,000</td>
<td>Yes</td>
<td>Not Required</td>
<td>Yes</td>
</tr>
<tr>
<td>Greater than 500,000&lt;sup&gt;g&lt;/sup&gt;</td>
<td>Yes</td>
<td>Not Required</td>
<td>Yes</td>
</tr>
<tr>
<td>0-500</td>
<td>Not</td>
<td>Not</td>
<td>Not</td>
</tr>
</tbody>
</table>

<sup>a</sup> Not Required
<sup>b</sup> See Sections 3206, 3207 and 3208.
<sup>c</sup> Maximum pile dimension.
<sup>d</sup> Maximum permissible storage height.
<sup>e</sup> Maximum pile volume (cubic feet).
<sup>f</sup> 30 feet
<sup>g</sup> Greater than 500,000 cubic feet.
<sup>h</sup> 200,000 cubic feet.
<sup>i</sup> Required.
<sup>j</sup> Required.
For SI: 1 foot = 304.8 mm, 1 cubic foot = 0.02832 m$^3$, 1 square foot = 0.0929 m$^2$.

a. Where automatic sprinklers are required for reasons other than those in Chapter 32, the portion of the sprinkler system protecting the high-piled storage area shall be designed and installed in accordance with Sections 3207 and 3208.

b. For aisles, see Section 3206.9.

c. Piles shall be separated by aisles complying with Section 3206.9.

d. For storage in excess of the height indicated, special fire protection shall be provided in accordance with Note g where required by the fire code official. See Chapters 51 and 57 for special limitations for aerosols and flammable and combustible liquids, respectively.

e. Section 503 shall apply for fire apparatus access.

f. For storage exceeding 30 feet in height, Option 1 shall be used.

g. Special fire protection provisions including, but not limited to, fire protection of exposed steel columns; increased sprinkler density; additional in-rack sprinklers, without associated reductions in ceiling sprinkler density; or additional fire department hose connections shall be provided required by the fire code official.

h. High-piled storage areas shall not exceed 500,000 square feet. A 2-hour fire wall constructed in accordance with Section 706 the International Building Code shall be used to divide high-piled storage exceeding 500,000 square feet in area.

i. Not required where an automatic fire-extinguishing system is designed and installed to protect the high-piled storage area in accordance with Sections 3207 and 3208.

j. Not required where storage areas are protected by either early suppression fast response (ESFR) sprinkler systems or control mode special application sprinklers with a response time index of 50 (m $\cdot$ s)$^{1/2}$ or less that are listed to control a fire in the stored commodities with 12 or fewer sprinklers, installed in accordance with NFPA 13.

**Reason:** This proposal revises the requirements for maximum pile dimensions. The maximum height and maximum volume of piles does not change. The allowable pile dimension is increased by 20%. This accommodates new construction methods and larger buildings. Many large buildings are constructed with a column spacing of 52 feet. The column spacing of 52 feet does not match up with the maximum pile size of 100 feet. Many building owners often desire pile dimensions beyond the 100 feet to fit into their building design and avoid interior columns spaced at 52'.

This proposal will allow the increase of 20% to allow piles to fit into the building design without a significant increase in fire load. The fire load is not increased because the volume of the pile does not change. In order to take advantage of the increased pile dimensions, some of the other dimensions of the pile must be reduced so as not to exceed the maximum pile volume.

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which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC

**Cost Impact:** Will not increase the cost of construction
This will actually reduce cost of construction by spacing doors further apart.
## TABLE 3206.2
### GENERAL FIRE PROTECTION AND LIFE SAFETY REQUIREMENTS

<table>
<thead>
<tr>
<th>COMMODITY CLASS</th>
<th>SIZE OF HIGH-PILED STORAGE AREA (square feet) (see Sections 3206.2 and 3206.4)</th>
<th>ALL STORAGE AREAS (see Sections 3206, 3207 and 3208)</th>
<th>SOLID-PILED STORAGE, SHELF STORAGE AND PALLETIZED STORAGE (see Section 3207.3)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Automatic fire-extinguishing system (see Section 3206.4)</td>
<td>Fire detection system (see Section 3206.5)</td>
<td>Building access (see Section 3206.6)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-500</td>
<td>Not Required</td>
<td>Not Required</td>
<td>Not Required</td>
</tr>
<tr>
<td>501-2,500</td>
<td>Not Required</td>
<td>Yes</td>
<td>Not Required</td>
</tr>
<tr>
<td>2,501-12,000 Public accessible</td>
<td>Yes</td>
<td>Not Required</td>
<td>Not Required</td>
</tr>
<tr>
<td>2,501-12,000 Nonpublic accessible (Option 1)</td>
<td>Yes</td>
<td>Not Required</td>
<td>Not Required</td>
</tr>
<tr>
<td>2,501-12,000 Nonpublic accessible (Option 2)</td>
<td>Not Required</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>12,001-20,000</td>
<td>Yes</td>
<td>Not Required</td>
<td>Yes</td>
</tr>
<tr>
<td>20,001-12,000</td>
<td>Yes</td>
<td>Not Required</td>
<td>Yes</td>
</tr>
<tr>
<td>Greater than 12,000</td>
<td>Yes</td>
<td>Not Required</td>
<td>Yes</td>
</tr>
<tr>
<td>High hazard</td>
<td>0-500</td>
<td>Not Required</td>
<td>Not Required</td>
</tr>
<tr>
<td>-------------</td>
<td>-------</td>
<td>--------------</td>
<td>--------------</td>
</tr>
<tr>
<td>501-2,500 Public accessible</td>
<td>Yes</td>
<td>Not Required</td>
<td>Not Required</td>
</tr>
<tr>
<td>501-2,500 Nonpublic accessible (Option 1)</td>
<td>Yes</td>
<td>Not Required</td>
<td>Not Required</td>
</tr>
<tr>
<td>501-2,500 Nonpublic accessible (Option 2)</td>
<td>Not Required</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>2,501-300,000</td>
<td>Yes</td>
<td>Not Required</td>
<td>Yes</td>
</tr>
<tr>
<td>300,001-500,000</td>
<td>Yes</td>
<td>Not Required</td>
<td>Yes</td>
</tr>
</tbody>
</table>

For SI: 1 foot = 304.8 mm, 1 cubic foot = 0.02832 m³, 1 square foot = 0.0929 m².

a. Where automatic sprinklers are required for reasons other than those in Chapter 32, the portion of the sprinkler system protecting the high-piled storage area shall be designed and installed in accordance with Sections 3207 and 3208.

b. For aisles, see Section 3206.9.

c. Piles shall be separated by aisles complying with Section 3206.9.

d. For storage in excess of the height indicated, special fire protection shall be provided in accordance with Note g where required by the fire code official. See Chapters 51 and 57 for special limitations for aerosols and flammable and combustible liquids, respectively.

e. Section 503 shall apply for fire apparatus access.

f. For storage exceeding 30 feet in height, Option 1 shall be used.

g. Special fire protection provisions including, but not limited to, fire protection of exposed steel columns; increased sprinkler density; additional in-rack sprinklers, without associated reductions in ceiling sprinkler density; or additional fire department hose connections shall be provided required by the fire code official.

h. High-piled storage areas shall not exceed 500,000 square feet. A 2-hour fire wall constructed in accordance with Section 706 the International Building Code shall be used to divide high-piled storage exceeding 500,000 square feet in area.

i. Not required where an automatic fire-extinguishing system is designed and installed to protect the high-piled storage area in accordance with Sections 3207 and 3208.

j. Not required where storage areas are protected by either early suppression fast response (ESFR) sprinkler systems or control mode special application sprinklers with a response time index of $50 \text{ (m \cdot s)}^{1/2}$ or less that are listed to control a fire in the stored commodities with 12 or fewer sprinklers, installed in accordance with NFPA 13.

**Reason:** This is merely an editorial correction. The rows for “12,001-20,000” and “20,001-500,000” both contain the same requirements. Since there is no difference in the requirements, the two rows should be combined.

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**Cost Impact:** Will not increase the cost of construction

This is an editorial change with no impact on application or enforcement.
3206.4.2 Speculative High Pile Combustible Storage Buildings. The minimum design requirements of the automatic sprinkler system for speculative high pile combustible storage buildings shall be based on the storage of a cartoned Class A nonexpanded plastic to the maximum available storage height. The maximum available storage height shall be determined by subtracting 48 inches from the highest point of the roof above each automatic sprinkler system for ESFR sprinklers and 30 inches for area density applications.

Reason: The current trend is for developers to build speculative warehouses for the use of high pile storage without knowing who will lease and what will be stored. If the building does not have the tenant and it is not known what will be stored the developer will then install an ordinary group 2 sprinkler system which will meet building/fire and NFPA 13 codes and then later will have to remove the system and replace with a new system. However, sometimes tenants are just moving inside these buildings without fixing the sprinkler system until the local fire department does an inspection and sees racks of high pile combustible storage and discovers an unsafe building. By providing this minimum level of design it would work for over 80% of the commodities that are stored in speculative warehouses.

Cost Impact: Will increase the cost of construction
The cost will increase since you would no longer be able to design an ORD Group 2 sprinkler system in a speculative warehouse.
F323-16
IFC: 3206.9.1.1.
Proponent: Michael O'Brian representing the Fire Code Action Committee (FCAC@icc.safe.org)

2015 International Fire Code

Revise as follows:

3206.9.1.1 Sprinklered buildings. Aisles in sprinklered buildings shall be not less than 44 inches (1118 mm) wide. Aisles shall be not less than 96 inches (2438 mm) wide in high-piled storage areas exceeding 2,500 square feet (232 m²) in area, that are accessible to the public and designated to contain high-hazard commodities.

Exceptions:

1. Aisles in high-piled storage areas exceeding 2,500 square feet (232 m²) in area, that are accessible to the public and designated to contain high-hazard commodities, are protected by a sprinkler system designed for multiple-row racks of high-hazard commodities shall be not less than 44 inches (1118 mm) wide.

2. Aisles in high-piled storage areas exceeding 2,500 square feet (232 m²) in area, that are not accessible to the public and are protected by a sprinkler system designed for multiple-row racks shall be not less than 24 inches (1118 mm) wide.

Aisles shall be not less than 96 inches (2438 mm) wide in areas accessible to the public where mechanical stocking methods are used.

Reason: Many high-piled storage areas consist of hand stacking areas. In these situations, minimum aisle widths of 24 inches are appropriate provided the aisles are not accessible by the public, and the storage area is protected as required for multi-row rack storage.

The 24 inch aisle width is already allowed in Section 3206.9.1 for employee use. This proposal will correlate the requirements in both sections.

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Cost Impact: Will not increase the cost of construction

This proposal will reduce the cost of construction since it allows smaller aisles when consistent with the sprinkler design.
3208.3 Flue spaces. Flue spaces shall be provided with flue spaces in accordance with Table 3208.3. Required flue spaces shall be maintained.

3208.3.1 Flue space protection. Where required by the fire code official, flue spaces required by Table 3208.3 above the first tier or level, in single-, double- or multiple-row rack storage installations shall be equipped with approved devices to protect the required flue spaces. Such devices shall not be removed or modified.

**TABLE 3208.3**
REQUIRED FLUE SPACES FOR RACK STORAGE

<table>
<thead>
<tr>
<th>RACK CONFIGURATION</th>
<th>AUTOMATIC SPRINKLER PROTECTION</th>
<th>SPRINKLER AT THE CEILING WITH OR WITHOUT MINIMUM IN-RACK SPRINKLERS</th>
<th>IN-RACK SPRINKLERS AT EVERY TIER</th>
<th>NONSPRINKLERED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storage Height</td>
<td>Option 1</td>
<td>≤ 25-feet</td>
<td>&gt; 25-feet</td>
<td>Any-height</td>
</tr>
<tr>
<td></td>
<td>Transverse flue space</td>
<td>3 inches</td>
<td>Not Applicable</td>
<td>3 inches</td>
</tr>
<tr>
<td></td>
<td>Vertically aligned</td>
<td>Not Required</td>
<td>Not Applicable</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Longitudinal flue space</td>
<td>Not Required</td>
<td>Not Applicable</td>
<td>Not Required</td>
</tr>
<tr>
<td>Single-row rack</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Transverse flue space</td>
<td>6 inches</td>
<td>3 inches</td>
<td>Not Required</td>
</tr>
<tr>
<td></td>
<td>Vertically aligned</td>
<td>Not Required</td>
<td>Not Required</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Longitudinal flue space</td>
<td>Not Required</td>
<td>6 inches</td>
<td>Not Required</td>
</tr>
<tr>
<td>Double-row rack</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Transverse flue space</td>
<td>6 inches</td>
<td>3 inches</td>
<td>Not Required</td>
</tr>
<tr>
<td></td>
<td>Vertically aligned</td>
<td>Not Required</td>
<td>Not Required</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Longitudinal flue space</td>
<td>Not Required</td>
<td>6 inches</td>
<td>Not Required</td>
</tr>
<tr>
<td>Multirow rack</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Transverse flue space</td>
<td>6 inches</td>
<td>Not Applicable</td>
<td>6 inches</td>
</tr>
<tr>
<td></td>
<td>Vertically aligned</td>
<td>Not Required</td>
<td>Not Applicable</td>
<td>Yes</td>
</tr>
<tr>
<td>Rack Configuration</td>
<td>Flue Design</td>
<td>Automatic Sprinkler Protection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>--------------------</td>
<td>------------</td>
<td>---------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Transverse</td>
<td>Sprinklers at the Ceiling With or Without Minimum In-Rack Sprinklers</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Size b</td>
<td>In-Rack Sprinklers at Every Tier</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single-row rack</td>
<td>3 inches</td>
<td>Storage Height ≤ 25 feet</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Storage Height &gt;25 feet</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Vertically aligned</td>
<td>Any Height</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Longitudinal flue space</td>
<td>Not Required</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Double-row rack</td>
<td>Transverse</td>
<td>3 inches</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Option 1)</td>
<td>Size b</td>
<td>6 inches a</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Vertically aligned</td>
<td>3 inches</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Longitudinal flue space</td>
<td>Not Required</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Not Required</td>
<td>Not Required</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Double-row rack</td>
<td>Transverse</td>
<td>3 inches</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Option 2)</td>
<td>Size b</td>
<td>3 inches</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Vertically aligned</td>
<td>Not Required</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Longitudinal flue space</td>
<td>Not Required</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>6 inches</td>
<td>Not Required</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multirow rack</td>
<td>Transverse</td>
<td>6 inches</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Size b</td>
<td>6 inches</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Vertically aligned</td>
<td>Not Required</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Longitudinal flue space</td>
<td>Not Required</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Not Required</td>
<td>Not Required</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

a. Three-inch transverse flue spaces shall be provided not less than every 10 feet where ESFR sprinkler protection is provided.

b. Random variations are allowed, provided that the configuration does not obstruct water penetration.

**Reason:** The application of flue space requirements and the format of Table 3208.3 have created confusion, and this proposal is intended to clarify the requirements.

Section 3208.3 is revised to clarify that the flue space requirements are not applicable to rack storage where a fire sprinkler system is not provided. The purpose of the flue spaces is to allow heat from a fire to rise and activate the sprinklers and then allow the water to penetrate down into the rack to the fire location. Since the building is not sprinklered, flue spaces are not required, which is already specified in the right column of Table 3208.3. This is no change from current requirements, just a simplification and clarification.

Section 3208.3.1 is revised to specify that in situations where flue protection devices are required, they are not needed on the first tier. The flue protection devices maintain open flue spaces which allow heat to rise from a fire and activate the sprinkler system, and sprinkler water to penetrate down to the fire location. The sprinkler water does not need to travel below the bottom tier, therefore flue protection devises are not necessary on that bottom tier.

Table 3208.3 is revised by deleting the right column since those provisions are handled in the revised Section 3208.3. Also, the criteria for the optional flue design has been moved from a column to a new row listed as Option 2 for Double-row Racks. These revisions to table do not change any requirements but simplify the table to aid in clearer application.

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**Cost Impact:** Will not increase the cost of construction

This proposal clarifies the code requirements.
F325-16
IFC: 3209.4, 3209.4.1 (New).

Proponent: Michael O’Brien representing the Fire Code Action Committee (FCAC@iccsafe.org)

2015 International Fire Code

Revise as follows:

3209.4 Automated rack storage. High-piled storage areas with greater than 500 square feet (46 m²) of automated rack storage shall be provided with shutdown capabilities as follows:

1. Automatic shutdown of the automated rack storage system shall occur when water flow is detected in the automatic sprinkler system, if present.
2. Automatic shutdown of the automated rack storage system shall occur upon activation of the fire detection system required in Table 3206.2, if present.
3. A manually activated emergency shutdown switch for use by emergency personnel shall be provided to shut down the automated rack storage system. The switch shall be clearly identified and shall be in a location approved by the fire chief.

Add new text as follows:

3209.4.1 Emergency operation. Capability shall be provided for emergency personnel to override the shutdown and operate the rack storage system after shutdown has occurred. When the override is utilized, the automated rack storage system will travel at a speed approved by the fire chief.

Reason: Automated rack storage systems typically consist of aisles which are only wide enough for the pallet load, and heights which reach above 75 feet. The pallet movers travel quickly from one end of the rack to the other, and from floor to topmost storage tier. If these pallet movers are operational when firefighters are within the storage array, there is very high possibility for injury since there is now here to escape the path of the pallet mover as it travels down the aisle. This process necessitates the need to clarify and enhance the requirements for shutdown and operation during a fire situation.

Similar to the requirements for carousel storage in Section 3209.3, a threshold is included for application of these shutdowns when the area exceeds 500 square feet. The functions of the required shutdowns are clarified. New requirements specify that shutdown is to occur automatically upon water flow or fire detection system operation. Additionally, the manual shutdown is retained.

Section 3209.4.1 is added to require that the system can be overridden to allow use by firefighters. Since many of these automated rack storage systems can exceed the reach of firefighting operations from the floor, the pallet movers can be used to carry firefighters up to locations within the rack for final extinguishment. The pallet movers are designed for this type of operation already, where they can transport personnel up into the rack for maintenance and inspection operations. This requirement allows the firefighters to utilize this same function after the automated rack storage system shutdown has activated. A requirement is included for the fire chief to review and approve the operating speed when the equipment is in manual override.

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**Cost Impact:** Will increase the cost of construction
This may result in a minimal increase to the cost of construction. Automated storage is a computer controlled system, so revisions to the program software may be necessary along with a manual switch.
F326-16
IFC: 3303.1.
Proponent: Jonathan Roberts (jonathan.roberts@ul.com)

2015 International Fire Code

Revise as follows:

3303.1 Listed. Temporary heating devices shall be listed and labeled in accordance with the International Mechanical Code or the International Fuel Gas Code labeled. The installation, maintenance and use of temporary heating devices shall be in accordance with the terms of listing and the listing manufacturers instructions.

Reason: The IMC and the IFGC do not regulate portable heating devices. Referencing these codes is not necessary. This code change will require the devices to be used in accordance with their listing and the manufacturer's instructions.

Cost Impact: Will not increase the cost of construction
The change simply clarifies existing requirements and revises the language within this section.
2015 International Fire Code

Add new text as follows:

### 3304.5 Fire watch

Where required by the fire code official for building demolition, or building construction during working hours that is hazardous in nature, qualified personnel shall be provided to serve as an on-site fire watch. Fire watch personnel shall be provided with not less than one approved means for notification of the fire department and their sole duty shall be to perform constant patrols and watch for the occurrence of fire. Follows:

1. While temporary heating equipment is in operation.
2. Where otherwise required by the fire code official for building demolition, or building construction during working hours that is hazardous in nature.

### 3304.5.1 Fire watch personnel

Qualified personnel shall be provided to serve as an on-site fire watch. Fire watch personnel shall be provided with not less than one approved means for notification of the fire department and their sole duty shall be to perform constant patrols and watch for the occurrence of fire. The combination of fire watch duties and site security duties is acceptable.

### 3304.5.2 Fire watch location and records

The fire watch shall include the entire construction project site. The fire watch personnel shall keep a record of all time periods of duty including a log entry each time the site was patrolled and each time a structure under construction was entered and inspected. The records and log entries shall be made available for review by the fire code official upon request.

### 3304.5.3 Equipment

Individuals assigned to fire watch duty shall have fire-extinguishing equipment readily available and shall be trained in the use of such equipment. Individuals assigned to fire watch duty shall be responsible for extinguishing spot fires and communicating an alarm.

### 3308.1 Program development and maintenance

The owner or owners authorized agent shall be responsible for the development and maintenance of a written plan establishing and implementing a fire prevention program at the project site applicable throughout all phases of the construction, repair, alteration, or demolition work. The plan shall address the requirements of this Chapter and other applicable portions of this code, the duties of staff, and staff training requirements. The plan shall be made available for review by the fire code official upon request.

Revise as follows:

### 3308.1 Program superintendent

The owner shall designate a person to be the fire prevention program superintendent who shall be responsible for the fire prevention program and ensure that it is carried out through completion of the project. The fire prevention program superintendent shall have the authority to enforce the provisions of this chapter and other provisions as necessary to secure the intent of this chapter. Where guard service is provided in accordance with NFPA 241, the superintendent shall be responsible for the guard service.
3308.2 Prefire plans. No change to text.

3308.3 Training. Training of responsible personnel in the use of fire protection equipment shall be the responsibility of the fire prevention program superintendent. Records of training shall be kept and made a part of the written plan for the fire prevention program.

3308.4 Fire protection devices. The fire prevention program superintendent shall determine that all fire protection equipment is maintained and serviced in accordance with this code. The quantity and type of fire protection equipment shall be approved. Fire protection equipment shall be inspected a minimum of once per day, and the findings along with any remediation measures shall be documented in the fire prevention program log.

3308.5 Hot work operations. No change to text.

3308.6 Impairment of fire protection systems. No change to text.

3308.7 Temporary covering of fire protection devices. No change to text.

3309.1 Emergency telephone. Readily accessible emergency telephone facilities shall be provided in an approved location at the construction site, or an approved equivalent means of communication shall be provided. The street address of the construction site and the emergency telephone number of the fire department shall be posted adjacent to the telephone or where an equivalent means of communication has been approved the site address and fire department emergency telephone number shall be posted at the main entrance to the site, in guard shacks and in the construction site office.

3309.2 Immediate notification. Written instructions shall be posted in an approved location on the construction site and issued to staff performing guard or fire watch duties and the fire prevention program superintendent for the immediate notification of the fire department in the case of a fire.

Reason: The purpose of this proposal is to improve the effectiveness of fire prevention programs on active construction sites and correlate various requirements with other portions of the IFC and the referenced standard NFPA 241 which has undergone some enhancements.

3304.5 - Has been split to focus the charging section on when a fire watch is required. Temporary heating has been added as a requirement for fire watch to correlate with 3306.6 and NFPA 241 5.2.7 which requires supervision while the heating is being utilized.

3304.5.1 - Covers the requirement for qualified personnel and primary duty. Language has been added to provide for combining the fire watch function with site security duties. Most if not all sites have guard service and allowing the functions to blend provides for economy of compliance.

3304.5.2 - The language in the first sentence was based upon language for hot work fire watches found at Section 3504.2.2 identifying the scope of the area to be patrolled. The records and log language was added to provide for accountability and the ability for the fire code official to spot check records to verify compliance.

3304.5.3 - The language here was sourced from Section 3504.2.3

3308.1 - Has been added as a charging statement for the development and maintenance of a ‘written’ program. Making the plan available for review by the fire code official provides for compliance verification and tracks with inspection report requires found in NFPA 241.

3308.2 - NFPA 241 has had an enhancement added to the guard service requirements and the added pointer helps to provide for the reference to those improvements.

3308.4 - The added sentence simply requires records of required training to be kept and made available upon request.

3308.5 - The added language provides for assurance that the required fire protection equipment will be available when necessary and documenting inspections and any necessary remediation.

3309.1 - The added language here acknowledges the fact that hardline phones are no longer the standard, cell
phones and radio communication are acceptable alternatives, the language makes it clear the alternative is subject to approval of the fire code official. Alternatives for posting of the site address and fire department phone number are included.

3309.2 - The language here makes it clear fires are to be reported immediately and that appropriate staff are to be informed of this requirement. This tracks with NFPA 241 Section 7.4.2 and with Section 401.3.1 of the IFC.

**Cost Impact:** Will not increase the cost of construction

The language added addresses requirements found in other portions of this code, within the referenced standard and within related construction site fire safety regulations. Adding the requirements here for clarification does not increase cost. Adding language to allow fire watch and guard service to be combined provides opportunity for savings.
F328-16

IFC: 3304.5.

Proponent: Robert Davidson, Davidson Code Concepts, LLC, representing Self (rjd@davidsoncodeconcepts.com)

2015 International Fire Code

Revise as follows:

3304.5 Fire watch. Where required by the fire code official for building demolition, or building construction during working hours that is hazardous in nature, qualified personnel shall be provided to serve as an on-site fire watch. Fire watch personnel shall be provided with not less than one approved means for notification of the fire department and their sole duty shall be to perform constant patrols and watch for the occurrence of fire.

Where a new building is constructed utilizing combustible construction materials where the construction activities exceed two stories above grade, other than detached one- and two-family dwellings and townhouses, a fire watch shall be maintained at all times until the building's passive and active fire protection systems have been approved and placed in service.

Reason: Buildings under construction are at their most vulnerable stage, particularly when combustible construction materials are being employed. Should a fire start there is nothing to impede rapid fire spread throughout the open structure. Such fires get a jump on responding fire service units and conditions are typically further negatively impacted by limited access, potentially limited sources of water, flying brands and radiant heat exposure of nearby buildings and sites.

Though any building regardless of height and size can rapidly be consumed by fire during the construction phase, this proposal is targeting buildings where the construction activities are exceeding over two stories because it changes the dynamics of firefighting activities. Suppression activities for a fire from grade for a two-story building has reduced challenges as compared to buildings of three or more stories when dealing with issues of access and ability to apply water from hose streams or vehicle mounted monitor nozzles. Exceed two stories from grade and the need for utilizing elevated master stream application comes increases, delaying suppression until sufficient elevated resources can be assembled at the fire scene. The flying brand problem and exposure to neighboring properties hazard increases as well.

Prevention and early detection are the keys to preventing major losses on construction sites. The greater than two-story above grade is a reasonable point to establish a mandatory fire watch. In practical application, many if not most sites have guard service from the beginning to prevent theft of supplies, guard service can double for fire watch. There are numerous construction related hazards that trigger fire watch requirements as well that can occur before height of construction exceeds two stories above grade.

Just a handful of dozens of fires that have occurred at construction sites.

Los Angeles CA 2014 Under-construction seven-story 526-unit wood complex burns. 250 firefighters respond. Fire closed two freeways. Video. "The fire caused significant exposure to two adjacent buildings. A 16-story high-rise across the street at 221 N. Figueroa St. had flames on three floors and sprinklers had been activated on six floors when firefighters arrived. Heat appeared to have cracked hundreds of the building's windows, pictures showed." Portland, OR 2014 5-alarm blaze in under-construction wood building. Car bodies nearby melted by the heat. "These buildings have no protections. It’s just bare wood, and it's stacked up like kindling," said Doug Jones, Portland's assistant fire marshal. 'Once they catch fire, he said, they burn too quickly to save.' ... It took 135 firefighters and 1.5 million gallons of water to extinguish the fire, but not before it spread to a nearby house that was left uninhabitable. ... 'You’ve got this giant stack of kiln-dried wood just waiting for a match,' said Jeff Myhre, president of Myhre Group Architects, which has designed dozens similar wood-frame buildings in Portland."

Madison, WI 2014 (abc report). 105-unit under construction building.


Rockland Maryland 2013 Under-construction wood building the size of a city block burns. 3-alarm fire. 90% complete. 150 units. Total loss. Estimated $15-20 million.

Renton, WA 2009 (near Seattle). Under construction fire-story wood building; fire spread to neighboring one-story business. 4-alarm fire; 100 fire fighters.

Edgewater NJ 2000 Near-completion 200-plus unit wood building burned to the ground. 9 surrounding homes destroyed; others damaged.

**Cost Impact:** Will increase the cost of construction

Mandating a fire watch has the potential to cause additional costs, however, from a practical standpoint, many if not most construction sites have guard service from the beginning to prevent theft of supplies, guard service can double for fire watch. There are also numerous construction related hazards that trigger fire watch requirements as well that can occur before height of construction exceeds two stories above grade. So on many sites there would be negligible costs to implement a fire watch.
F329-16
3304.5.1 (New); IBC 3314 (New), [F] 3314.1

Proponent: Ali Fattah, City of San Diego Development Services Department, representing City of San Diego Development Services Department (afattah@sandiego.gov)

2015 International Fire Code

Add new text as follows:

3304.5.1(IBC [F] 3314.1) Fire watch during combustible construction. Where required by the fire code official, a fire watch shall be provided during non-working hours for construction that is combustible and exceeds 40 feet in height above the lowest adjacent grade.

2015 International Building Code

Add new text as follows:

SECTION 3314 FIRE WATCH DURING CONSTRUCTION

Reason: This code change was submitted as a public comment to G232-15 in Cycle A however staff indicated that it should be submitted to the Fire Code Committee in Cycle B so it was not considered by the membership. The code change is submitted after consideration of feedback from the American Wood Council and the Fire Code Action Committee as well as other stakeholders during the committee action hearings in Memphis.

Two issues were raised with the original proposal.

1. The proposal allowing either the Fire Code Official or Building Official to trigger compliance would create a potential conflict since one may trigger the requirement and the other may not.
2. The proposed language is more appropriate for the International Fire Code.

Technical merits of the original proposal were well received when considering the other proposals that had been submitted that were significantly more restrictive. The proposed code change recognizes issues prevalent in dense urban communities that are seeing an increase in multi-story combustible construction in close proximity to adjacent properties. This balanced proposal recognizes that the installation of automatic detection and fire extinguishing systems during construction is not practical and that at a minimum early notification for fire department response will improve protection for vulnerable neighboring properties.

The code change will not mitigate the socioeconomic impacts of losses created by such fires, however the proposed code change seeks to minimize the potential damage by initiating faster notification. Additionally the proposal recognizes responsibility for regulating construction, and fire safety during construction, varies between communities and the revised proposal adds the requirement to both the IBC and IFC and identifies the responsible official by code. Many large national developers provide fire watch to protect their investment even for non-combustible buildings when combustible materials are used and placed for future use during project construction. We urge the committee to support this necessary code change as a stop gap measure until a comprehensive research project funded by the wood industry provides more scientific and technically based solutions to the problem of large construction fires in urban areas.

Cost Impact: Will not increase the cost of construction
Most insurers providing coverage during construction require fire watch.
F330-16
IFC: 3304.6.

Proponent: Michael O'Brian representing the Fire Code Action Committee (FCAC@icc.safe.org)

2015 International Fire Code

Revise as follows:

3304.6 Cutting and welding. Operations involving the use of welding, cutting, open torches and welding other hot work operations and equipment shall be done in accordance with Chapter 35.

Reason: The current provisions in 3304.6 are limited to cutting and welding, yet the scope of Chapter 35 also includes the use of torches and other hot work operations and equipment. It is appropriate that these additional hot work operations, which might occur during construction, also be cross-referenced from 3304.6 to Chapter 35. This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire safety and hazardous materials in new and existing buildings and facilities and the protection of life and property in wildland urban interface areas. In 2014 and 2015 the Fire-CAC has held 5 open meetings. In addition, there were numerous conference calls, Regional Work Group and Task Group meetings for the current code development cycle, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC

Cost Impact: Will increase the cost of construction

This proposal does not introduce new construction requirements, but may result in a modest increase in the cost of construction to cover these additional operations.
IFC: 3304.8 (New).
Proponent: Jeffrey Shapiro, representing National Multifamily Housing Council
(jeff.shapiro@intlcodeconsultants.com)

2015 International Fire Code

Add new text as follows:

**3304.8 Cooking.** Cooking shall be prohibited except in approved designated cooking areas. Signs with a minimum letter height of 3 inches and a minimum brush stroke of 1/2 inch shall be posted in a conspicuous location in designated cooking areas stating:

**DESIGNATED COOKING AREA**
**COOKING OUTSIDE OF A DESIGNATED COOKING AREA IS PROHIBITED**

**Reason:** In 2014, a report entitled *Fires in Residential Properties Under Construction or Undergoing Major Renovation Other Than One- or Two-Family Homes* was published by NFPA in response to recent construction fires involving multifamily housing projects. The data analysis presented in this report revealed that cooking is a statistically significant source of ignition, and this finding was confirmed as plausible based on discussions with numerous construction managers for major multifamily developers regarding their personal experience. Although most of these fires were contained, the frequency of ignition and the risk of occasional large losses warrants a response by the industry and fire codes to establish reasonable control on cooking at construction sites. Requiring cooking to be located in a designated approved area will facilitate more effective oversight of cooking equipment, individuals performing cooking and exposed combustible materials where cooking equipment is used. The prescribed sign lettering dimensions match those already prescribed for other signs in Sections 5604.6.5 and 5703.5.1.

**Cost Impact:** Will increase the cost of construction
Requiring that cooking be located in a designated area and the cost of posting signs will have an insignificant impact on increasing construction costs.
Smoke detectors and smoke alarms. Smoke detectors and smoke alarms located in an area where airborne construction dust is expected shall be covered to prevent exposure to dust or shall be temporarily removed. During the time when smoke detectors or smoke alarms are out of service, an approved fire watch or other approved alternative means of detecting a fire shall be provided. Smoke detectors and alarms that were removed shall be replaced upon conclusion of dust-producing work. Smoke detectors and smoke alarms that were covered shall be inspected and cleaned, as necessary, upon conclusion of dust-producing work.

Reason: Unwanted alarms continue to negatively impact fire service resources. Construction activities such as welding, cutting, sanding and other dust producing operations, cause many unwanted alarms and unnecessary responses. When project planning, coordination and positive actions are taken before the construction activities, unwanted alarms can be drastically reduced.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire safety and hazardous materials in new and existing buildings and facilities and the protection of life and property in wildland urban interface areas. In 2014 and 2015 the Fire-CAC has held 5 open meetings. In addition, there were numerous conference calls, Regional Work Group and Task Group meetings for the current code development cycle, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC

Cost Impact: Will not increase the cost of construction
This proposal is merely trying to avoid unwanted alarms due to construction conditions associated with smoke alarms and smoke detectors.
F333-16
IFC: 3310.1, 3310.1.1 (New).
Proponent: Robert Davidson, Davidson Code Concepts, LLC, representing Self
(rjd@davidsoncodeconcepts.com)

2015 International Fire Code

Revise as follows:

3310.1 Required access. Approved vehicle access for fire fighting shall be provided to all construction or demolition sites. Vehicle access shall be provided to within in accordance with the following:

1. Within 100 feet (30 480 mm) of temporary or permanent fire department connections. Vehicle access shall be provided by either temporary or permanent roads, capable of supporting vehicle loading under all weather conditions.

2. Within 150 feet on not less than two sides of supporting vehicle loading under all weather conditions a building being constructed where both of the following apply:
   2.1. Construction is utilizing combustible materials
   2.2. Construction activities exceed two stories in height above grade other than detached one- and two-family dwellings and townhouses. Vehicle access shall be maintained until permanent fire apparatus access roads are available.

Add new text as follows:

3310.1.1 All weather access Vehicle access shall be provided by either temporary or permanent roads, capable of supporting vehicle loading under all weather conditions. Vehicle access shall be maintained until permanent fire apparatus access roads are available.

Reason: The r of this proposal is tw o fold. The first objective w as to split the language into tw o sections, leaving 3310.1 as the charging section for when access is required and creating a new 3310.1.1 for the carrying capability requirements for that access.

The current language calls for approved access to all construction or demolition sites, but does not provide any specific other than access within 100 feet of any FDCs. Construction is when a building is at its most vulnerable, particularly those utilizing combustible construction components. The fires, when they occur, are challenging and require access to effectively apply hose and master device streams.

The referenced standard, NFPA 241, includes the following requirement:
"7.5.5.7 The access roadway shall be extended to within 46 m (150 ft) of all portions of the exterior walls of the first story of any building."

Recognizing that pulling that requirement into the code presents practical difficulties for the overwhelming majority of construction sites, the language suggested ties the access to only two sides and uses a trigger of over two stories in height of combustible construction methods as a more reasonable target for compliance.

Cost Impact: Will increase the cost of construction

There could be some increased compliance by providing the required access, however, there will also be opportunities to save costs by having a standard of access in the code that designers and builders can utilize as they develop project plans instead of facing the unexpected need to modify operations to provide access once the site work starts.
F334-16

IFC: 3310.1.

Proponent: Mark Nowak, representing Steel Framing Alliance

2015 International Fire Code

3310.1 Required access. Approved vehicle access for fire fighting shall be provided to all construction or demolition sites. Vehicle access shall be provided to within 100 feet (30 480 mm) of temporary or permanent fire department connections. Vehicle access shall be provided by either temporary or permanent roads, capable of supporting vehicle loading under all weather conditions. Vehicle access shall be maintained until permanent fire apparatus access roads are available. For residential buildings with combustible building elements 40 feet or more above grade plane, the vehicle access shall be provided to all sides of the building, or temporary sprinklers or other approved alternative protection shall be provided.

Reason: This proposal will address a gap in the code resulting from an expanded use of combustible construction in buildings as high as 7 stories. With the introduction of increased allowable heights and stories in the building code based on the installation of sprinklers and horizontal building separation allowances (podium construction), more and more 4 story or higher buildings are being constructed with combustible construction. These buildings pose a threat to adjacent properties and buildings on the same lot during construction. In the past few years, a series of high profile buildings around North America have burned during construction. In many of these fires, access was limited or impossible for fire fighters. This proposal improves the ability of fire fighters to address these fast growing fires. In several of the major fires, adjacent buildings and other property were damaged, and in almost all cases, the building under construction has been a total loss. Examples of documented fires include but are not limited to:

Project Name / Location: Lindell Avenue Apartments, St. Louis, MO
Date of Incidents: June 13, 2007 and July 18, 2012
Project Description: 4 story, 197-unit, wood framed apartment building.
Building Status: Completed and occupied.
This same wood framed building was also the scene of a 2007 fire that caused $12 million in damage while construction was underway.

Project Name / Location: 21828 South Avalon Boulevard, Carson, California
Date of Incident: October 27, 2011
Project Description: Three-story wood framed apartment building
Building Status: Under construction
The three-story apartment building caught fire on October 27, 2011 and quickly spread to a nearby mobile home park. More than 139 mobile homes were evacuated. At least 10 homes in the park were damaged by flames. The total damage estimate was $3.1 million, with $2.5 million for the senior living center and $600,000 for the mobile home park.

Project Name / Location: Monroe Apartments, Portland, OR
Date of Incident: August 8, 2013
Project Description: 46-unit, wood frame apartment building
Building Status: Under construction
The Monroe Apartments is one of a surge in mid-sized projects across the Portland area. Portland Fire & Rescue put the damage at $4 million.

Project Name / Location: Student Apartments, Kingston, Ontario, CAN
Date of Incident: December 17, 2013
Project Description: The 144-unit student wood-framed apartment complex in Kingston, Ont., was 4,559 square meters (49,072 square feet).
Building Status: Under construction
In all, 10 stations and 113 Kingston firefighters were on scene with 27 apparatuses; 11 Kingston fire personnel helped in communications; 11 mutual-aid departments were called and brought 160 firefighters and 19 trucks.

Project Name / Location: 550 East and 500 South, Salt Lake City, UT
Date of Incident: February 9, 2014
Project Description: Four story, wood frame apartment complex
Building Status: Under construction
The building is a four-story apartment complex. The fire caused $2.5 million in damage.

**Project Name / Location:** Mission Bay Project, San Francisco, CA  
**Date of Incident:** March 11, 2014  
**Project Description:** The projects, supported by piles, consist of 4 and 5-story wood framed residential buildings over 2 levels of parking. The levels above the podium slabs are Type III and V. The 172 unit building was one half of the 360-unit Mission Bay Project.  
**Building Status:** Under construction  
The six-story, largely wood-frame building wouldn't have been permitted in California just a few years ago. Until 2008, buildings six stories or higher were required to have "noncombustible" exterior walls.

**Project Name / Location:** Axis Apartments, Houston, TX  
**Date of Incident:** March 25, 2014  
**Project Description:** 5 story, 396 unit wood-framed apartment building.  
**Building Status:** Under construction  
The inferno began as a 3-alarm fire at 12:30 p.m. but was upgraded to a 5-alarm in less than an hour. More than 400 HFD personnel responded.

**Project Name / Location:** Gables Upper Rock, Rockville, MD  
**Date of Incident:** April 1, 2014  
**Project Description:** The Type III 300 unit apartment complex was a five story project, with a two story cast in place parking structure and amenity deck, with three stories of apartment units built with wood framed walls, joists and roof.  
**Building Status:** Under construction  
More than 200 firefighters were called to the scene of a three-alarm fire. Montgomery County fire officials say the three-acre complex was 90 percent complete and expected to be finished in two to three weeks before this fire ripped through 150 units. The apartment complex is a total loss, an estimated $15-$20 million.

**Project Name / Location:** SE Tech Center Drive/Redwood Circle, Vancouver, WA  
**Date of Incident:** June 19, 2014  
**Project Description:** A four-story apartment building, planned to include 90 units.  
**Building Status:** Under construction  
About 40 firefighters from Vancouver and Klackamas responded to the fire, which was reported around 3:15 a.m. Natural gas helped fuel the flames until a utility crew shut off the line. Estimated dollar loss falls somewhere between $2.5 million and $3.5 million.

**Project Name / Location:** Victoria Commons, Kitchener, Ontario, CAN  
**Date of Incident:** July 22, 2014  
**Project Description:** The Victoria Common development includes 958 units in a mixture of condominiums, townhomes and parkland. The complex is expected to be constructed in four phases over a decade. The fire was in the first phase of units and is three and four-story wood frame construction.  
**Building Status:** Under construction  
The fire started in the partially completed townhouse development, destroying two blocks of homes and damaging another. At least $5 million in damage was done by the blaze. Flames swept through the primarily wood frame structures in minutes before spreading. The block behind it was destroyed and partially collapsed.

**Project Name / Location:** Apollo Way, Madison, WI  
**Date of Incident:** August 8, 2014  
**Project Description:** The project is a four-story, 105-unit wood-frame apartment complex.  
**Building Status:** Under construction  
Authorities initially said the fire caused $3.5 million to $5 million in damage, but the insurer subsequently has estimated that damage is “upwards of $10 million.”

**Project Name / Location:** DaVinci Apartment Complex, Los Angeles, CA  
**Date of Incident:** December 8, 2014  
**Project Description:** The 526-unit apartment building had 1.3 million square feet of floor space, with five stories of wood framing over two stories of concrete.  
**Building Status:** Under construction  
The seven-story apartment building was a complete loss after fire. More than 250 firefighters were dispatched to the scene. The collapse of scaffolding and the structure's wooden frame forced the closure of northbound Harbor (110) Freeway to the northbound 101 Freeway until 10 a.m. Computers and cubicles melted in neighboring buildings. Hundreds of windows cracked. Intense heat damaged fiber-optic cables beneath a downtown freeway and melted one of the signs. There was $10 million in estimated losses and at least four nearby buildings were also damaged.
The building at 221 N. Figueroa St., where the computers and cubicles melted, had significant damage on its 15 floors, with 300 windows blown out. Three floors were also damaged in the Los Angeles County Department of Health Services building at 313 N. Figueroa. LA Department of Water and Power staff identified at least 160 windows, mostly on the west side of the John Ferraro Building, that were cracked. Los Angeles Department of Building and Safety reported that windows blew out in the north tower of its department headquarters, and the heat and smoke triggered sprinklers that soaked carpets and desks.

**Cost Impact:** Will increase the cost of construction
The cost of construction will rise to accommodate additional roadway access surrounding all sides of the building. With most residential buildings, a roadway surface and parking is already provided around much of the building and the extra roadway surface will be limited. Any extra costs will be offset by the benefits of added protection provided to adjacent property.
F335-16
IFC: 3311.2 (IBC: [F] 3310.2) (IEBC: [F] 1505.2)

Proponent: Edward Kulik, representing Building Code Action Committee (bcac@iccsafe.org)

2015 International Fire Code

Revise as follows:

3311.2 Maintenance. Required means of egress and accessible means of egress shall be maintained during construction and demolition, remodeling or alterations and additions to any building.

   Exception: Approved temporary means of egress and accessible means of egress systems and facilities.

Reason: In July/2014 the ICC Board decided to sunset the activities of the Code Technology Committee (CTC). This is being accomplished by re-assigning many of the CTC Areas of Study to the applicable Code Action Committee (CAC). This proposal falls under the CTC Area of Study entitled IBC Coordination with the New ADAAG. Information on the CTC, including: the sunset plan; meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CTC effort can be downloaded from the CTC website. This public proposal is submitted by the ICC Building Code Action Committee (BCAC). The BCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the BCAC has held 13 open meetings and numerous workgroup calls which included members of the BCAC as well as any interested party to discuss and debate the proposed changes and the public comments. Related documentation and reports are posted on the BCAC website at: http://www.iccsafe.org/cs/BCAC/Pages/default.aspx.

Buildings that have been constructed after accessible means of egress was required for new construction need to maintain that accessible means of egress in the same way the general means of egress must be maintained both during construction and during occupancy.

Cost Impact: Will not increase the cost of construction

The proposal is a clarification and coordination of current requirements; therefore, there is no impact on the cost.
Add new text as follows:

**3314.2 (IBC [F] 3312.2, IEBC [F] 1507.2)**  
**Completion during construction**  
Where an automatic sprinkler system is required by this code in buildings of Type III, IV and V construction, four or more stories in height, the portion of the building or structure that is more than 40-feet above fire department vehicle access shall not begin construction until the automatic sprinkler system is operational for all stories below. Such automatic sprinkler system shall be extended as construction progresses to within one floor of the highest point of construction having secured decking or flooring.

**Reason:** Buildings built to larger heights and areas as allowed in Tables 504.3, 504.4 and 506.2 of the International Building Code are very dependent on automatic sprinkler protection systems. With these increases in building size there has been a notable increase in fires, especially for Group R2 Residential Occupancies constructed of combustible framing and while the building is under construction. This has resulted in significant loss of property for the building under construction and nearby properties exposed to the fire in part because important fire safety features such as passive fire protection for the combustible framing is not complete and automatic sprinkler system upon which these larger and taller buildings depend have not been made operational.

Besides the damage to the building under construction and to nearby properties some of these fires have required major street closures including interstates, and tied up firefighting resources to the extent that other areas of the communities were left under-protected for extended periods. A recent example is a major fire in Los Angeles with five stories of wood framing over a two story concrete podium on December 8, 2014 that not only resulted in millions of dollars in damage to the building under construction, but also damaged adjacent buildings. The apartment building known as the DaVinci was a complete loss after the fire that was fueled by the five stories of wood frame construction. More than 250 firefighters were dispatched to the scene. The burning of the structure's wooden frame forced the closure of northbound Harbor(110) Freeway and affected local streets causing major traffic disruptions for commuters and to the nearby business and residences. Buildings nearby were damaged by exposure to fire from the radiant heat as well as damage inside because the fire activated sprinklers in these adjacent buildings. It has been reported that the heat also melted or damaged computers and partition cubicles in neighboring building as well. The glazing in hundreds of windows of a nearby building was also damaged.

Besides this DaVinci fire other recent large combustible framed buildings under construction that had fires that illustrate the risk of exposed combustible framing without operational sprinkler systems and presented significant challenges for the fire service include:

**Project Name / Location:** Lindell Avenue Apartments, St. Louis, MO  
**Date of Incidents:** June 13, 2007 and July 18, 2012  
**Project Description:** 4 story, 197-unit, wood framed apartment building.  
**Building Status:** Completed and occupied.  
This same wood framed building was also the scene of a 2007 fire that caused $12 million in damage while construction was underway.

**Project Name / Location:** 550 East and 500 South, Salt Lake City, UT  
**Date of Incident:** February 9, 2014
Project Description: 4 story, wood frame apartment complex
Building Status: Under construction
The fire caused $2.5 million in damage.

Project Name / Location: Axis Apartments, Houston, TX
Date of Incident: March 25, 2014
Project Description: 5 story, 396 unit wood-framed apartment building
Building Status: Under construction
The fire incident began as a 3-alarm fire at 12:30 p.m. but was upgraded to a 5-alarm in less than an hour. More than 400 Houston Fire Department personnel responded.

Project Name / Location: Apollo Way, Madison, WI
Date of Incident: August 8, 2014
Project Description: 4 story, 105-unit wood-frame apartment complex.
Building Status: Under construction
Authorities initially said the fire caused $3.5 million to $5 million in damage, but later the insurer estimated that damage is "upwards of $10 million."

Section 3311.1 of this code requires operational standpipes be in place when portions of buildings requiring standpipes are 40 feet or more above the lowest level of fire department vehicle access. This proposal takes a similar approach to the standpipe requirement for fire safety by requiring the sprinkler systems that are necessary to build these taller and larger buildings of combustible construction be operational when the construction reaches the 40 foot height above the fire department vehicle access. Too, like the standpipe requirements, the sprinkler system must be extended as each floor is provided with decking or flooring.

Cost Impact: Will increase the cost of construction
This proposal is expected to increase the cost of construction due to the sprinkler protection system having to be completed on lower floors before construction can begin higher up in the building. This increased cost however is necessary to reduce the risk of damage to adjacent properties due to fire exposure which results in economic hardship for repairs and disruption to businesses and residences, to minimize the impact to the public from traffic disruptions due to the size of the conflagrations, and to reduce the demand for fire service response due to these larger taller combustible framed buildings while under construction.
2015 International Fire Code

Add new text as follows:

105.6.49 Animal Housing Facility An operational permit is required for commercial facilities where animals are housed and attended to regularly and daily by assigned personnel for the purpose of feeding, resting, working, exercising, treating, examining, or exhibiting the animals in their care.

SECTION 202 DEFINITIONS

ANIMAL HOUSING FACILITY Area of a commercial building, structure or complex, including interior and adjacent exterior spaces, where humans regularly and daily interact with animals for the purpose of feeding, resting, working, exercising, treating, examining, or exhibiting the animals in their care.

CHAPTER 38 ANIMAL HOUSING FACILITIES

SECTION 3801 GENERAL

3801.1 Scope Requirements for protection of property and life safety from the hazards of fire in animal housing facilities shall comply with the provisions of this chapter.

3801.2 Permits Permits shall be required for animal housing facilities as set forth in Section 105.6.

SECTION 3802 DEFINITIONS

3802.1 Definitions The following term is defined in Chapter 2:

ANIMAL HOUSING FACILITY

SECTION 3803 PRECAUTIONS

3803.1 Sources of Ignition. Smoking shall be prohibited. The use of heating or other devices employing an open flame, or the use of spark-producing equipment, shall be prohibited. The use of exposed-element heating appliances shall be prohibited. The storage of combustible and flammable liquids, with the exception of those used for medicinal purposes, shall be prohibited.

3803.2 Housekeeping. Accumulation of trash and animal waste shall be kept to a minimum in all areas, including interior and adjacent exterior spaces. Accumulated trash and animal waste shall be collected by means of an established and frequent waste removal program.

SECTION 3804 PROPERTY PROTECTION AND LIFE SAFETY

3804.1 Standards. The fire code official is authorized to enforce applicable provisions of the codes and standards listed in Table 3804.1 to protect property and life for both humans and animals from the hazards of fire in animal housing facilities.

TABLE 3804.1
Property Protection and Life Safety Codes and Standards
**Reference standards type:** This reference standard is new to the ICC Code Books

**Add new standard(s) as follows:**
NFPA 150-16 Standard for Fire and Life Safety in Animal Housing Facilities
It can be viewed here:

**Reason:** The Code is currently silent on the subject of facilities that house animals other than livestock and poultry, facilities where humans interact with animals on a regular, daily basis, and who are subject, along with the animals in their care, to the hazards of fire. Agricultural buildings, while including poultry and livestock shelters, do not encompass the wide variety of facilities where animals other than livestock and poultry are housed and where the level of animal care and scrutiny is often much higher and on a more frequent basis. Additionally agricultural buildings are mainly for storage of feed and farm equipment, not animals. This correlates with the removal of animals from the definition of storage occupancies in the Life Safety Code (NFPA 101). While an agricultural building may house animals, such as livestock and poultry, an agricultural building is not the same as an animal housing facility. A veterinary clinic or rescue kennel, for example, is not an agricultural building. Therefore, a wide variety of facilities that house animals, such as clinics, animal display areas in zoos, kennels, animal research laboratories where animals are housed, etc., do not fit into the agricultural building definition. This unique type of facility needs to be defined and addressed in its own Chapter, which an additional proposal has addressed. The Code needs to acknowledge and afford protection to these unique properties, the humans who work there, and the animals in their care.

**Cost Impact:** Will not increase the cost of construction

Commercial animal housing facilities are not new to the construction industry. They are simply not acknowledged yet in the Code. Therefore, there are no increases anticipated in the cost of construction.

**Analysis:** A review of the standard(s) proposed for inclusion in the code, NFPA 150-16 Standard for Fire and Life Safety in Animal Housing Facilities with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1, 2016.
2015 International Fire Code

Add new text as follows:

CHAPTER 38 MARIJUANA PROCESSING AND EXTRACTION FACILITIES

SECTION 3801 GENERAL

3801.1 Scope Marijuana processing or extraction facilities shall comply with this chapter and the International Building Code. The extraction process includes the act of extraction of the oils and fats by use of a solvent, desolventizing of the raw material and production of the miscella, distillation of the solvent from the miscella and solvent recovery. The use, storage, transfilling, and handling of hazardous materials in these facilities shall comply with this chapter, other applicable provisions of this code and the International Building Code.

3801.2 Existing buildings or facilities. Existing buildings or facilities used for the processing of marijuana or where the medium of extraction or solvent is changed shall comply with this chapter.

3801.3 Permits. Permits shall be required as set forth in Section 105.6 and 105.7.

SECTION 3802 DEFINITIONS

3802.1 Definitions The following terms are defined in Chapter 2:

MARIJUANA EXTRACTION FACILITY (MEF)
MARIJUANA EXTRACTION EQUIPMENT (MEE)
MARIJUANA EXTRACTION ROOM (MER)
DESOVLENTIZING
MISCELLA

SECTION 3803 PROCESSING AND EXTRACTION OF MARIJUANA

3803.1 Construction. Marijuana processing shall be located in a building complying with the International Building Code.

3803.2 Prohibited occupancies. Marijuana extraction processes utilizing flammable gasses or flammable cryogenic fluids shall not be located in any building containing a Group A, E, I or R occupancy.

3803.3 Location. The extraction equipment and extraction process shall be located in a room dedicated to extraction.

3803.4 Staffing The extraction process shall be continuously staffed by personnel trained in the extraction process, the use and hazards of hazardous materials and all emergency procedures. All staff training records shall be maintained on-site by the owner and made available upon request from the fire code official.

3803.5 Post-process purification and winterization. Post-processing and winterization involving the heating or pressurizing of the miscella to other than normal pressure or temperature shall be approved and performed in an appliance listed for such use. Domestic or commercial cooking appliances shall not be used.
3803.5.1 Industrial ovens. The use of industrial ovens shall comply with Chapter 30.

3803.6 Use of flammable and combustible liquids. The use of flammable and combustible liquids for liquid extraction processes where the liquid is boiled, distilled, or evaporated shall be located within a hazardous exhaust fume hood, rated for exhausting flammable vapors. Electrical equipment used within the hazardous exhaust fume hood shall be rated for use in flammable atmospheres. Heating of flammable or combustible liquids over an open flame is prohibited.

Exception: The use of a heating element not rated for flammable atmospheres approved where documentation from the manufacture or approved testing laboratory indicates it is rated for heating of flammable liquids.

3803.7 Liquefied Petroleum Gas Liquefied-petroleum gases shall not be released to the atmosphere.

Exception: LPG gas may be released to the atmosphere in accordance with NFPA 58 Section 7.3.

SECTION 3804 SYSTEMS AND EQUIPMENT

3804.1 General requirements. Systems and equipment used with the processing and extraction of marijuana shall comply with Sections 3804.2 through 3804.4, 5003.2, other applicable provisions of this code, the International Building Code, and the International Mechanical Code.

3804.2 Systems and equipment. Systems or equipment used for the extraction of marijuana and cannabis oils from plant material shall be listed or approved for the specific use. If the system used for extraction of marijuana and cannabis oils and products from plant material is not listed, then the system shall be reviewed by a Registered Design Professional. The Registered Design Professional shall review and consider any information provided by the system's designer or manufacturer. For systems and equipment not listed for the specific use, a technical report in accordance with Section 3804.3 shall be prepared and submitted to the fire code official for review and approval. The firm or individual preparing the technical report shall be approved by the fire code official prior to performing the analysis.

3804.3 Technical report. The technical report which has been reviewed and approved by the fire code official, as required by Section 3804.2 is required prior to the equipment being located or installed at the facility. The report shall be prepared by a Registered Design Professional or other professional approved by the fire code official.

3804.3.1 Report Content. The technical report shall contain all of the following:

1. Manufacturer information.
2. Preparer of record on technical report.
3. Date of review and report revision history.
4. Signature page shall include all of the following:
   4.1. Author of the report
   4.2. Date of report
   4.3. Date and signature of Registered Design professional of record performing the design or peer review
5. Model number of the item evaluated. If the equipment is provided with a serial number, the serial number shall be included for verification at time of site inspection.
6. Methodology of the design or peer review process used to determine minimum safety requirements. Methodology shall consider the basis of design, and shall include a code analysis and code path to demonstrate the reason as to why specific code or standards are applicable or not.

7. Equipment description. A list of every component and sub-assembly (fittings, hose, quick disconnects, gauges, site glass, gaskets, valves, pumps, vessels, containers, switches, etc.) of the system or equipment, indicating the manufacturer, model number, material, and solvent compatibility. Manufacture’s data sheets shall be provided.

8. A general flow schematic or general process flow diagram of the process. Post-processing or winterization may be included in this diagram. All primary components of the process equipment shall be identified and match the equipment list required in Item 7. Operating temperatures, pressures, and solvent state of matter shall be identified in each primary step or component. A piping and instrumentation diagram (PID or Pi&D) shall be provided.

9. Analysis of the vessel(s) if pressurized beyond standard atmospheric pressure. Analysis shall include purchased and fabricated components.

10. Structural analysis for the frame system supporting the equipment.

11. Process safety analysis of the extraction system, from the introduction of raw product to the end of the extraction process.

12. Comprehensive process hazard analysis considering failure modes and points of failure throughout the process. The process hazard analysis shall include a review of emergency procedure information provided by the manufacturer of the equipment or process and not that of the facility, building or room.

13. Review of the assembly instructions, operational and maintenance manuals provided by the manufacturer.

14. List of references used in the analysis.

3804.4 Site inspection. Prior to operation of the extraction equipment, where required by the fire code official, the engineer of record or approved professional, as approved in 3805.2 shall inspect the site of the extraction process once equipment has been installed for compliance with the technical report and the building analysis. The engineer of record or approved professional shall provide a report of findings and observations of the site inspection to the fire code official prior to the approval of the extraction process. The field inspection report authored by engineer of record shall include the serial number of the equipment used in the process and shall confirm the equipment installed is the same model and type of equipment identified in the technical report.

SECTION 3805 SAFETY SYSTEMS

3805.1 Gas detection. For extraction processes utilizing flammable gases as solvents, a continuous gas detection system shall be provided. The gas detection threshold shall be no greater than 25% of the LEL/LFL limit of the materials.

3805.1.1 System design. The flammable gas detection system shall be listed or approved and shall be calibrated to the types of fuels or gases used for the extraction process. The gas detection system shall be designed to activate when the level of flammable gas exceeds 25 percent of the lower flammable limit (LFL).

3805.1.2 Gas detection system components. Gas detection system control units shall be listed and labeled in accordance with UL 864 or UL 2017. Gas detectors shall be listed and labeled in accordance with UL 2075 for use with the gases and vapors being detected.
3805.1.3 **Operation.** Activation of the gas detection system shall result in all the following:

1. Initiation of distinct audible and visual alarm signals in the extraction room.
2. Deactivation of all heating systems located in the extraction room.
3. Activation of the mechanical ventilation system, where the system is interlocked with gas detection.

3805.1.4 **Failure of the gas detection system.** Failure of the gas detection system shall result in the deactivation of the heating system, activation of the mechanical ventilation system where the system is interlocked with the gas detection system and cause a trouble signal to sound in an approved location.

3805.1.5 **Interlocks.** All electrical components within the extraction room shall be interlocked with the gas detection system. Activation of the gas detection system shall disable all light switches and electrical outlets.

3805.2 **Emergency shutoff.** Extraction processes utilizing gaseous hydro-carbon based solvents shall be provided with emergency shutoff systems in accordance with Section 5803.1.3.

105.6.49 **Marijuana extraction systems.** An operational permit is required to use a marijuana/cannabis extraction systems.

105.7.19 **Marijuana extraction systems.** A construction permit is required for installation of or modification to a marijuana/cannabis extraction systems. Maintenance performed in accordance with this code is not considered to be modification and does not require a construction permit.

**SECTION 202 DEFINITIONS**

**DESOVLENTIZING** The act of removing a solvent from a material.

**SECTION 202 DEFINITIONS**

**MARIJUANA EXTRACTION EQUIPMENT (MEE)** Equipment or appliances used for the extraction of botanical material such as essential oils, from marijuana.

**SECTION 202 DEFINITIONS**

**MARIJUANA EXTRACTION FACILITY (MEF)** A building used for the solvent-based extraction process of marijuana.

**SECTION 202 DEFINITIONS**

**MARIJUANA EXTRACTION ROOM (MER)** The room or space in which the solvent-based extractions occur.

**SECTION 202 DEFINITIONS**

**MISCELLA** A mixture, in any proportion, of the extracted oil or fat and the extracting solvent.

**Reason:** This proposal is established to provide regulatory guidance to marijuana extraction facilities. This new industry legal is several states produces marijuana for sale in specially stores. At this time there are no specific regulations in place to ensure safety in the extraction facilities. This proposal will establish specific requirements for
handling hazardous materials, establish inspection standards and provide construction and permit requirements to ensure the life/safety of occupants, fire responders and the general public. One of the biggest items this proposal covers and assist with is the fact that there is no listed equipment for these types of processes and this proposal gives the jurisdiction some guidance on how to deal with that issue.

This proposal provides operational and construction permit requirements for marijuana extraction. Marijuana extraction can involve explosive materials and dangerous processes that pose serious risks to public health, safety and welfare, as illustrated by the 2013 explosion, fire and fatality in Bellevue and Spokane, WA. This proposal provides administrative direction, establish definitions, create requirements for risk analysis reports and inspections, identify construction requirements and electrical systems, and direct other administrative oversight to protect public safety. Given the serious risks posed by activities regulated by this rule, observing permanent rule timing requirements would be contrary to the public interest.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire safety and hazardous materials in new and existing buildings and facilities and the protection of life and property in wildland urban interface areas. In 2014 and 2015 the Fire-CAC has held 5 open meetings. In addition, there were numerous conference calls, Regional Work Group and Task Group meetings for the current code development cycle, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC

**Cost Impact:** Will not increase the cost of construction
This has to do with a process issue and will not increase the cost of construction.
F339-16
105.6.32 (New), 202 (New), 3801.1 (New), 3801.2 (New), 3801.3 (New), 3801.4 (New), 3801.5 (New), 3801.5.1 (New), 3801.5.1.1 (New), 3801.5.2 (New), 3801.5.2.1 (New), 3801.5.3 (New), 3801.5.3.1 (New), 3801.5.4 (New), 3801.5.4.1 (New), 3801.5.5 (New), 3801.5.5.1 (New), 3801.5.6 (New), 3801.5.6.1 (New), 3801.5.7 (New), 3801.5.8 (New), 3801.5.9 (New), 3801.5.10 (New), 3801.6 (New), 3801.7 (New), 3801.8 (New), 5003, 5003.1.1, 5003.8.3, 905.3.9; IBC 307, [F] 307.1, [F] 427.1 (New), [F] 427.2 (New), [F] 427.3 (New), [F] 427.4 (New), [F] 427.4.1 (New), [F] 427.5 (New), [F] 427.5.1 (New), [F] 427.6 (New), [F] 427.6.1 (New), [F] 427.6.2 (New), [F] 427.7 (New), [F] 427.7.1 (New), [F] 427.7.1.1 (New), [F] 427.7.2 (New), [F] 427.7.2.1 (New), [F] 427.7.3 (New), [F] 427.7.3.1 (New), [F] 427.7.4 (New), [F] 427.7.4.1 (New), [F] 427.7.5 (New), [F] 427.7.5.1 (New), [F] 427.7.6 (New), [F] 427.7.6.1 (New), [F] 427.7.7 (New), [F] 427.7.8 (New), [F] 427.7.9 (New), [F] 427.7.10 (New), [F] 427.8 (New), [F] 427.9 (New), [F] 427.10 (New), [F] 427.11 (New), [F] 903.2.11.6, [F] 905.3.9 (New); IMC [F] 408.1 (New)

Proponent: Robert Davidson, Davidson Code Concepts, LLC, representing Self (rjd@davidsoncodeconcepts.com)

2015 International Fire Code

Add new text as follows:

105.6.32 **Non-production laboratory** An operational permit is required to operate a nonproduction laboratory.

Add new definition as follows:

**SECTION 202 DEFINITIONS**

**LABORATORY, NONPRODUCTION.** A building or portion thereof wherein chemicals or gases are used or synthesized on a nonproduction basis for testing, research, experimental, instructional or educational purposes.

**SECTION 202 DEFINITIONS**

**LABORATORY STORAGE ROOM.** A room where laboratory chemicals or gases are stored and not otherwise used or synthesized.

**SECTION 202 DEFINITIONS**

**LABORATORY UNIT.** A space designed or used as a nonproduction laboratory. Laboratory units may include one or more separate laboratory work areas, and accessory storage rooms or spaces within or contiguous to the laboratory unit, including but not limited to offices and lavatories.

Add new text as follows:

**CHAPTER 38 NON-PRODUCTION LABORATORIES**

**CHAPTER PART 3801 — NON-PRODUCTION CHEMICAL LABORATORIES**
3801.1 Scope. The provisions of this Chapter shall provide an option for nonproduction laboratories to increase the maximum allowable quantities of hazardous material within a laboratory. The design and construction of non-production laboratories shall comply with this code and Section 427 of the International Building Code.

3801.2 General. Laboratory chemicals within a laboratory unit or laboratory storage room shall be stored, handled and used in accordance with this code and NFPA 45.

3801.3 Permits. Permits shall be required as set forth in 105.6

3801.4 Prohibitions. It shall be prohibited in a non-production laboratory or a laboratory storage room to:

1. Store, handle or use any explosive.
2. Store, handle or use any unclassified detonable organic peroxide, detonable pyrophoric material, detonable unstable (reactive) material or detonable water-reactive material.
3. Store, handle or use any Class 4 unstable (reactive) material.
4. Store, handle or use any Class 4 oxidizing material.
5. Store, handle or use any flammable gas below grade.
6. Use an open flame for heating or distilling any flammable solid, flammable liquid or flammable gas.
7. Store flammable liquids in basements, cellars or other areas below grade.
8. Store combustible liquids in basements, cellars or other areas below grade in a manner not in accordance with Section 5704.3.5.1.

3801.5 Quantity limitations The maximum allowable quantity limit thresholds for control areas set forth in Tables 5003.1.1(1) and 5003.1.1(2) shall be modified in accordance with Sections 3801.5.1 through 3801.5.10.

3801.5.1 Flammable and combustible liquids The density and total quantity of flammable and combustible liquids in a laboratory unit, excluding laboratory storage rooms, shall be in accordance with Section 9.1 of NFPA 45 for laboratory unit fire hazard Class D.

3801.5.1.1 Additional flammable or combustible liquids. The following increased allowable quantity thresholds apply to laboratory units other than educational or instructional laboratories:

1. The density of flammable and combustible liquids allowed within a laboratory unit shall be permitted to be increased in accordance with Section 9.1 of NFPA 45 for laboratory unit fire hazard Class B provided the total quantity of flammable and combustible liquid, including any amounts located in storage cabinets or safety cans, does not exceed 25 gallons (95 L).

2. The density of flammable and combustible liquids allowed within a laboratory unit shall be permitted to be increased in accordance with Section 9.1 of NFPA 45 for laboratory unit fire hazard Class B provided the total quantity of flammable and combustible liquid, including any amounts located in storage cabinets or safety cans, does not exceed 30 gallons (114 L) when the laboratory unit fire-resistance rated separation required by Section 427.4 of the International Building Code is increased to 2 hours.

3. Based on a density of 1 gallon per 100 square feet (3.785 L per 9.3 m²) of area, the quantity of flammable and combustible liquid within a laboratory unit, excluding quantities in storage cabinets or safety cans, shall be permitted to be increased to 100 gallons (379 L), and the total quantities of flammable and combustible liquids, including quantities in storage cabinets or safety cans, shall be permitted to be increased to 200 gallons (775 L) where the laboratory unit fire-resistance rated separation required by Section 427.4 is increased to 2 hours.
3801.5.2 Flammable solids The aggregate quantity of flammable solids within a laboratory unit, excluding any quantities in a laboratory storage room, shall not exceed 10 pounds (4.5 kg).

3801.5.2.1 Additional flammable solids. The aggregate quantity of flammable solids within a laboratory unit shall not exceed 15 pounds (6.8 kg) when the laboratory unit fire-resistance rated separation required by Section 427.4 of the International Building Code is increased to 2 hours.

3801.5.3 Oxidizers and organic peroxides The aggregate quantity of solid and liquid oxidizers and organic peroxides within a laboratory unit, excluding any quantities in a laboratory storage room, shall not exceed 40 pounds (18 kg), provided not more than 2 pounds (0.908 kg) of which are Class 3 oxidizers and 1 pound (0.454 kg) of which is Class I organic peroxides.

3801.5.3.1 Additional oxidizer and organic peroxide material The aggregate quantity of solid and liquid oxidizers and organic peroxides combined within a laboratory unit shall not exceed 50 pounds (23 kg), provided not more than 2 pounds (0.908 kg) of which is Class 3 oxidizers and 1 pound (0.454 kg) of which are Class I organic peroxides, where the laboratory unit fire-resistance rated separation required by Section 427.4 of the International Building Code is increased to 2 hours.

3801.5.4 Unstable (reactive). The aggregate quantity of unstable (reactive) material within a laboratory unit, excluding any quantities in a laboratory storage room, shall not exceed 6 pounds (2.7 kg), provided not more than 1 pound (0.454 kg) of which is Class 3 unstable (reactive).

3801.5.4.1 Additional unstable (reactive) material: The aggregate quantity of unstable (reactive) material allowed within a laboratory unit shall not exceed 12 pounds (5.4 kg), provided not more than 1 pound (0.454 kg) of which is Class 3 unstable (reactive) where the laboratory unit fire-resistance rated separation required by Section 427.4 of the International Building Code is increased to 2 hours.

3801.5.5 Water reactive material The aggregate quantity of water reactive material within a laboratory unit, excluding any quantities in a laboratory storage room, shall not exceed 2.5 pounds (1.1 kg).

3801.5.5.1 Additional water reactive material The aggregate quantity of water-reactive material within a laboratory unit shall not exceed 5 pounds (2.3 kg) when the laboratory unit fire-resistance rated separation required by Section 427.4 of the International Building Code is increased to 2 hours.

3801.5.6 Pyrophoric material The aggregate quantity of solid or liquid pyrophoric material within a laboratory unit, excluding any quantities in a laboratory storage room, shall not exceed 0.5 pounds (0.227 kg).

3801.5.6.1 Additional pyrophoric material The aggregate quantity of pyrophoric material within a laboratory unit shall not exceed 1 pound (0.454 kg) where the laboratory unit fire-resistance rated separation required by Section 427.4 of the International Building Code is increased to 2 hours.

3801.5.7 Highly toxic material The aggregate quantity of solid or liquid highly toxic material within a laboratory unit, excluding any quantities in a storage room, shall not exceed 5 pounds (0.227 kg).

3801.5.8 Toxic material The aggregate quantity of solid or liquid toxic material within a laboratory unit, excluding any quantities in a laboratory storage room, shall not exceed 250 pounds (946 L).
3801.5.9 **Corrosive material** The aggregate quantity of solid or liquid corrosive material within a laboratory unit, excluding any quantity in a laboratory storage room, shall not exceed 250 gallons (946 L).

3801.5.10 **Highly toxic and toxic gases** In educational and instructional laboratories, the aggregate quantity of highly toxic and toxic gases combined within a laboratory unit, excluding any quantities in a laboratory storage room, shall not exceed 20 standard cubic feet (0.56 standard cubic m).

3801.6 **Laboratory storage rooms.** In addition to the quantities within a laboratory unit by Section 3801.5, laboratory chemicals that are accessory to a laboratory unit shall be permitted to be stored in dedicated laboratory storage rooms complying with all of the following:

1. The laboratory storage room shall be constructed and ventilated as required by Section 427 of the International Building Code and the International Mechanical Code.

2. Storage room capacity shall not exceed a maximum of 300 gallons (1136 L) of laboratory chemicals, not to exceed 5 gallons per square foot (204 L/m²) of floor area.

3. Flammable gas storage rooms shall not contain more than 2,500 SCF (70.8 m³) of flammable gas.

4. Laboratory chemicals that are incompatible with each other shall not be stored in the same storage room except where such materials are in accordance with the requirements for the separation of incompatible materials.

5. Laboratory chemicals shall not be used within the storage room.

6. Doors to laboratory units and laboratory storage rooms shall be labeled in accordance with NFPA 704.

3801.7 **Safety showers.** Where more than 5 gallons (19 L) of corrosive liquid or flammable liquid are stored, handled or used, suitable facilities with fixed overhead or flexible hand-held showers shall be installed and maintained in accordance with the International Plumbing Code.

3801.8 **Neutralizing or absorbing agents.** Where more than 5 gallons (19 L) of corrosive liquids are stored, handled or used, a sufficient quantity of suitable neutralizing or absorbing agents shall be provided.

CHAPTER 50 HAZARDOUS MATERIALS—GENERAL PROVISIONS

SECTION 5003 GENERAL REQUIREMENTS

5003.1.1 **Maximum allowable quantity per control area.** The maximum allowable quantity per control area shall be as specified in Tables 5003.1.1(1) through 5003.1.1(4).

For retail and wholesale storage and display in Group M occupancies and Group S storage, see Section 5003.11.

For non-production laboratories see Chapter 38.

5003.8.3 (IBC [F] 414.2) **Control areas.** Control areas shall comply with Sections 5003.8.3.1 through 5003.8.3.5.

These requirements do not apply to Nonproduction Laboratories and their associated Laboratory...
storage rooms where in accordance with Chapter 38 and the International Building Code.

905.3.9 Non production laboratory buildings. Class I automatic wet standpipes shall be provided in Nonproduction Laboratory Buildings where a laboratory unit is located two or more stories above or below the lowest level of exit discharge.

2015 International Building Code
Add new definition as follows:

SECTION 202 DEFINITIONS

[F] LABORATORY, NONPRODUCTION. A building or portion thereof wherein chemicals or gases are used or synthesized on a nonproduction basis for testing, research, experimental, instructional or educational purposes.

SECTION 202 DEFINITIONS

[F] LABORATORY STORAGE ROOM. A room where laboratory chemicals or gases are stored and not otherwise used or synthesized.

SECTION 202 DEFINITIONS

[F] LABORATORY UNIT. A space designed or used as a nonproduction laboratory. Laboratory units may include one or more separate laboratory work areas, and accessory storage rooms or spaces within or contiguous to the laboratory unit, including but not limited to offices and lavatories.

CHAPTER 3 USE AND OCCUPANCY CLASSIFICATION
SECTION 307 HIGH-HAZARD GROUP H
Add new text as follows:

[F] 307.1 High-hazard Group H. High-hazard Group H occupancy includes, among others, the use of a building or structure, or a portion thereof, that involves the manufacturing, processing, generation or storage of materials that constitute a physical or health hazard in quantities in excess of those allowed in control areas complying with Section 414, based on the maximum allowable quantity limits for control areas set forth in Tables 307.1(1) and 307.1(2). Hazardous occupancies are classified in Groups H-1, H-2, H-3, H-4 and H-5 and shall be in accordance with this section, the requirements of Section 415 and the International Fire Code. Hazardous materials stored, or used on top of roofs or canopies, shall be classified as outdoor storage or use and shall comply with the International Fire Code.

Where a nonproduction laboratory occupancy is in compliance with Section 427 and the International Fire Code, the hazardous material quantities shall be in accordance with the maximum allowable quantities allowed in laboratory units and laboratory storage rooms respectively.

CHAPTER PART [F] 427— NONPRODUCTION LABORATORIES
[F] 427.1 General The provisions of this section shall provide an option for nonproduction laboratories to increase the maximum allowable quantities of hazardous material permitted to be present within a laboratory. Where a provision of this code is applied based upon the maximum
allowable quantity limits for control areas set forth in Tables 307.1(1) and 307.1(2), for the chemical classifications specified within this section, the maximum allowable quantity threshold amounts shall be increased inaccordance with Sections 427.1 through 427.11 where located within a laboratory unit or laboratory storage room.

The provisions of this section shall not be applicable to:

1. 1. Laboratory activities associated with pilot plants.
2. Laboratory that are associated with manufacturing plants.
3. Incidental testing facilities.
4. Physical, electronic, instrument, laser, or similar laboratories that use chemicals only for incidental purposes, such as cleaning.
5. 5. Laboratories associated with High hazard occupancies.

Nonproduction laboratories not in compliance with the provisions of Section 427 for laboratory chemical quantity limitations shall be in compliance with the Sections 307, 414 and 415 of this code as applicable; and the International Fire Code.

[F] 427.2 Standards Except as otherwise provided in this section, in addition to other provisions of this code, nonproduction laboratories shall meet the design, construction and chemical quantity limitation requirements for laboratory unit fire hazard Class D, as set forth in NFPA 45, and the International Mechanical Code. The storage arrangement, handling and use of chemicals within nonproduction laboratories and accessory storage rooms; and the operation and maintenance of nonproduction laboratories shall comply with the requirements of NFPA 45 and the International Fire Code.

[F] 427.3 Prohibitions It shall be prohibited in any nonproduction laboratory to:
1. Store, handle or use any explosive.
2. Store, handle or use any unclassified detonable organic peroxide, detonable pyrophoric material, detonable unstable (reactive) material or detonable water-reactive material.
3. Store, handle or use any Class 4 unstable (reactive) material.
4. Store, handle or use any Class 4 oxidizing material.
5. Store, handle or use any flammable gas below grade.

[F] 427.4 Laboratory unit separation Laboratory units shall be separated from the remainder of the building with fire barriers in accordance with Section 707, or horizontal assemblies in accordance with Section 711, or both, with a minimum 1-hour fire-resistance rating with 1-hour fire-resistance rated opening protectives constructed in accordance with this code.

[F] 427.4.1 Increased separation protection Where laboratory units are required to increase the fire-resistance rating to a 2 hours fire-resistance rating pursuant to requirements in Sections 427.7 through 427.7.6.1, doors to the laboratory units shall be provided with a minimum 1½-hour rated fire doors in compliance with Section 716.5.

[F] 427.5 Laboratory unit floors Floors of laboratory units shall be sealed to prevent liquid leakage to lower floors. The sealing material shall be compatible with the chemicals being stored or used in the laboratory.

[F] 427.6 Fire protection Fire protection systems shall be installed as required in Sections 427.6.1 and 427.6.2.

[F] 427.6.1 Automatic Sprinkler system An automatic sprinkler system installed in accordance with Section 903.3.1.1 shall be provided in the following locations.
1. Throughout all Laboratory units.
2. Throughout the entire building where the aggregate floor area of all laboratory units within a building exceeds 20,000 square feet (1858 m²).
3. Laboratory storage rooms. The storage rooms shall have an occupancy classification of Extra Hazard (Group 2) in accordance with NFPA 13.

[F] 427.6.2 Standpipe and hose system Where a laboratory unit is located two or more stories above or below the lowest level of exit discharge, standpipes shall be installed throughout the building where the nonproduction laboratory is located in accordance with Section 905.

[F] 427.7 Quantity limitations The maximum allowable quantity limit thresholds for control areas set forth in Tables 307.1(1) and 307.1(2) shall not apply to laboratory units in compliance with Section 427 of this code and Chapter 38 in the International Fire Code.

[F] 427.7.1 Flammable and combustible liquids The density and total quantity of flammable and combustible liquids in a laboratory unit, excluding laboratory storage rooms, shall be as provided by Section 9.1 of NFPA 45 for laboratory unit fire hazard Class D.

[F] 427.7.1.1 Additional flammable or combustible liquids The following increased allowable quantity thresholds apply to laboratory units other than educational or instructional laboratories:

1. The density of flammable and combustible liquids allowed within a laboratory unit shall be permitted to be increased in accordance with Section 9.1 of NFPA 45 for laboratory unit fire hazard Class B provided the total quantity of flammable and combustible liquid, including any amounts located in storage cabinets or safety cans, does not exceed 25 gallons (95 L).

2. The density of flammable and combustible liquids allowed within a laboratory unit shall be permitted to be increased in accordance with Section 9.1 of NFPA 45 for laboratory unit fire hazard Class B provided the total quantity of flammable and combustible liquid, including any amounts located in storage cabinets or safety cans, does not exceed 30 gallons (114 L) when the laboratory unit fire-resistance rated separation required by Section 427.4 is increased to 2 hours.

3. Based on a density of 1 gallon per 100 square feet (3.785 L per 9.3 m²) of area, the quantity of flammable and combustible liquid allowed within a laboratory unit, excluding quantities in storage cabinets or safety cans, shall be permitted to be increased to 100 gallons (379 L), and the total quantities of flammable and combustible liquids, including quantities in storage cabinets or safety cans, shall be permitted to be increased to 200 gallons (775 L) where the laboratory unit fire-resistance rated separation required by Section 427.4 is increased to 2 hours.

[F] 427.7.2 Flammable solids The aggregate quantity of flammable solids within a laboratory unit, excluding any quantities in a laboratory storage room, shall not exceed 10 pounds (4.5 kg).

[F] 427.7.2.1 Additional flammable solids The aggregate quantity of flammable solids within a laboratory unit shall not exceed 15 pounds (6.8 kg) when the laboratory unit fire-resistance rated separation required by Section 427.4 is increased to 2 hours.

[F] 427.7.3 Oxidizers and organic peroxides The aggregate quantity of solid and liquid oxidizers and organic peroxides within a laboratory unit, excluding any quantities in a laboratory storage room, shall not exceed 40 pounds (18 kg), provided not more than 2 pounds (0.908 kg) of which are Class 3 oxidizers and 1 pound (0.454 kg) of which is Class I organic peroxides.

[F] 427.7.3.1 Additional oxidizer and organic peroxide material The aggregate quantity of
solid and liquid oxidizers and organic peroxides combined within a laboratory unit shall not exceed 50 pounds (23 kg), provided not more than 2 pounds (0.908 kg) of which is Class 3 oxidizers and 1 pound (0.454 kg) of which are Class I organic peroxides, where the laboratory unit fire-resistance rated separation required by Section 427.4 is increased to 2 hours.

[F] 427.7.4 Unstable (reactive) The aggregate quantity of unstable (reactive) material within a laboratory unit, excluding any quantities in a laboratory storage room, shall not exceed 6 pounds (2.7 kg), provided not more than 1 pound (0.454 kg) of which is Class 3 unstable (reactive).

[F] 427.7.4.1 Additional unstable (reactive) material The aggregate quantity of unstable (reactive) material within a laboratory unit shall not exceed 12 pounds (5.4 kg), provided not more than 1 pound (0.454 kg) of which is Class 3 unstable (reactive) where the laboratory unit fire-resistance rated separation required by Section 427.4 is increased to 2 hours.

[F] 427.7.5 Water reactive material The aggregate quantity of water reactive material within a laboratory unit, excluding any quantities in a laboratory storage room, shall not exceed 2.5 pounds (1.1 kg).

[F] 427.7.5.1 Additional water reactive material The aggregate quantity of water-reactive material within a laboratory unit shall not exceed 5 pounds (2.3 kg) where the laboratory unit fire-resistance rated separation required by Section 427.4 is increased to 2 hours.

[F] 427.7.6 Pyrophoric material The aggregate quantity of solid or liquid pyrophoric material within a laboratory unit, excluding any quantities in a laboratory storage room, shall not exceed 0.5 pounds (0.227 kg).

[F] 427.7.6.1 Additional pyrophoric material The aggregate quantity of pyrophoric material within a laboratory unit shall not exceed 1 pound (0.454 kg) where the laboratory unit fire-resistance rated separation required by Section 427.4 is increased to 2 hours.

[F] 427.7.7 Highly toxic material The aggregate quantity of solid or liquid highly toxic material within a laboratory unit, excluding any quantities in a storage room, shall not exceed 5 pounds (0.227 kg).

[F] 427.7.8 Toxic material The aggregate quantity of solid or liquid toxic material within a laboratory unit, excluding any quantities in a laboratory storage room, shall not exceed 250 pounds (946 L).

[F] 427.7.9 Corrosive material The aggregate quantity of solid or liquid corrosive material within a laboratory unit, excluding any quantity in a laboratory storage room, shall not exceed 250 gallons (946 L).

[F] 427.7.10 Highly toxic and toxic gases In educational and instructional laboratories, the total quantity of highly toxic and toxic gases combined within a laboratory unit, excluding any quantities in a laboratory storage room, shall not exceed 20 standard cubic feet (0.56 standard cubic m).

[F] 427.8 Laboratory storage room classification Laboratory storage rooms for laboratory chemicals accessory to a laboratory unit shall be classified as occupancy Group S-1 provided they comply with the provisions of Section 427.9.

[F] 427.9 Laboratory storage rooms In addition to the quantities allowed within a laboratory unit in accordance with Section 427.7, laboratory chemicals accessory to a laboratory unit shall be stored in dedicated laboratory storage rooms complying with all of the following:
1. Laboratory storage room capacity shall be limited to a maximum of 300 gallons (1136 L) of laboratory chemicals, not to exceed 5 gallons per square foot (0.125 L/m²) of floor area.

2. Flammable gas in laboratory storage rooms shall be limited to 2,500 standard cubic feet (71 standard cubic m) of flammable gas.

3. Laboratory storage rooms shall be separated from the remainder of the building with fire barriers in accordance with Section 707, or horizontal assemblies in accordance with Section 711, or both, with a minimum 2-hour fire-resistance rating with 2-hour fire-resistance rated opening protectives constructed in accordance with this code. Doors to the laboratory storage rooms shall be provided with a minimum 1½-hour rated fire doors in compliance with Section 716.5.

4. Laboratory storage rooms shall be equipped with a continuously operated exhaust ventilation system installed in accordance with this code and the *International Mechanical Code* that provides at least 6 changes of air per hour.

5. Floors of laboratory storage rooms shall be sealed to prevent liquid leakage to lower floors. The sealing material shall be compatible with the chemicals being stored.

6. Each entrance to the laboratory storage room shall be provided with a sill at the doorway. Exception: Laboratory storage rooms containing only flammable gases.

7. Laboratory storage rooms shall not open directly into an exit access stairway, exit access ramp, interior exit stairway, interior exit ramp; or exit passageway.

8. The floor of any laboratory storage room storing flammable gases shall be located at or above grade.

[F] 427.10 Ventilation Nonproduction laboratories shall be ventilated in accordance with Section 407 of the *International Mechanical Code* and the *International Fire Code*.

[F] 427.11 Safety showers Where more than 5 gallons (19 L) of corrosive liquid or flammable liquid are intended to stored, handled or used, suitable facilities with fixed overhead or flexible hand-held showers shall be installed and maintained in accordance with the *International Plumbing Code*.

<table>
<thead>
<tr>
<th>SECTION</th>
<th>SUBJECT</th>
</tr>
</thead>
<tbody>
<tr>
<td>402.5, 402.6.2</td>
<td>Covered and open mall buildings</td>
</tr>
<tr>
<td>403.3</td>
<td>High-rise buildings</td>
</tr>
<tr>
<td>404.3</td>
<td>Atriums</td>
</tr>
</tbody>
</table>
2015 International Mechanical Code

Add new text as follows:

CHAPTER PART [F] 408—VENTILATION OF NONPRODUCTION LABORATORIES

[F] 408.1 General Nonproduction chemical laboratories complying with the hazardous materials quantity limitations of Section 427 of the *International Building Code* shall be provided mechanical ventilation in accordance with Table 403.3.1.1 of this code and NFPA 45. Ducts constructed of combustible materials shall be prohibited.

Reference standards type: This reference standard is new to the ICC Code Books
Add new standard(s) as follows:

Add the NFPA 45 reference to the IFC, IBC and IMC.

NFPA 45-2015  Fire Protection for Laboratories Using Chemicals

Reason: A continual issue within the ICC code development discussions is the ability for laboratories to function based upon the current MAQs coupled with the control area provisions. This has a larger impact in urban environments where the use of midrise and high rise buildings are more prevalent creating the need to use upper floors or establishing laboratories. How to effectively provide for safety in laboratory construction and operation without presenting practical barriers pre-dates the establishment of the ICC family of codes and the issue has been addressed in some cases by local and state jurisdictions within their individual code adoption process.

The NYC Fire Department has had chemical laboratory specific regulations since 1966. Since that time, in addition to the laboratory specific technical requirements, the FDNY has required that non-production chemical laboratories operate under a FDNY operational permit. The issuance of an annual permit is predicated on a satisfactory annual inspection by FDNY representatives. Coupling specific technical requirements specific to laboratories within the fire and building code with an annual operational permit provides for an effective and safe program that allows for increased flexibility in establishing or expanding a laboratory. Currently FDNY has approximately 6500 permit holders for chemical laboratories.

When NYC was considering adoption of the 2003 IBC and the IFC for NYC in 2004 it was clear that if labs were going to continue to operate in the manner that they had been in NYC for many years there was a need to make NYC specific amendments to the I Codes. Accordingly, when NYC adopted the 2004 NYC Fire and Building Codes they added Section 2706 Nonproduction Laboratories to the Fire Code and Section 424 Nonproduction Laboratories to the Building Code. These sections were carried over to the 2014 NYC Fire and Building Codes when NYC updated their codes in 2014 to consider for NYC the 2006 and 2009 I Codes.

The NYC requirements for nonproduction chemical laboratories strike the necessary balance between public safety and industry needs. Bottom line, the current requirements (which became effective July 1, 2008) have been “put to the test” through the FDNY operational permit requirement and work well. This proposal takes the current NYC provisions for nonproduction laboratories and presents those requirements for inclusion within the ICC family of codes.

The proposed language sets forth requirements for the storage, handling and use of laboratory chemicals in a non-production laboratory and accessory storage of laboratory chemicals in a laboratory storage room, prohibitions against certain types of hazardous materials, and limitations on the quantities of hazardous materials.

The language submitted requires that the storage, handling and use of hazardous materials in non-production laboratories comply with the a new Section 427 in the International Building Code for construction purposes and with a new Chapter 38 in the International Building Code that coordinates with the IBC construction requirements and includes operational provisions to augment the provisions of both Chapter 50 and the material specific hazardous material chapters of the IFC.

The new requirements are proposed to be linked with the requirements of NFPA 45, “Standard on Fire Protection for Laboratories Using Chemicals” requirements for the density and total quantity of flammable and combustible liquids allowed within a laboratory unit, including compliance with Section 9.1.1 for Class D laboratories. There are equivalent provisions in the existing Fire Prevention Code, except that the new laboratory specific language allows for the design of larger laboratories by increasing the maximum quantity of hazardous materials, but tying that increase to a specific quantity/density per square foot. As the size of a laboratory increases or if you add an additional laboratory you material amounts increase, but the density remains the same because it is tied to square feet of floor area.

The new language will help ensure that the Code does not preclude the operation of university and other research laboratories, which are widespread across the country, not just in New York City. Fire safety is ensured in such facilities by restricting the storage of certain hazardous materials in such laboratories in addition to the density per square foot factor. These restrictions limit the storage of flammable solids (to 15 pounds), solid and liquid oxidizers and organic peroxides (to 40 pounds, including not more than 2 pounds of Class 3 oxidizers, and not more than 1 pound of Class 3 organic peroxides), unstable (reactive) material (to 6 pounds, including not more than 1 pound of Class 3), water reactive material (to 2.5 pounds) pyrophoric material (to 0.5 pounds), solid or liquid highly toxic material (to 5 pounds), solid or liquid toxic material (to 250 pounds) and solid or liquid corrosive material (to 250 gallons).
Additional thresholds are:

- This section prohibits, in educational and instructional laboratory units, the storage, handling or use of highly toxic and toxic gases in combined quantities exceeding 20 SCF.
- This section requires that the quantities of hazardous materials stored and handled in a storage room be limited to 300 gallons of chemicals, not more than 5 gallons per square foot of floor area, and not more than 2,500 SCF of flammable gas.
- This section also requires that in areas where more than 5 gallons of corrosive liquid or flammable liquid are stored, handled or used, safety showers be provided, and neutralizing or absorbing agents be provided for corrosive liquid.
- This section regulates non-production laboratories more comprehensively than the existing rules. There are no equivalent provisions for the requirements set forth above with respect to the materials newly regulated by the code.

Construction and Operational safety is provided by:

- Requiring laboratories and laboratory storage rooms to be individually enclosed by either 1 or 2 hour fire-resistance rated construction.
- Requiring automatic fire suppression for laboratory units, for laboratory storage rooms and for any building with more than 20,000 sq. feet of nonproduction laboratories.
- Requiring Class I automatic wet standpipes shall be provided in Nonproduction Laboratory Buildings where a laboratory unit is located two or more stories above or below the lowest level of exit discharge.
- Requiring mechanical ventilation in accordance with the IMC and NFPA 45.
- Requiring floors in laboratory units and laboratory storage rooms to be liquid tight.
- Requiring the laboratories comply with the operational requirements of NFPA 45 in addition to the provisions of the IFC.

The scoping of the language is permissive, in that it is an option to exercise. A building owner/operator seeking to increase the quantity of hazardous materials permitted can opt to meet the construction and operational requirement for nonproduction laboratories. Those that do not choose the new path simply comply with the existing requirements for MAQs and control areas.

**Cost Impact:** Will increase the cost of construction

There will be an increase in construction of some features within the proposed language, but those increases are balanced by relief from the current restrictions that apply to the establishment and operational needs of nonproduction laboratories and what can safely be conducted within the laboratory. In some cases, such as buildings already provided with an automatic sprinkler system and a standpipe system, there may be no net increase or a reduction in costs.

**Analysis:** A review of the standard(s) proposed for inclusion in the code, NFPA 45-2015 Fire Protection for Laboratories Using Chemicals with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1, 2016.
2015 International Fire Code

Add new text as follows:

CHAPTER 38  HIGHER EDUCATION LABORATORIES

SECTION 3801  GENERAL

3801.1 Scope. Laboratories in Group B occupancies used for educational purposes above the 12th grade complying with the requirements of this chapter shall be permitted to exceed the maximum allowable quantities of hazardous materials in control areas set forth in Chapter 50 without requiring classification as a Group H occupancy. Except as specified in this chapter, such laboratories shall comply with all applicable provisions of this code and the Building Code. Storage, use and handling of chemicals in such laboratories shall be limited to purposes related to testing, analysis, teaching, research or developmental activities on a nonproduction basis.

3801.2 Application. The provisions of this chapter shall be applied as exceptions or additions to applicable requirements of this code. Unless specifically modified by this chapter, the storage, use and handling of hazardous materials shall comply with all other provisions in Chapters 50 through 67 and the International Building Code for quantities not exceeding the maximum allowable quantity.

SECTION 3802  DEFINITIONS

3802.1 Definitions. The following terms are defined in Chapter 2:

CHEMICAL FUME HOOD
GLOVE BOX
LABORATORY SUITE
SPECIAL EXPERT

SECTION 3803  GENERAL SAFETY PROVISIONS

3803.1 Scope. Laboratories and laboratory suites applying the requirements of this chapter shall be in accordance with the general safety provisions in Sections 3803.1.1 through 3803.2.2.

3803.1.1 Chemical Safety Reviews. Operating and emergency procedures planning and documentation shall be provided in accordance with Sections 5001.3.3.11 through 5001.3.3.17. Such documentation shall be prepared by laboratory safety personnel or special experts, and shall be made available in the workplace for reference and review by employees. Copies of such documentation shall be made available to the fire code official for review upon request.

3803.1.2 Chemical handling. Receiving, transporting on site, unpacking and dispensing of hazardous materials shall be carried out by persons trained in proper handling of such materials and shall be performed in accordance with Chapters 50 through 67, as applicable.

3803.1.3 Warning Signage. Warning signs shall be provided in accordance with Section
5003.5.

3803.1.4 Maintenance of equipment, machinery and processes. Maintenance of equipment, machinery and processes used with hazardous materials shall comply with Section 5003.2.6.

3803.1.5 Time sensitive materials. Containers of materials that have the potential to become hazardous during prolonged storage shall be dated when first opened, and shall be managed in accordance with NFPA 45 Section 8.2.4.4.1.

3803.1.6 Hazardous Wastes. Storage, dispensing, use and handling of hazardous waste shall comply with this chapter and Chapters 50 through 67, as applicable.

3803.1.7 Ventilation. Ventilation for laboratories and laboratory equipment shall be designed and installed in accordance with the requirements in the International Mechanical Code and Chapter 7, NFPA 45.

3803.1.8 Automatic Fire Extinguishing Systems. New laboratories in new or existing buildings that increase maximum allowable quantities of hazardous materials based upon the requirements in this chapter shall be equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1.

3803.2 Hazardous materials storage and use. Hazardous Materials storage, handling and use in laboratories and laboratory suites complying with Chapter 38 shall be in accordance with this chapter and Chapters 50 through 67.

3803.2.1 Container Size. The maximum container size for all hazardous materials shall be 5.3 gallons for liquids, 50 pounds for solids, 100 cf. for health hazard gases per Table 5003.1.1(2) and 500 cf. for all other gases in accordance with Table 5003.1.1(1).

Exception: Hazardous waste collection containers, for other than Class I and Class II flammable liquids, are permitted to exceed 5.3 (20L) gallons where approved.

3803.2.2 Density. Quantities of Class I flammable liquids in storage and use shall not exceed 8 gallons per 100 sf of floor areas. Densities shall be reduced by 25% on the 4th through 6th floors of the building and by 50% above the 6th floor. Regardless of the density, the maximum allowable quantity per control area or laboratory suite in accordance with this chapter, shall not be exceeded.

Exception: Designated hazardous waste collection areas or rooms within a laboratory suite or control area are not limited, but such materials shall not exceed the maximum allowable quantity per laboratory suite or control area.

SECTION 3804 LABORATORY SUITE CONSTRUCTION

3804.1 General. Where laboratory suites are provided, they shall be constructed in accordance with this chapter, and Section 427 of the International Building Code.

3804.1.1 Laboratory Suites. The number of control areas and percentage of maximum allowable quantities of hazardous materials in laboratory suites shall be in accordance with Table 3804.1.1.

<table>
<thead>
<tr>
<th>TABLE 3804.1.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>DESIGN AND NUMBER OF LABORATORY SUITES PER FLOOR</td>
</tr>
</tbody>
</table>

 ICC COMMITTEE ACTION HEARINGS :: April, 2016
### Table 3804.1.1

<table>
<thead>
<tr>
<th>FLOOR LEVEL</th>
<th>PERCENTAGE OF THE MAXIMUM ALLOWABLE QUANTITY PER LAB SUITE&lt;sup&gt;a&lt;/sup&gt;</th>
<th>NUMBER OF LAB SUITES PER FLOOR</th>
<th>FIRE-RESISTANCE RATING FOR FIRE BARRIERS IN HOURS&lt;sup&gt;b&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Above Grade Plane</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21+</td>
<td>Not allowed</td>
<td>Not Permitted</td>
<td>Not Permitted</td>
</tr>
<tr>
<td>16-20</td>
<td>25</td>
<td>1</td>
<td>2&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
<tr>
<td>11-15</td>
<td>50</td>
<td>1</td>
<td>2&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
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<td>4</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>100</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>1-2</td>
<td>100</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>Below Grade Plane</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Lower than 2</td>
<td>75</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>50</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

<sup>a</sup> Percentages shall be of the maximum allowable quantity per control area shown in Tables 5003.1.1(1) and 5003.1.1(2), with all increases allowed in the footnotes to those tables.

<sup>b</sup> Fire barriers shall include walls, floors and ceilings necessary to provide separation from other portions of the building.

<sup>c</sup> Vertical fire barriers separating laboratory suites from other spaces on the same floor may be one hour rated.

### 3804.1.1.1 Separation from other non-laboratory areas.

Laboratory suites shall be separated from other portions of the building in accordance with the most restrictive of the following:

1. Table 3804.1.1 with fire barriers constructed in accordance with Section 707 of the International Building Code and horizontal assemblies constructed in accordance with Section 711 of the International Building Code.

   **Exception:** Where an individual laboratory suite occupies more than one story, the fire resistance rating of intermediate floors contained within the laboratory suite shall comply with the requirements of the International Building Code.


### 3804.1.1.2 Separation from other Laboratory Suites.

Laboratory suites shall be separated from other laboratory suites in accordance with Table 3804.1.1.

### 3804.1.1.3 Floor Assembly Fire Resistance.

The floor assembly supporting the laboratory suite and the construction supporting the floor of the laboratory suite shall have a fire resistance rating of not less than 2 hours.

**Exception:** The floor assembly of the laboratory suite and the construction supporting the floor of the laboratory suite are allowed to be 1-hour fire resistance rated in buildings of Types IIA, IIIA and VA construction, provided that the building is 3 or fewer stories.
3804.1.1.4 Maximum number. The maximum number of laboratory suites shall be in accordance with Table 3804.1.1. Where a building contains both laboratory suites and control areas, the total number of laboratory suites and control areas within a building shall not exceed the maximum number of laboratory suites in accordance with Table 3804.1.1.

3804.1.1.5 Means of Egress. Means of egress shall be in accordance with Chapter 10.

3804.1.1.6 Standby or emergency power. Standby or emergency power shall be provided in accordance with Section 5004.7 where laboratory suites are located above the sixth story above grade plane or located in a story below grade plane.

3804.1.1.7 Ventilation. Ventilation shall be in accordance with Chapter 7 of NFPA 45, and the International Mechanical Code.

3804.1.1.8 Liquid tight floor. Portions of the laboratory suite where hazardous materials are present shall be provided with a liquid tight floor.

3804.1.1.9 Automatic fire extinguishing systems. Buildings shall be equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1.

3804.1.2 Percentage of maximum allowable quantity in each laboratory suite. The percentage of maximum allowable quantities in each laboratory suite shall be in accordance with Table 3804.1.1.

SECTION 3805 NON-SPRINKLERED LABORATORIES

3805.1 Scope. Storage and use of hazardous materials in existing laboratories located within existing buildings not equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, is permitted where such use complies with Section 3803, and with Chapters 50 through 67, as applicable, and Sections 3805.2 through 3805.4.

3805.2 Non-sprinklered laboratories. The maximum allowable quantities of hazardous materials in storage and use in control areas in laboratories located in buildings not equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 shall be in accordance with Table 5003.1.1(1) and 5003.1.1(2), and Table 5003.8.3.2, except as modified by Sections 3805.2.1 and 3805.2.2.

3805.2.1 Restricted Materials Storage. Storage of hazardous materials prohibited by Table 5003.1.1 in buildings not equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, shall be allowed within a laboratory at 25% of Table 5003.1.1 limits for a building equipped throughout with an automatic sprinkler system, with no additional increases allowed, provided that all such materials are stored in accordance with all of the following:

1. Containers shall be completely sealed and stored according to the manufacturer's recommendations.
2. Storage shall be within approved hazardous materials storage cabinets in accordance with Section 5003.8.7, or shall be located in an inert atmosphere glove box in accordance with NFPA 45 Section 7.11.
3. The storage cabinet or glove box shall not contain any storage of incompatible materials.

3805.2.2 Restricted materials use. Use of hazardous materials prohibited by Table 5003.1.1 in buildings not equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, shall be allowed within a laboratory at 25% of Table 5003.1.1 limits for buildings
equipped throughout with an automatic sprinkler system, with no additional increases allowed, provided that all such materials are used in accordance with all of the following:

1. **Use shall be within an approved chemical fumehood** listed in accordance with UL 1805, or in an inert atmosphere **glove box** in accordance with NFPA 45 Section 7.11, or other approved equipment designed for the specific hazard of the material.
2. Combustible materials shall be kept at least 0.610 m (2 ft.) away from the work area, except for those items directly related to the research.
3. A portable fire extinguisher appropriate for the specific material shall be provided within 20 feet of the use in accordance with Section 906.

### 3805.3 Restricted materials automatic fire detection

An automatic fire detection system shall be installed in all existing laboratories in non-sprinklered buildings in accordance with this section. Detectors shall be connected to the building's fire alarm control unit where a fire alarm system is provided. Detector initiation shall activate the occupant notification system in accordance with Section 907.5 where connected to the building's fire alarm control unit. Activation of the detection system shall sound a local alarm in buildings not equipped with a fire alarm notification system.

### 3805.3.1 System supervision and monitoring

Automatic fire detection systems shall be electronically supervised and monitored by an approved supervising station or, where approved, shall initiate an audible and visual signal at a constantly attended on-site location.

### 3805.4 Percentage of maximum allowable quantity per control area

The percentage of maximum allowable quantities per **control area** shall be permitted to be increased in accordance with Table 3805.4.

#### TABLE 3805.4

<table>
<thead>
<tr>
<th>FLOOR LEVEL</th>
<th>PERCENTAGE OF THE MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA</th>
<th>NUMBER OF CONTROL AREAS PER FLOOR</th>
<th>FIRE RESISTANCE RATING FOR FIRE BARRIERS IN HOURS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Above grade</td>
<td>Higher than 9</td>
<td>5%</td>
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<td>Below Grade</td>
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</tr>
</tbody>
</table>

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**ICC COMMITTEE ACTION HEARINGS ::: April, 2016**
a. Percentages shall be of the maximum allowable quantity per control area shown in Tables 5003.1.1(1) and 5003.1.1(2), excluding all increases allowed in the footnotes to those tables.
b. Fire barriers shall include walls, floors and ceilings necessary to provide separation from other portions of the building.
c. Vertical fire barriers separating control areas from other spaces on the same floor shall be permitted to be one hour rated.
d. See International Building Code Section 414.2.4 for additional requirements.

SECTION 3806 EXISTING SPRINKLERED LABORATORIES

3806.1 Scope. Storage and use of hazardous materials in new and existing laboratories in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, shall be in accordance with Section 3803, and with Chapters 50-67 as applicable, except as modified by this section.

3806.2 Hazardous materials storage and use. Storage and use of hazardous materials within control areas in new and existing sprinklered laboratories shall be in accordance with this section and Chapters 50 through 67, as applicable.

Exception: Existing laboratories in buildings equipped though with an automatic sprinkler meeting requirements for laboratory suites are permitted to comply with Section 3804.

3806.2.1 Percentage of maximum allowable quantity per control area. The percentage of maximum allowable quantities per control area shall be in accordance with Table 3806.2.1.

<table>
<thead>
<tr>
<th>FLOOR LEVEL</th>
<th>PERCENTAGE OF THE MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREAa</th>
<th>NUMBER OF CONTROL AREAS PER FLOOR</th>
<th>FIRE-RESISTANCE RATING FOR FIRE BARRIERS IN HOURSbc</th>
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<td>11-20</td>
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</tr>
<tr>
<td></td>
<td>7-10</td>
<td>25%</td>
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<tr>
<td></td>
<td>4-6</td>
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<tr>
<td></td>
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</tr>
<tr>
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<td>100%</td>
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<td>Below Grade</td>
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<td>1</td>
<td>100%</td>
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<tr>
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<td>75%</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Lower than 2</td>
<td>Not Allowed</td>
<td>Not Allowed</td>
</tr>
</tbody>
</table>

a. Percentages shall be of the maximum allowable quantity per control area shown in Tables 5003.1.1(1) and 5003.1.1(2), with all increases allowed in the footnotes to those tables.
b. Fire barriers shall include walls, floors and ceilings necessary to provide separation from other portions of the building.
portions of the building. See International Building Code Section 414.2.4 for additional requirements.

5003.8.3 Control areas. Control areas shall comply with Sections 5003.8.3.1 through 5003.8.3.5.

Exception: Higher education laboratories in accordance with Chapter 38 and Section 427 of the International Building Code.

604.2.17 Laboratory suites. Laboratory Suites shall be provided with emergency or standby power in accordance with Chapter 38.

Add new definition as follows:

SECTION 202 DEFINITIONS

CHEMICAL FUME HOOD. A ventilated enclosure designed to contain and exhaust fumes, gases, vapors, mists and particulate matter generated within the hood.

SECTION 202 DEFINITIONS

GLOVE BOX. A sealed enclosure in which items inside the box are handled exclusively using long gloves sealed to ports in the enclosure.

SECTION 202 DEFINITIONS

LABORATORY SUITE. A fire-rated enclosed laboratory area that will provide one or more laboratory spaces, within a Group B educational occupancy, that are permitted to include ancillary uses such as offices, bathrooms, and corridors that are contiguous with the laboratory area, and are constructed in accordance with section 3804.

SECTION 202 DEFINITIONS

SPECIAL EXPERT. An individual who has demonstrated qualifications in a specific area, outside the practice of architecture or engineering, through education, training and experience.

2015 International Building Code

[F] 307.1.1 Uses other than Group H. An occupancy that stores, uses or handles hazardous materials as described in one or more of the following items shall not be classified as Group H, but shall be classified as the occupancy that it most nearly resembles.

1. Buildings and structures occupied for the application of flammable finishes, provided that such buildings or areas conform to the requirements of Section 416 and the International Fire Code.
2. Wholesale and retail sales and storage of flammable and combustible liquids in mercantile occupancies conforming to the International Fire Code.
3. Closed piping system containing flammable or combustible liquids or gases utilized for the operation of machinery or equipment.
4. Cleaning establishments that utilize combustible liquid solvents having a flash point of 140°F (60°C) or higher in closed systems employing equipment listed by an approved testing agency, provided that this occupancy is separated from all other areas of the building by 1-hour fire barriers constructed in accordance with Section 707 or 1-hour horizontal assemblies constructed in accordance with Section 711, or both.
5. Cleaning establishments that utilize a liquid solvent having a flash point at or above 200°F (93°C).
7. Refrigeration systems.
8. The storage or utilization of materials for agricultural purposes on the premises.
9. Stationary batteries utilized for facility emergency power, uninterruptable power supply or telecommunication facilities, provided that the batteries are provided with safety venting caps and ventilation is provided in accordance with the International Mechanical Code.
10. Corrosive personal or household products in their original packaging used in retail display.
11. Commonly used corrosive building materials.
12. Buildings and structures occupied for aerosol storage shall be classified as Group S-1, provided that such buildings conform to the requirements of the International Fire Code.
13. Display and storage of nonflammable solid and nonflammable or noncombustible liquid hazardous materials in quantities not exceeding the maximum allowable quantity per control area in Group M or S occupancies complying with Section 414.2.5.
14. The storage of black powder, smokeless propellant and small arms primers in Groups M and R-3 and special industrial explosive devices in Groups B, F, M and S, provided such storage conforms to the quantity limits and requirements prescribed in the International Fire Code.
15. Group B Higher Education Laboratory occupancies complying with Section 427 and Chapter 38 of the IFC.

[F] 414.2 Control areas. Control areas shall comply with Sections 414.2.1 through 414.2.5 and the International Fire Code.

Exception: Higher education laboratories in accordance with Section 427 and Chapter 38 of the International Fire Code.

SECTION 427 HIGHER EDUCATION LABORATORIES

[F]427.1 Scope. Laboratories in Group B occupancies used for educational purposes above the 12th grade complying with the requirements of this chapter shall be permitted to exceed the maximum allowable quantities of hazardous materials in control areas set forth in Chapter 50 without requiring classification as a Group H occupancy. Except as specified in this chapter, such laboratories shall comply with all applicable provisions of this code and the International Fire Code. Storage, use and handling of chemicals in such laboratories shall be limited to purposes related to testing, analysis, teaching, research or developmental activities on a nonproduction basis.

[F]427.2 Application. The provisions of this chapter shall be applied as exceptions or additions to applicable requirements of this code. Unless specifically modified by this chapter, the storage, use and handling of hazardous materials shall comply with all other provisions in Chapters 50 through 67 of the International Fire Code and this code for quantities not exceeding the maximum allowable quantity.

[F]427.3 Laboratory suite construction. Where laboratory suites are provided, they shall be constructed in accordance with this Section and Chapter 38 of the International Fire Code. The number of control areas and percentage of maximum allowable quantities of hazardous materials...
in laboratory suites shall be in accordance with Table 427.3.

[F]427.3.1 Separation from other non-laboratory areas. Laboratory suites shall be separated from other portions of the building in accordance with the most restrictive of the following:

1. Table 427.3 with fire barriers constructed in accordance with Section 707 and horizontal assemblies constructed in accordance with Section 711.

   **Exception:** Where an individual laboratory suite occupies more than one story, the fire resistance rating of intermediate floors contained within the laboratory suite shall comply with the requirements of this code.


[F]427.3.2 Separation from other Laboratory Suites. Laboratory suites shall be separated from other laboratory suites in accordance with Table 427.3.

[F]427.3.3 Floor Assembly Fire Resistance. The floor assembly supporting the laboratory suite and the construction supporting the floor of the laboratory suite shall have a fire resistance rating of not less than 2 hours.

   **Exception:** The floor assembly of the laboratory suite and the construction supporting the floor of the laboratory suite are allowed to be 1-hour fire resistance rated in buildings of Types IIA, IIIA and VA construction, provided that the building is 3 or fewer stories.

[F]427.3.4 Maximum number. The maximum number of laboratory suites shall be in accordance with Table 427.3. Where a building contains both laboratory suites and control areas the total number of laboratory suites and control areas within a building shall not exceed the maximum number of laboratory suites in accordance with Table 427.3.

[F]427.3.5 Means of egress. Means of egress shall be in accordance with Chapter 10.

[F]427.3.6 Standby or emergency power. Standby or emergency power shall be provided in accordance with Section 5004.7 where laboratory suites are located above the sixth story above grade plane or located in a story below grade plane.

[F]427.3.7 Ventilation. Ventilation shall be in accordance with Chapter 7 of NFPA 45, and the International Mechanical Code.

[F]427.3.8 Liquid tight floor. Portions of the laboratory suite where hazardous materials are present shall be provided with a liquid tight floor.

[F]427.3.9 Automatic fire extinguishing systems. Buildings shall be equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1.

[F]427.4 Percentage of maximum allowable quantity in each laboratory suite. The percentage of maximum allowable quantities in each laboratory suite shall be in accordance with Table 427.3

<table>
<thead>
<tr>
<th>SECTION</th>
<th>SUBJECT</th>
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TABLE [F] 903.2.11.6
ADDITIONAL REQUIRED SUPPRESSION SYSTEMS

ICC COMMITTEE ACTION HEARINGS :: April, 2016

F741
<table>
<thead>
<tr>
<th>Reference standards type</th>
<th>Description</th>
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<tr>
<td>402.5, 402.6.2</td>
<td>Covered and open mall buildings</td>
</tr>
<tr>
<td>403.3</td>
<td>High-rise buildings</td>
</tr>
<tr>
<td>404.3</td>
<td>Atriums</td>
</tr>
<tr>
<td>405.3</td>
<td>Underground structures</td>
</tr>
<tr>
<td>407.6</td>
<td>Group I-2</td>
</tr>
<tr>
<td>410.7</td>
<td>Stages</td>
</tr>
<tr>
<td>411.4</td>
<td>Special amusement buildings</td>
</tr>
<tr>
<td>412.3.6</td>
<td>Airport traffic control towers</td>
</tr>
<tr>
<td>412.4.6, 412.4.6.1, 412.6.5</td>
<td>Aircraft hangars</td>
</tr>
<tr>
<td>415.11.11</td>
<td>Group H-5 HPM exhaust ducts</td>
</tr>
<tr>
<td>416.5</td>
<td>Flammable finishes</td>
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<td>417.4</td>
<td>Drying rooms</td>
</tr>
<tr>
<td>419.5</td>
<td>Live/work units</td>
</tr>
<tr>
<td>424.3</td>
<td>Children's play structures</td>
</tr>
<tr>
<td>427.</td>
<td>Buildings containing laboratory suites</td>
</tr>
<tr>
<td>507</td>
<td>Unlimited area buildings</td>
</tr>
<tr>
<td>509.4</td>
<td>Incidental uses</td>
</tr>
<tr>
<td>1029.6.2.3</td>
<td>Smoke-protected assembly seating</td>
</tr>
</tbody>
</table>

**Reference standards type:** This reference standard is new to the ICC Code Books

**Add new standard(s) as follows:**

Sprinkler system requirements as set forth in Section 903.2.11.6 of the *International Fire Code*
Reason: There is quite possibly no industry more important to lives across the world than higher education academic institutions. The advance of technologies, science, medicine and our knowledge of the world often relies on having vibrant and successful academic institutions.

These academic institutions often have chemistry, biology, medical, engineering and other laboratories where hazardous materials are used. The IFC does not specifically address teaching and research laboratories, so users must try to apply general hazardous materials provisions, which oftentimes are not appropriate for specialized academic laboratory settings.

The following is a list of several conditions typically present in academic laboratories that make them unique:

1. **Lower chemical density in individual research laboratories.** In a teaching and research environment, there are often many small laboratories within a building that are using small quantities of hazardous materials in each location. Individually, they do not store or use a large quantity of hazardous materials, but together, they may often exceed the maximum allowable quantities for the control area. This lower chemical density often mitigates the overall risk, but the IFC currently has no provisions to recognize this condition.

2. **Ongoing staff oversight from "Special Experts" in laboratory safety.** Many higher education institutions have a full cadre of faculty and staff with chemical expertise. These "Special Experts" often include, but are not limited to: Fire Marshals, Industrial Hygienists, Radiation Safety Officers, Biological Safety Officers, Chemical Hygiene Officers and Environmental Health and Safety Officers. These individuals are an integral part of the preparation/review of laboratory safety documentations, as well as regularly scheduled safety audits. Fire and life safety expertise and oversight on our campuses is continually increasing with the addition of these highly capable professionals.

3. **Limited, or "directed", funding streams.** Also unique to academic institutions are the funding sources for research. In a "non-profit" teaching and research environment, the majority of research is funded through grants and endowments. Unfortunately, many grants only support the costs of research personnel and equipment, not structural upgrades to accommodate new research processes.

4. **Mixed-use occupancies.** A typical university science building will house laboratories, office space, storerooms, classrooms and lecture halls. The current limits on hazardous materials are so restrictive on upper floors that many universities are forced to locate classrooms and lecture halls on the upper floors so that they can take full advantage of the hazardous materials quantities allowed on the lower floors. This results in moving large numbers of students through hallways, past laboratories to get to the upper floors. They will also have to exit back down the same routes in the event of an emergency.

This proposal introduces a post-secondary academic laboratory chapter to address these unique circumstances. University fire and life safety professionals from across the United States have collaborated on writing this chapter. Conscientious effort has been made to balance the proposed IFC modifications with enhanced administrative, emergency planning and structural provisions.

This chapter also introduces some important provisions from NFPA 45, Fire Protection for Laboratories. Although the IFC references many national standards on specific topics, there are no such references currently for laboratories. This standard contains many laboratory specific requirements and design professionals rely heavily upon this national standard for current laboratory designs.

Specifically, the chapter addresses three primary needs: 1) increasing general laboratory safety requirements, 2) increasing MAQ's in large or multi-story laboratories, or laboratories located in multi-story buildings and, 3) allowing very small quantities of currently prohibited hazardous materials in non-sprinklered laboratory buildings. A brief description of each is as follows:

### 1. Increased general laboratory safety requirements:

This proposal introduces a post-secondary academic laboratory chapter in to the IFC. Currently, there is no teaching/research laboratory specific chapter in the IFC, and there are no references to NFPA 45 (Fire Protection for Laboratories). This new chapter fills a much needed gap in the IFC, and provides for enhanced safety requirements in these academic laboratories.

### 2. Control Area Limitations:

As post-secondary campuses across the world grow to meet increasing populations, they often are landlocked, and require that new buildings are built taller and/or larger. This particularly
true in large metropolitan areas. The current "Control Area" restrictions in the ICC codes severely restrict functioning laboratories on upper floor levels or in larger buildings.

In response to this critical issue, numerous jurisdictions have adopted state or local amendments to allow for greater numbers of control areas and larger percentages of MAQs in academic and/or non-production laboratories. Such jurisdictions include California, Arizona, Minnesota, Seattle and New York City. One of the primary purposes of this proposal is to provide standardized model code language to address this topic.

This chapter provides an alternate design approach for such scenarios where traditional control area limitations are not feasible, and where building Group H-Occupancies is not possible. The "Laboratory Suite" concept gives users an option to allow more flexibility in hazardous materials use, in exchange for additional administrative and structural safeguards, while still remaining a "B" occupancy.

3. Non-Sprinklered Limitations: There are thousands of existing post-secondary academic institutions, with some dating back to 1800's, where retrofitting automatic sprinklers is not practical. This proposal addresses a critically important issue to selected laboratories in existing, non-sprinklered buildings, who need very small quantities of materials that have blanket restrictions in non-sprinklered buildings. This proposal provides a limited exception to allow very small quantities of such materials when specific mitigation controls are provided.

PART 1 REASON:

Section 3801. Provides general scoping information. It clarifies that the chapter applies to both existing laboratories in existing buildings and new laboratories as referenced in the sections.

The definition used for laboratories mirrors the definition found in the International Mechanical Code, with the addition of language to clarify that the chapter is limited to "Laboratories in higher education institutions beyond the 12th grade".

Section 3802. Provides definitions for new terms introduced in this chapter. The term "Special Expert" is in the International Performance Code in the appendix. It was utilized in this chapter to reflect the high level of faculty and staff safety professionals available at many academic institutions.

Section 3803. Requires additional safety pre-planning for all laboratories or laboratory suites utilizing this chapter, also consistent with laboratory safeguards found in NFPA 45. Enhanced safety requirements found in this section include:

1. New hazard analysis documentation shall include: Process Hazard Analysis, Pre-startup Safety Review, Operating and Emergency Procedures, Management of Change, Accident Procedures, Consequence Analysis and Safety Audits. Requires that such documentation shall be submitted to the fire code official. (IFC Section 5001)
2. Time-sensitive materials shall be dated and pro-actively managed. (NFPA 45)
3. Maximum container size of Class I flammable liquids is 5.3 gallons. (NFPA 45)
4. Density of Class I flammable liquids in storage and use shall be no greater than 8 gallons per 100 square feet of floor area. (NFPA 45)

Section 3804. Provides the "Laboratory Suite" design option in addition to traditional control area options. Enhanced safety requirements in this section include:

1. All of those listed above in section 3803
2. Rated fire barriers for compartmentation of laboratory suites within buildings.
3. In laboratories above the 6th story, or in a story below grade plane, requirements for standby or emergency power for safety-related equipment and enhanced automatic sprinkler protection.
4. Automatic sprinkler design and density exceeding that which would be required by NFPA 45.

If the vertical fire barrier between lab suites is required to be two-hour rated, a fire rated duct enclosure, UL listed duct wrap, or multiple building shafts is required. Footnote c in the table allows the vertical fire barriers between laboratory suites on a floor to be one-hour rated because of the reduced quantities of hazardous materials in each laboratory suite on the floors above the 6th story, and additional safety provisions in Chapter 38 which apply to all laboratories utilizing this chapter. In addition, chemical exhaust ducts routed through the one-hour rated barriers would be permitted to be installed without fire dampers, where the duct needs to be routed to the nearest chemical exhaust shaft. Fire dampers are not installed in laboratory exhaust ducts to maintain exhaust ventilation in laboratories in the event of a fire. In the IBC, section 714.1.1 and section 717.5.2, exception 3; and IMC 607.5.5 allow exhaust system ducts to penetrate fire rated barriers and fire rated shafts without a fire damper. These provisions carry significant importance and allow multiple laboratory suites per floor of a building. The footnote has no effect on other provisions of the code and does not change the structural fire resistance requirements of IBC Chapter 6, or the continuity requirements of IBC Chapter 7.
Historical fire data over the last 25 years has shown that the vast majority of laboratory fires do not typically extend beyond the area, or even the room of origin. This is primarily due to the limited quantities of hazardous materials in use, and the following safety features that are incorporated into laboratory designs:

1. Ventilation systems provide large volumes of airflow through laboratories to continuously remove hazardous vapors, fumes and gases.
2. Fume hoods provide local ventilation control for containment and removal of hazardous vapors, fumes and gases during the use of hazardous materials.
3. Automatic fire sprinkler systems can confine the fires to the room of origin.
4. Fire alarm systems provide prompt notification to building occupants and/or emergency responders.

All of these structural safety features are required in some combination in laboratories utilizing this chapter, as well as the additional NFPA 45 requirements for monitoring of time-sensitive materials, limitations on container sizes and limiting the density of flammable liquids over the floor area of laboratory space.

Section 3805. Provides and clarifies general hazardous materials requirements for non-sprinklered laboratories. Provides an option to allow for very small quantities of prohibited materials in non-sprinklered laboratories. Enhanced safety requirements in this section include:

1. All of those listed above in section 3803
2. Enhanced storage requirements in accordance with NFPA 45
4. Use of hazardous materials use must be in a chemical fume hood, glove box or other approved laboratory equipment designed for the specific hazard.
5. The work area must be free of all unnecessary combustible materials.
6. There must be an appropriate extinguishing media located within 20 feet.

Section 3806. Provides requirements for existing laboratories in existing sprinklered buildings. Enhanced safety requirements in this section include all of those in section 3803, including complete hazard analysis and safety audits, and limits on container sizes for all hazardous materials and density limits on flammable liquids.

PART 2 REASON:
Modifies IBC 414.2 to identify that "Laboratory Suites" are an exception to traditional control area provisions.

PART 3 REASON:
Modifies IFC 604.2 to identify that "Laboratory Suites" require emergency or standby power.

PART 4 REASON:
Adds NFPA 45 as recognized standard.

This chapter was written and reviewed by a national taskforce made up of fire and life safety professionals from colleges, universities, municipal fire organizations and private industry across the United States. Taskforce members are individuals representing their own institutions, as well as members who were assigned participants by national college and university safety associations.

National endorsements:
Campus Safety, Health, and Environmental Management Association (CSHEMA)
Center for Campus Fire Safety (CCFS)

Chapter 38 Taskforce

Taskforce Chairperson – Morgana Yahnke, University of California, Davis

University Representatives:
Zachary Adams, Virginia Polytechnic Institute and State University and designated representative for Campus Safety, Health, and Environmental Management Association (CSHEMA)
Dwain Archer, University of Louisville
Jason Ellis, University of Kentucky, Principal Voting Member – NFPA 45
Todd Griffin, University of South Carolina
William Guffey, University of Maryland and designated representative for the Center for Campus Fire Safety (CCFS)
Megan Hall, University of California, Berkeley
Scott Jackson, University of California, Irvine
This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire safety and hazardous materials in new and existing buildings and facilities and the protection of life and property in wildland urban interface areas. In 2014 and 2015 the Fire-CAC has held 5 open meetings. In addition, there were numerous conference calls, Regional Work Group and Task Group meetings for the current code development cycle, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC

<table>
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<tr>
<th>Floor Level</th>
<th>2015 International Fire Code B Occupancy</th>
<th>Chapter 38: MAQ in Existing Non-Sprinklered Labs B Occupancy</th>
<th>Chapter 38: MAQ in Existing Sprinklered Labs B Occupancy</th>
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</thead>
<tbody>
<tr>
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<td>% of MAQ times # of Control areas = total volume per floor</td>
<td>% of MAQ times # of Lab Suites = total volume per floor</td>
<td>% of MAQ times # of Control areas = total volume per floor</td>
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<td>12.5 % x 2 = 30 gal</td>
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</tr>
<tr>
<td>5</td>
<td>12.5 % x 2 = 30 gal</td>
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<td>50 % x 2 = 30 gal</td>
<td>75 % x 2 = 0 gal</td>
<td>75 % x 2 = 45 gal</td>
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<tr>
<td>Lower than 2</td>
<td>Not Allowed</td>
<td>Not Allowed</td>
<td>Not Allowed</td>
</tr>
</tbody>
</table>

*a* Listed volumes do not include increases allowed for sprinklers or reflect increases for storage within a flammable cabinet

*b* Class 1 liquids shall be allowed to be stored in basements in amounts not exceeding the MAQ for use-open systems from Table 5003.1.11(1) provided that automatic fire suppression and other fire protection features are in accordance with Chapter 9.
Cost Impact: Will increase the cost of construction
The code change proposal will increase the cost of construction for those entities choosing to voluntarily comply with the requirements of this chapter.

Analysis: A review of the standard(s) proposed for inclusion in the code, NFPA 45-2015 and UL 1805 with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1, 2016.
IFC: , 105, 105.6, 105.6.16 (New), 105.7.6 (New), 5001.1, 5002, 5002 (New), [A] 105.7.

Proponent: Robert Davidson, Davidson Code Concepts, LLC, representing Self (rjd@davidsoncodeconcepts.com)

2015 International Fire Code

SECTION 105 PERMITS

105.6 Required operational permits. The fire code official is authorized to issue operational permits for the operations set forth in Sections 105.6.1 through 105.6.48.

105.6.16 Extraction systems An operational permit is required to use an extraction system including but not limited to desolventizing, post extraction and winterization activities.

[A] 105.7 Required construction permits. The fire code official is authorized to issue construction permits for work as set forth in Sections 105.7.1 through 105.7.18.

Add new text as follows:

105.7.6 Extraction systems A construction permit is required for installation of, or modification to an extraction system extraction equipment, extraction room or extraction facility.

Exception: A permit is not required for routine maintenance performed in accordance with this code.

SECTION 5002 DEFINITIONS

Add new definition as follows:

SECTION 5002 DESOLVENTIZING. The act of removing a solvent from a material, line, piece of equipment, or process.

SECTION 5002 EXTRACTION. The removal of the oils and fats from botanical material by the use of a solvent, production of miscella, distillation of the solvent from the miscella, and solvent recovery.

SECTION 5002 EXTRACTION EQUIPMENT. Equipment or appliances used for the extraction of botanical material such as essential oils, from plants.

SECTION 5002 EXTRACTION FACILITY. A building used for the solvent-based extraction process of botanical material.

SECTION 5002 EXTRACTION ROOM. The room in which oil or fat extractions occur.

SECTION 5002 MISCELLA. A mixture, in any proportion, of the extracted oil or fat and the extraction solvent.

SECTION 5002 POST-EXTRACTION AND WINTERIZATION. The heating or pressurizing of the miscella to other than normal pressure or temperature.

CHAPTER 50 HAZARDOUS MATERIALS—GENERAL PROVISIONS
Revise as follows:

5001.1 Scope. Prevention, control and mitigation of dangerous conditions related to storage, dispensing, use and processing or handling of hazardous materials shall be in accordance with this chapter.

This chapter shall apply to all hazardous materials, including those materials regulated elsewhere in this code, except that where specific requirements are provided in other chapters, those specific requirements shall apply in accordance with the applicable chapter. Where a material has multiple hazards, all hazards shall be addressed.

Exceptions:

1. In retail or wholesale sales occupancies, the quantities of medicines, foodstuff or consumer products and cosmetics containing not more than 50 percent by volume of water-miscible liquids and with the remainder of the solutions not being flammable shall not be limited, provided such materials are packaged in individual containers not exceeding 1.3 gallons (5 L).
2. Quantities of alcoholic beverages in retail or wholesale sales occupancies shall not be limited providing the liquids are packaged in individual containers not exceeding 1.3 gallons (5 L).
3. Application and release of pesticide and agricultural products and materials intended for use in weed abatement, erosion control, soil amendment or similar applications where applied in accordance with the manufacturers' instructions and label directions.
4. The off-site transportation of hazardous materials where in accordance with Department of Transportation (DOTn) regulations.
5. Building materials not otherwise regulated by this code.
6. Refrigeration systems (see Section 606).
7. Stationary storage battery systems regulated by Section 608.
8. The display, storage, sale or use of fireworks and explosives in accordance with Chapter 56.
9. Corrosives utilized in personal and household products in the manufacturers' original consumer packaging in Group M occupancies.
10. The storage of distilled spirits and wines in wooden barrels and casks.
11. The use of wall-mounted dispensers containing alcohol-based hand rubs classified as Class I or II liquids where in accordance with Section 5705.5.

Reason: The purpose of this proposal is to clarify that processing and extraction activities involving the use of solvents, or other hazardous materials, of botanical products are regulated by the IFC. With changes in laws and regulations across the country there is an increase in extraction of oils and fats from botanical materials from small scale to large scale operations. It is important that the IFC is clear that such activities are regulated to ensure the operations are conducted safely.

The added permit requirements and associated definitions will provide that clarification.

This proposal also adds the word 'processing' to the list of activities in scoping Section 5001.1 of Chapter 50. This is done as further a clarification since the materials being extracted are being processed, and as a correlation with Section 307.1 of the International Building Code which includes processing as one of the activities regulated and assessed in relation to hazardous materials.

[F] 307.1 High-hazard Group H.

High-hazard Group H occupancy includes, among others, the use of a building or structure, or a portion thereof, that involves the manufacturing, processing, generation or storage of materials that constitute a physical or health hazard...

In explaining the application of Chapter 50, the International Fire Code Commentary includes processing as one of the activities regulated.
"The requirements of this chapter apply to all hazardous chemicals. Hazardous chemicals are defined as those that pose an unreasonable risk to the health and safety of operating or emergency personnel, the public and the environment if not properly controlled during handling, storage, manufacture, processing, packaging, use, disposal or transportation."

**Cost Impact:** Will not increase the cost of construction

Since this is a clarification of the code it does not cause an increase in cost and may provide for a reduction in compliance costs by providing clarity.
F342-16

IFC: 5001.1.

Proponent : Ellie Klausbruckner, Klausbruckner & Associates, representing Klausbruckner & Associates (ek@klausbruckner.com)

2015 International Fire Code

Revise as follows:

5001.1 Scope. Prevention, control and mitigation of dangerous conditions related to storage, dispensing, use and handling of hazardous materials shall be in accordance with this chapter. This chapter shall apply to all hazardous materials, including those materials regulated elsewhere in this code, except that where specific requirements are provided in other chapters, those specific requirements shall apply in accordance with the applicable chapter. Where a material has multiple hazards, all hazards shall be addressed.

Exceptions:

1. In retail or wholesale sales occupancies, the quantities of medicines, foodstuff or consumer products and cosmetics containing not more than 50 percent by volume of water-miscible liquids and with the remainder of the solutions not being flammable shall not be limited, provided such materials are packaged in individual containers not exceeding 1.3 gallons (5 L).

2. Quantities of alcoholic beverages in retail or wholesale sales occupancies shall not be limited providing the liquids are packaged in individual containers not exceeding 1.3 gallons (5 L).

3. Application and release of pesticide and agricultural products and materials intended for use in weed abatement, erosion control, soil amendment or similar applications where applied in accordance with the manufacturers' instructions and label directions.

4. The off-site transportation of hazardous materials where in accordance with Department of Transportation (DOTn) regulations.

5. Building materials not otherwise regulated by this code.

6. Refrigeration systems (see Section 606).

7. Stationary storage battery systems regulated by Section 608.

8. The display, storage, sale or use of fireworks and explosives in accordance with Chapter 56.

9. Corrosives utilized in personal and household products in the manufacturers' original consumer packaging in Group M occupancies.

10. The storage of distilled spirits and wines in wooden barrels and casks.

11. The use of wall-mounted dispensers containing alcohol-based hand rubs classified as Class I or II liquids where in accordance with Section 5705.5.

12. The use of less than 10 alcohol wipes in a single room where each wipe contains less than 0.10 ounces of flammable liquids.

Reason: It is impractical to require protections systems for such small quantities of alcohol use, especially in hospitals and clinics. Requirements such as exhaust and/or classified electrical may be triggered if these small items are not exempted. The amounts proposed are far less than nail polish remover used in single family homes. The total quantity exempted per room is less than 1 oz.
Cost Impact: Will not increase the cost of construction
The exemption of a few alcohol swipes in facilities such as hospitals and clinics will not increase the cost of construction. This simply puts the codes in line with what is practiced out there.
F343-16

IFC: 5001.3.3.19 (New).

Proponent: Jay Weightman, representing Colorado Springs Fire Department, Division of the Fire Marshal (jweightman@springsgov.com)

2015 International Fire Code

Add new text as follows:

5001.3.3.19 Detection of a gas or vapor Detection and alarm is required where a release of a hazardous material gas or vapor causes immediate harm to any person by exceeding the PEL of a gas or by decreasing the oxygen level to below 19.5 percent. A detection and alarm system shall initiate a means of mitigation of a release and provide notification to the occupants.

Reason: Section 5001.3.3.8 is being changed editorially to "Mitigation of a gas or vapor" from "Detection of a gas or vapor" and the Detection portion has been addressed in this new section. This new section would require detection and alarm with different detection types. The Permissible Exposure Level (PEL) for an 8 hour Time-Weighted-Average (TWA) for inert gases, other than Carbon Dioxide, is a nationally recognized standard for allowable levels. The oxygen level of 19.0 percent is a medically recognized figure where the "normal average adult" will show signs of hypoxia and confusion. The level of 19.5 percent for the alarm threshold will allow the "normal average adult" to recognize the alarm and be able to exit the building at an appropriate time.

Cost Impact: Will increase the cost of construction
This proposal will increase the cost of construction depending on the number of gas sources and points of use. The CO2 meter costs range from approximately $150.00 per unit up to approximately $900.00 per unit depending on the choice of the customer. Most of the units researched on-line show that the normal price range, for most manufacturers, is in the $700.00 to $900.00 per unit range.

The oxygen sensors can range from $150.00 per unit to over $2,000.00 per unit, depending on whether the unit is portable or statically mounted, available functions and consumer needs.

Staff note: The editorial revision to Section 5001.3.3.8 was approved by the CCC as editorial.
### Table 5003.1.1 (IBC [F] Table 307.1(1))

**MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A PHYSICAL HAZARD**

<table>
<thead>
<tr>
<th>MATERIAL</th>
<th>CLASS</th>
<th>GROUP WHEN THE MAXIMUM ALLOWABLE QUANTITY IS EXCEEDED</th>
<th>STORAGE&lt;sup&gt;b&lt;/sup&gt;</th>
<th>USE-CLOSED SYSTEMS&lt;sup&gt;b&lt;/sup&gt;</th>
<th>USE-OPEN SYSTEMS&lt;sup&gt;b&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Solid pounds (cubic feet)</td>
<td>Liquid gallons (pounds)</td>
<td>Solid pounds (cubic feet)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Combustible dust</td>
<td>NA</td>
<td>H-2</td>
<td>Not Limited</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Combustible fibers</td>
<td>Loose</td>
<td>H-3</td>
<td>(100) (1,000)</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Combustible fibers</td>
<td>Baled</td>
<td>H-3</td>
<td>13,200&lt;sup&gt;e, f&lt;/sup&gt;</td>
<td>13,200&lt;sup&gt;f&lt;/sup&gt;</td>
<td>13,200&lt;sup&gt;f&lt;/sup&gt;</td>
</tr>
<tr>
<td>Consumer fireworks</td>
<td>1.4G</td>
<td>H-3</td>
<td>125&lt;sup&gt;e, l&lt;/sup&gt;</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Cryogenic Flammable</td>
<td>NA</td>
<td>H-2</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Cryogenic Inert</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NL</td>
</tr>
<tr>
<td>Cryogenic Oxidizing</td>
<td>NA</td>
<td>H-3</td>
<td>45&lt;sup&gt;d&lt;/sup&gt;</td>
<td>45&lt;sup&gt;d&lt;/sup&gt;</td>
<td>45&lt;sup&gt;d&lt;/sup&gt;</td>
</tr>
<tr>
<td>Explosives</td>
<td>Division 1.1</td>
<td>H-1</td>
<td>1&lt;sup&gt;e, g&lt;/sup&gt;</td>
<td>(1)&lt;sup&gt;e, g&lt;/sup&gt;</td>
<td>0.25&lt;sup&gt;g&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Division 1.2</td>
<td>H-1</td>
<td>1&lt;sup&gt;e, g&lt;/sup&gt;</td>
<td>(1)&lt;sup&gt;e, g&lt;/sup&gt;</td>
<td>0.25&lt;sup&gt;g&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Division 1.3</td>
<td>H-1 or H-2</td>
<td>5&lt;sup&gt;e, g&lt;/sup&gt;</td>
<td>(5)&lt;sup&gt;e, g&lt;/sup&gt;</td>
<td>1&lt;sup&gt;g&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Division 1.4</td>
<td>H-3</td>
<td>50&lt;sup&gt;e, g&lt;/sup&gt;</td>
<td>(50)&lt;sup&gt;e, g&lt;/sup&gt;</td>
<td>50&lt;sup&gt;g&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Division 1.4G</td>
<td>H-3</td>
<td>125&lt;sup&gt;d, e, l&lt;/sup&gt;</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>MATERIAL</td>
<td>CLASS</td>
<td>GROUP WHEN THE MAXIMUM ALLOWABLE QUANTITY IS EXCEEDED</td>
<td>STORAGE&lt;sup&gt;b&lt;/sup&gt;</td>
<td>USE-CLOSED SYSTEMS&lt;sup&gt;b&lt;/sup&gt;</td>
<td>USE-OPEN SYSTEMS&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>----------</td>
<td>-------</td>
<td>--------------------------------------------------------</td>
<td>---------------------</td>
<td>------------------------------</td>
<td>-------------------------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Solid pounds (cubic feet)</td>
<td>Liquid gallons (pounds)</td>
<td>Gas (cubic feet at NTP)</td>
<td>Solid pounds (cubic feet)</td>
</tr>
<tr>
<td>Inert Gas</td>
<td>Gaseous</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NL</td>
</tr>
<tr>
<td></td>
<td>Liquefied</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NL</td>
</tr>
<tr>
<td>Organic peroxide</td>
<td>UD</td>
<td>H-1</td>
<td>e, g</td>
<td>(1)e,g</td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td>I</td>
<td>H-2</td>
<td>d, e</td>
<td>(5)d,e</td>
<td>d</td>
</tr>
<tr>
<td></td>
<td>II</td>
<td>H-3</td>
<td>50d, e</td>
<td>(50)d,e</td>
<td>50d</td>
</tr>
<tr>
<td></td>
<td>III</td>
<td>H-3</td>
<td>125d, e</td>
<td>(125)d,e</td>
<td>125d</td>
</tr>
<tr>
<td></td>
<td>IV</td>
<td>NA</td>
<td>NL</td>
<td>NL</td>
<td>NL</td>
</tr>
<tr>
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<td>V</td>
<td>NA</td>
<td>NL</td>
<td>NL</td>
<td>NL</td>
</tr>
<tr>
<td>Oxidizer</td>
<td>4</td>
<td>H-1</td>
<td>g</td>
<td>(1)g</td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td>3k</td>
<td>H-2 or H-3</td>
<td>10d, e</td>
<td>(10)d,e</td>
<td>2d</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>H-3</td>
<td>250d, e</td>
<td>(250)d,e</td>
<td>250d</td>
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<tr>
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<td>1</td>
<td>NA</td>
<td>4,000e, f</td>
<td>(4,000)e,f</td>
<td>4,000f</td>
</tr>
<tr>
<td>Oxidizing gas</td>
<td>Gaseous</td>
<td>H-3</td>
<td>NA</td>
<td>NA</td>
<td>1,500d, e</td>
</tr>
<tr>
<td></td>
<td>Liquified</td>
<td>Pyrophoric</td>
<td>Unstable (reactive)</td>
<td>Water reactive</td>
<td></td>
</tr>
<tr>
<td>----------------</td>
<td>-----------</td>
<td>------------</td>
<td>---------------------</td>
<td>---------------</td>
<td></td>
</tr>
<tr>
<td></td>
<td>H-2</td>
<td>NA</td>
<td>H-1 or H-2</td>
<td>H-2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(150)</td>
<td>(150)</td>
<td>(1)</td>
<td>(50)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>d, e, g</td>
<td>d, e</td>
<td>d, e</td>
<td>d, e</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(4)</td>
<td>(3)</td>
<td>(4)</td>
<td>(50)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>e, g</td>
<td>e, g</td>
<td>d, e</td>
<td>d, e</td>
<td></td>
</tr>
<tr>
<td></td>
<td>50 e, g</td>
<td>10 e, g</td>
<td>50 d, e</td>
<td>50 d, e</td>
<td></td>
</tr>
<tr>
<td></td>
<td>g</td>
<td>0.25 g</td>
<td>(1)</td>
<td>(5)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1)</td>
<td>(0.25) g</td>
<td>d, e</td>
<td>d, e</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10 e, g</td>
<td>0.25 g</td>
<td>d, e</td>
<td>(10) d</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>(0.25) g</td>
<td>(1)</td>
<td>(10) d</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>0.25</td>
<td>(1)</td>
<td>(10) d</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.25</td>
<td>2</td>
<td>(1)</td>
<td>(10) d</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>10</td>
<td>(1)</td>
<td>(10) d</td>
<td></td>
</tr>
</tbody>
</table>

For SI: 1 cubic foot = 0.02832 m³, 1 pound = 0.454 kg, 1 gallon = 3.785 L.

NA = Not Applicable, NL = Not Limited, UD = Unclassified Detonable.

a. For use of control areas, see Section 5003.8.3.
b. The aggregate quantity in use and storage shall not exceed the quantity listed for storage.

c. The quantities of alcoholic beverages in retail and wholesale sales occupancies shall not be limited providing the liquids are packaged in individual containers not exceeding 1.3 gallons. In retail and wholesale sales occupancies, the quantities of medicines, foodstuff or consumer products and cosmetics containing not more than 50 percent by volume of water-miscible liquids with the remainder of the solutions not being flammable shall not be limited, provided that such materials are packaged in individual containers not exceeding 1.3 gallons.
d. Maximum allowable quantities shall be increased 100 percent in buildings equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1. Where Note e also applies, the increase for both notes shall be applied accumulatively.
e. Maximum allowable quantities shall be increased 100 percent where stored in approved storage cabinets, day boxes, gas cabinets, gas rooms, exhausted enclosures or in listed safety cans in accordance with Section 5003.9.10. Where Note d also applies, the increase for both notes shall be applied accumulatively.
f. Quantities shall not be limited in a building equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1.
g. Allowed only in buildings equipped throughout with an approved automatic sprinkler system.
h. Containing not more than the maximum allowable quantity per control area of Class IA, Class IB or Class IC flammable liquids.
i. The maximum allowable quantity shall not apply to fuel oil storage complying with Section 603.3.2.
j. Quantities in parenthesis indicate quantity units in parenthesis at the head of each column.
k. A maximum quantity of 200 pounds of solid or 20 gallons of liquid Class 3 oxidizers is allowed where such materials are necessary for maintenance purposes, operation or sanitation of equipment where the storage containers and the manner of storage are approved.
l. Net weight of pyrotechnic composition of the fireworks. Where the net weight of the pyrotechnic composition of the fireworks is not known, 25 percent of the gross weight of the fireworks including packaging shall be used.
m. For gallons of liquids, divide the amount in pounds by 10 in accordance with Section 5003.1.2.
n. For storage and display quantities in Group M and storage quantities in Group S occupancies complying with Section 5003.11, see Table 5003.11.1.
o. Densely-packed baled cotton that complies with the packing requirements of ISO 8115 shall not be included in this material class.
p. The following shall not be included in determining the maximum allowable quantities:
1. Liquid or gaseous fuel in fuel tanks on vehicles.
2. Liquid or gaseous fuel in fuel tanks on motorized equipment operated in accordance with this code.
4. Liquid fuels in piping systems and fixed appliances, regulated by the International Mechanical Code.

5. Alcohol-based hand rubs classified as Class I or II liquids in dispensers that are installed in accordance with Sections 5705.5 and 5705.5.1. The location of the alcohol-based hand rub (ABHR) dispensers shall be provided in the construction documents.

q. Where manufactured, generated or used in such a manner that the concentration and conditions create a fire or explosion hazard based on information prepared in accordance with Section 104.7.2 and Chapter 22.

**Reason:** Footnote q is only in reference to where a hazard condition exists as a result of **use**. Also a reference to Chapter 22 has been added sending users to this particular Chapter for guidance on the evaluation.

**Cost Impact:** Will not increase the cost of construction
The change to the table is only an editorial change and therefore does not impact the cost to construction. The change to Footnote q is only sending the user to the correct chapter. Chapter 22 is already existing and applicable. Therefore it does not impact the cost to construction.
Table 5003.1.1 (IBC [F] Table 307.1(1)) (1)
MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A PHYSICAL HAZARD

<table>
<thead>
<tr>
<th>MATERIAL</th>
<th>CLASS</th>
<th>GROUP WHEN THE MAXIMUM ALLOWABLE QUANTITY IS EXCEEDED</th>
<th>STORAGE&lt;sup&gt;b&lt;/sup&gt;</th>
<th>USE-CLOSED SYSTEMS&lt;sup&gt;b&lt;/sup&gt;</th>
<th>USE-OPEN SYSTEMS&lt;sup&gt;b&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Solid pounds (cubic feet)</td>
<td>Liquid gallons (pounds)</td>
<td>Gas (cubic feet at NTP)</td>
<td>Solid pounds (cubic feet)</td>
</tr>
<tr>
<td>Combustible dust</td>
<td>NA</td>
<td>H-2</td>
<td>See Note q</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Combustible fibers&lt;sup&gt;a&lt;/sup&gt;</td>
<td></td>
<td>H-3</td>
<td>(100) (1,000)</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Combustible liquid&lt;sup&gt;c, i&lt;/sup&gt;</td>
<td></td>
<td>II</td>
<td>H-2 or H-3</td>
<td>NA</td>
<td>120&lt;sup&gt;d, e&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IIIA</td>
<td>H-2 or H-3</td>
<td>NA</td>
<td>330&lt;sup&gt;d, e&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IIIB</td>
<td>NA</td>
<td>13,300&lt;sup&gt;e, f&lt;/sup&gt;</td>
<td>NA</td>
</tr>
<tr>
<td>Consumer fireworks</td>
<td>1.4G</td>
<td>H-3</td>
<td>125&lt;sup&gt;e, l&lt;/sup&gt;</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Cryogenic</td>
<td>NA</td>
<td>H-2</td>
<td>NA</td>
<td>40&lt;sup&gt;d&lt;/sup&gt;</td>
<td>NA</td>
</tr>
<tr>
<td>Flammable</td>
<td>NA</td>
<td>H-3</td>
<td>NA</td>
<td>45&lt;sup&gt;d&lt;/sup&gt;</td>
<td>NA</td>
</tr>
<tr>
<td>Cryogenic inert</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Cryogenic Oxidizing</td>
<td>NA</td>
<td>H-3</td>
<td>NA</td>
<td>45&lt;sup&gt;d&lt;/sup&gt;</td>
<td>NA</td>
</tr>
<tr>
<td>Explosives</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Division 1.1</td>
<td>H-1</td>
<td>1&lt;sup&gt;e, g&lt;/sup&gt;</td>
<td>(1)&lt;sup&gt;e, g&lt;/sup&gt;</td>
<td>0.25&lt;sup&gt;g&lt;/sup&gt;</td>
<td>0.25&lt;sup&gt;g&lt;/sup&gt;</td>
</tr>
<tr>
<td>Division 1.2</td>
<td>H-1</td>
<td>1&lt;sup&gt;e, g&lt;/sup&gt;</td>
<td>(1)&lt;sup&gt;e, g&lt;/sup&gt;</td>
<td>0.25&lt;sup&gt;g&lt;/sup&gt;</td>
<td>0.25&lt;sup&gt;g&lt;/sup&gt;</td>
</tr>
<tr>
<td>Division 1.3</td>
<td>H-1 or H-2</td>
<td>1&lt;sup&gt;e, g&lt;/sup&gt;</td>
<td>(5)&lt;sup&gt;e, g&lt;/sup&gt;</td>
<td>0.25&lt;sup&gt;g&lt;/sup&gt;</td>
<td>0.25&lt;sup&gt;g&lt;/sup&gt;</td>
</tr>
<tr>
<td>Division 1.4</td>
<td>H-3</td>
<td>125&lt;sup&gt;e, g&lt;/sup&gt;</td>
<td>(50)&lt;sup&gt;e, g&lt;/sup&gt;</td>
<td>1&lt;sup&gt;g&lt;/sup&gt;</td>
<td>1&lt;sup&gt;g&lt;/sup&gt;</td>
</tr>
<tr>
<td>Division 1.4G</td>
<td>H-3</td>
<td>125&lt;sup&gt;d, e, l&lt;/sup&gt;</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
</tbody>
</table>

<sup>a</sup> Note q

<sup>b</sup> See Notes d, e, f

<sup>c</sup> Flammable

<sup>d</sup> Not available

<sup>e</sup> See Notes e, f

<sup>f</sup> See Notes e, f

Proponent: Patrick McLaughlin, Axiall, representing Axiall (pmclaugma@aol.com)
<table>
<thead>
<tr>
<th>MATERIAL CLASS</th>
<th>GROUP WHEN THE MAXIMUM ALLOWABLE QUANTITY IS EXCEEDED</th>
<th>STORAGE&lt;sup&gt;b&lt;/sup&gt;</th>
<th>USE-CLOSED SYSTEMS&lt;sup&gt;b&lt;/sup&gt;</th>
<th>USE-OPEN SYSTEMS&lt;sup&gt;b&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Solid pounds (cubic feet)</td>
<td>Liquid gallons (pounds)</td>
<td>Gas (cubic feet at NTP)</td>
<td>Solid pounds (cubic feet)</td>
</tr>
<tr>
<td>Inert Gas</td>
<td>Gaseous</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td>Liquified</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Organic peroxide</td>
<td>UD</td>
<td>H-1</td>
<td>e, g</td>
<td>(1) e, g</td>
</tr>
<tr>
<td></td>
<td>I</td>
<td>H-2</td>
<td>d, e</td>
<td>(5) d, e</td>
</tr>
<tr>
<td></td>
<td>II</td>
<td>H-3</td>
<td>d, e</td>
<td>(50) d, e</td>
</tr>
<tr>
<td></td>
<td>III</td>
<td>H-3</td>
<td>125 d, e</td>
<td>(125) d, e</td>
</tr>
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<td></td>
<td>IV</td>
<td>NA</td>
<td>NL</td>
<td>NL</td>
</tr>
<tr>
<td></td>
<td>V</td>
<td>NA</td>
<td>NL</td>
<td>NL</td>
</tr>
<tr>
<td>Oxidizer</td>
<td>4</td>
<td>H-1</td>
<td>g</td>
<td>(3) e, g</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>H-2 or H-3</td>
<td>d, e</td>
<td>(10) d, e</td>
</tr>
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<td>2</td>
<td>H-3</td>
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<td>(250) d, e</td>
</tr>
<tr>
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<td>1</td>
<td>NA</td>
<td>4,000 e, f</td>
<td>(4,000) e, f</td>
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<tr>
<td>Oxidizing gas</td>
<td>Gaseous</td>
<td>H-3</td>
<td>NA</td>
<td>NA</td>
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<tr>
<td></td>
<td>Liquified</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
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<tr>
<td>Pyrophoric</td>
<td>NA</td>
<td>H-2</td>
<td>e, g</td>
<td>4 e, g</td>
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<td>--------------------</td>
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<td>------</td>
<td>--------</td>
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<tr>
<td>Unstable (reactive)</td>
<td>4</td>
<td>H-1</td>
<td>e, g</td>
<td>4 e, g</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>H-1 or H-2</td>
<td>d, e</td>
<td>3 d, e</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>H-3</td>
<td>d, e</td>
<td>2 d, e</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>NA</td>
<td>NL</td>
<td>NA</td>
</tr>
<tr>
<td>Water reactive</td>
<td>3</td>
<td>H-2</td>
<td>d, e</td>
<td>3 d, e</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>H-3</td>
<td>d, e</td>
<td>2 d, e</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>NA</td>
<td>NL</td>
<td>NA</td>
</tr>
</tbody>
</table>

For SI: 1 cubic foot = 0.02832 m³, 1 pound = 0.454 kg, 1 gallon = 3.785 L.

NA = Not Applicable, NL = Not Limited, UD = Unclassified Detonable.

a. For use of control areas, see Section 5003.8.3.

b. The aggregate quantity in use and storage shall not exceed the quantity listed for storage.

c. The quantities of alcoholic beverages in retail and wholesale sales occupancies shall not be limited providing the liquids are packaged in individual containers not exceeding 1.3 gallons. In retail and wholesale sales occupancies, the quantities of medicines, foodstuff or consumer products and cosmetics containing not more than 50 percent by volume of water-miscible liquids with the remainder of the solutions not being flammable shall not be limited, provided that such materials are packaged in individual containers not exceeding 1.3 gallons.

d. Maximum allowable quantities shall be increased 100 percent in buildings equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1. Where Note e also applies, the increase for both notes shall be applied accumulatively.

e. Maximum allowable quantities shall be increased 100 percent where stored in approved storage cabinets, day boxes, gas cabinets, gas rooms, exhausted enclosures or in listed safety cans in accordance with Section 5003.9.10. Where Note d also applies, the increase for both notes shall be applied accumulatively.

f. Quantities shall not be limited in a building equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1.

g. Allowed only in buildings equipped throughout with an approved automatic sprinkler system.

h. Containing not more than the maximum allowable quantity per control area of Class IA, Class IB or Class IC flammable liquids.

i. The maximum allowable quantity shall not apply to fuel oil storage complying with Section 603.3.2.

j. Quantities in parenthesis indicate quantity units in parenthesis at the head of each column.

k. A maximum quantity of 200 pounds of solid or 22 gallons of liquid Class 3 oxidizers is allowed where such materials are necessary for maintenance purposes, operation or sanitation of equipment where the storage containers and the manner of storage are approved.

l. Net weight of pyrotechnic composition of the fireworks. Where the net weight of the pyrotechnic composition of the fireworks is not known, 25 percent of the gross weight of the fireworks including packaging shall be used.

m. For gallons of liquids, divide the amount in pounds by 10 in accordance with Section 5003.1.2.

n. For storage and display quantities in Group M and storage quantities in Group S occupancies complying with Section 5003.11, see Table 5003.11.1.

o. Densely-packed baled cotton that complies with the packing requirements of ISO 8115 shall not be included in this material class.

p. The following shall not be included in determining the maximum allowable quantities:

1. Liquid or gaseous fuel in fuel tanks on vehicles.

2. Liquid or gaseous fuel in fuel tanks on motorized equipment operated in accordance with this code.


4. Liquid fuels in piping systems and fixed appliances, regulated by the International Mechanical Code.
5. Alcohol-based hand rubs classified as Class I or II liquids in dispensers that are installed in accordance with Sections 5705.5 and 5705.5.1. The location of the alcohol-based hand rub (ABHR) dispensers shall be provided in the construction documents.

q. Where manufactured, generated or used in such a manner that the concentration and conditions create a fire or explosion hazard based on information prepared in accordance with Section 104.7.2.

### TABLE 5003.11.1 (IBC [F] 414.2.5)
**MAXIMUM ALLOWABLE QUANTITY PER INDOOR AND OUTDOOR CONTROL AREA IN GROUP M AND S OCCUPANCIES—NONFLAMMABLE SOLIDS, NONFLAMMABLE AND NONCOMBUSTIBLE LIQUIDS**

<table>
<thead>
<tr>
<th>CONDITION</th>
<th>MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Material</strong></td>
<td><strong>Class</strong></td>
</tr>
</tbody>
</table>

| **A. HEALTH-HAZARD MATERIALS—NONFLAMMABLE AND NONCOMBUSTIBLE SOLIDS AND LIQUIDS** |
|---|---|---|---|
| 1. Corrosives<sup>b, c</sup> | Not Applicable | 9,750 | 975 |
| 2. Highly Toxics | Not Applicable | 20<sup>b, c</sup> | 2<sup>b, c</sup> |
| 3. Toxics<sup>b, c</sup> | Not Applicable | 1,000 | 100 |

| **B. PHYSICAL-HAZARD MATERIALS—NONFLAMMABLE AND NONCOMBUSTIBLE SOLIDS AND LIQUIDS** |
|---|---|---|---|
| 1. Oxidizers<sup>b, c</sup> | 4 | Not Allowed | Not Allowed |
| 3 | 1350<sup>g</sup> | | 135<sup>g</sup> |
| 2 | 2,250<sup>h</sup> | | 225 |
| 1 | 18,000<sup>i, j</sup> | | 1,800<sup>i, j</sup> |
| 2. Unstable (Reactives)<sup>b, c</sup> | 4 | Not Allowed | Not Allowed |
| 3 | 550 | | 55 |
| 2 | 1,150 | | 115 |
| 1 | Not Limited | | Not Limited |
| 3<sup>b, c</sup> | 550 | | 55 |
3. Water Reactives

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2b, c</td>
<td>1,150</td>
</tr>
<tr>
<td>1</td>
<td>Not Limited</td>
</tr>
<tr>
<td></td>
<td>Not Limited</td>
</tr>
</tbody>
</table>

For SI: 1 pound = 0.454 kg, 1 gallon = 3.785 L, 1 cubic foot = 0.02832 m³.

a. Hazard categories are as specified in Section 5001.2.2.

b. Maximum allowable quantities shall be increased 100 percent in buildings equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1. Where Note c also applies, the increase for both notes shall be applied accumulatively.

c. Maximum allowable quantities shall be increased 100 percent where stored in approved storage cabinets in accordance with Section 5003.8. Where Note b also applies, the increase for both notes shall be applied accumulatively.

d. See Table 5003.8.3.2 for design and number of control areas.

e. Maximum allowable quantities for other hazardous material categories shall be in accordance with Section 5003.1.

f. Maximum allowable quantities shall be increased 100 percent in outdoor control areas.

g. Maximum allowable quantities shall be increased to 2,250 pounds where individual packages are in the original sealed containers from the manufacturer or packager and do not exceed 10 pounds each.

h. Maximum allowable quantities shall be increased to 4,500 pounds where individual packages are in the original sealed containers from the manufacturer or packager and do not exceed 10 pounds each.

i. Quantities are unlimited where protected by an automatic sprinkler system.

j. Quantities are unlimited in an outdoor control area.

6303.1.1.2 Class 3 liquid and solid oxidizers. Not more than 200 pounds (91 kg) of solid or 22 gallons (76 L) of liquid Class 3 oxidizer is allowed in storage and use where such materials are necessary for maintenance purposes or operation of equipment. The oxidizers shall be stored in approved containers and in an approved manner.

**Reason:** Many 50 lb. containers of oxidizers have changed to 25 kg or 55 lb. containers. Four containers in use, which is a common condition, would equal 220 lb. This change will continue to allow 4 containers without a noticeable increase in the hazard. Also, when the maximum allowable quantity of oxidizers was established for mercantile occupancies, it was based on one pallet load of product. As explained above, the weight of some product has increased slightly, resulting in the total weight of a pallet load exceeding the 1150 lb MAQ. As a result, the top row of product has to be manually removed from the pallet before shipping to stay under the MAQ. This change resolves that problem by increasing the MAQ to accommodate current weights. Again, many 50 lb. containers have changed to a 25 kg or 55 lb. container. A normal pallet configuration of 8 55 lb. (25kg) pails per row, three high, would equal 1,320 lbs. The hazard is not noticeably increased and the original concept of retail MAQ quantity, of one pallet load, is maintained. Furthermore the change brings the IFC in line other NFPA codes that regulate oxidizers.

**Cost Impact:** Will not increase the cost of construction
The code change will reduce the costs of distribution by allowing full, instead of partial, pallet loads.
### 2015 International Fire Code

**Table 5003.1.1; IBC [F] Table 307.1(1)**

**Proponent:** Michael O'Brian representing the Fire Code Action Committee (FCAC@iccsafe.org)

**TABLE 5003.1.1 (IBC [F] 307.1(1))**

MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A PHYSICAL HAZARD

<table>
<thead>
<tr>
<th>MATERIAL</th>
<th>CLASS</th>
<th>GROUP WHEN THE MAXIMUM ALLOWABLE QUANTITY IS EXCEEDED</th>
<th>STORAGE&lt;sup&gt;b&lt;/sup&gt;</th>
<th>USE-CLOSED SYSTEMS&lt;sup&gt;b&lt;/sup&gt;</th>
<th>USE-OPEN SYSTEMS&lt;sup&gt;b&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Solid pounds (cubic feet)</td>
<td>Liquid gallons (pounds)</td>
<td>Gas (cubic feet at NTP)</td>
<td>Solid pounds (cubic feet)</td>
</tr>
<tr>
<td>Combustible dust</td>
<td>NA</td>
<td>H-2</td>
<td>See Note q</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Combustible fibers</td>
<td>Loose</td>
<td>H-3</td>
<td>(100) (1,000)</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td>Baled</td>
<td></td>
<td></td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Combustible liquid</td>
<td>II</td>
<td>H-2 or H-3</td>
<td>NA</td>
<td>120&lt;sup&gt;d,e&lt;/sup&gt;</td>
<td>120&lt;sup&gt;d&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>IIIA</td>
<td>H-2 or H-3</td>
<td>330&lt;sup&gt;d,e&lt;/sup&gt;</td>
<td>NA</td>
<td>330&lt;sup&gt;d&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>IIIB</td>
<td>NA</td>
<td>13.300&lt;sup&gt;e,f&lt;/sup&gt;</td>
<td>NA</td>
<td>13.300&lt;sup&gt;f&lt;/sup&gt;</td>
</tr>
<tr>
<td>Consumer fireworks</td>
<td>1.4G</td>
<td>H-3</td>
<td>125&lt;sup&gt;e,l&lt;/sup&gt;</td>
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<td>NA</td>
</tr>
<tr>
<td>Cryogenic</td>
<td>NA</td>
<td>H-2</td>
<td>NA</td>
<td>45&lt;sup&gt;d&lt;/sup&gt;</td>
<td>45&lt;sup&gt;d&lt;/sup&gt;</td>
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<tr>
<td>Flammable</td>
<td>NA</td>
<td>H-3</td>
<td>NA</td>
<td>45&lt;sup&gt;d&lt;/sup&gt;</td>
<td>45&lt;sup&gt;d&lt;/sup&gt;</td>
</tr>
<tr>
<td>Cryogenic Inert</td>
<td>NA</td>
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<td>NA</td>
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<td>Cryogenic Oxidizing</td>
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<td>H-3</td>
<td>45&lt;sup&gt;d&lt;/sup&gt;</td>
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<td>NA</td>
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<td>Explosives</td>
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<td>Division 1.1</td>
<td>H-1</td>
<td>1&lt;sup&gt;e,g&lt;/sup&gt;</td>
<td>(1)&lt;sup&gt;e,g&lt;/sup&gt;</td>
<td>0.25&lt;sup&gt;g&lt;/sup&gt;</td>
<td>0.25&lt;sup&gt;g&lt;/sup&gt;</td>
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<td>1&lt;sup&gt;e,g&lt;/sup&gt;</td>
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<td>0.25&lt;sup&gt;g&lt;/sup&gt;</td>
<td>0.25&lt;sup&gt;g&lt;/sup&gt;</td>
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<tr>
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<td>H-1 or H-2</td>
<td>5&lt;sup&gt;e,g&lt;/sup&gt;</td>
<td>(5)&lt;sup&gt;e,g&lt;/sup&gt;</td>
<td>1&lt;sup&gt;g&lt;/sup&gt;</td>
<td>1&lt;sup&gt;g&lt;/sup&gt;</td>
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<td>(50)&lt;sup&gt;e,g&lt;/sup&gt;</td>
<td>50&lt;sup&gt;g&lt;/sup&gt;</td>
<td>50&lt;sup&gt;g&lt;/sup&gt;</td>
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<tr>
<td>Division 1.4G</td>
<td>H-3</td>
<td>125&lt;sup&gt;e,l&lt;/sup&gt;</td>
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<td>NA</td>
<td>NA</td>
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<tr>
<td>MATERIAL</td>
<td>CLASS</td>
<td>GROUP WHEN THE MAXIMUM ALLOWABLE QUANTITY IS EXCEEDED</td>
<td>STORAGE&lt;sup&gt;b&lt;/sup&gt;</td>
<td>USE-CLOSED SYSTEMS&lt;sup&gt;b&lt;/sup&gt;</td>
<td>USE-OPEN SYSTEMS&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>------------------</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>Solid pounds (cubic feet)</td>
<td>Liquid gallons (pounds)</td>
<td>Gas (cubic feet at NTP)</td>
<td>Solid pounds (cubic feet)</td>
</tr>
<tr>
<td>Inert Gas</td>
<td>Gaseous</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NL</td>
</tr>
<tr>
<td></td>
<td>Liquefied</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NL</td>
</tr>
<tr>
<td>Organic peroxide</td>
<td>UD</td>
<td>H-1</td>
<td>1&lt;sup&gt;e&lt;/sup&gt;, g</td>
<td>(1)&lt;sup&gt;e&lt;/sup&gt;, g</td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td>I</td>
<td>H-2</td>
<td>d, e</td>
<td>(5)&lt;sup&gt;d&lt;/sup&gt;, e</td>
<td>d</td>
</tr>
<tr>
<td></td>
<td>II</td>
<td>H-3</td>
<td>50&lt;sup&gt;d&lt;/sup&gt;, e</td>
<td>(50)&lt;sup&gt;d&lt;/sup&gt;, e</td>
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<td>(125)&lt;sup&gt;d&lt;/sup&gt;, e</td>
<td>125&lt;sup&gt;d&lt;/sup&gt;</td>
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<td>IV</td>
<td>NA</td>
<td>NL</td>
<td>NL</td>
<td>NL</td>
</tr>
<tr>
<td></td>
<td>V</td>
<td>NA</td>
<td>NL</td>
<td>NL</td>
<td>NL</td>
</tr>
<tr>
<td>Oxidizer</td>
<td>4</td>
<td>H-1</td>
<td>g</td>
<td>(1)&lt;sup&gt;e&lt;/sup&gt;, g</td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td>3k</td>
<td>H-2 or H-3</td>
<td>10&lt;sup&gt;d&lt;/sup&gt;, e</td>
<td>(10)&lt;sup&gt;d&lt;/sup&gt;, e</td>
<td>8&lt;sup&gt;d&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
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<td>H-3</td>
<td>250&lt;sup&gt;d&lt;/sup&gt;, e</td>
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<td>(4,000)&lt;sup&gt;e&lt;/sup&gt;, f</td>
<td>4,000&lt;sup&gt;f&lt;/sup&gt;</td>
</tr>
<tr>
<td>Oxidizing gas</td>
<td>Gaseous</td>
<td>H-3</td>
<td>NA</td>
<td>NA</td>
<td>1,500&lt;sup&gt;d&lt;/sup&gt;, e</td>
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<tr>
<td></td>
<td>Liquefied</td>
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<td>NA</td>
<td>NA</td>
<td>1,500&lt;sup&gt;d&lt;/sup&gt;, e</td>
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</tbody>
</table>
### Pyrophoric

<table>
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<tr>
<th>No.</th>
<th>H-1</th>
<th>H-2</th>
<th>e, g</th>
<th>(e, g)</th>
<th>g</th>
<th>(g)</th>
<th>10e, g</th>
<th>(0.25e, g)</th>
<th>2e, g</th>
<th>0.25e, g</th>
<th>(0.25e, g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td></td>
<td></td>
<td>e, g</td>
<td>(e, g)</td>
<td>g</td>
<td></td>
<td>10e, g</td>
<td>(0.25e, g)</td>
<td>2e, g</td>
<td>0.25e, g</td>
<td>(0.25e, g)</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td>d, e</td>
<td>(d, e)</td>
<td>g</td>
<td></td>
<td>10^5d, e</td>
<td>(0.25d, e)</td>
<td>2d, e</td>
<td>0.25d, e</td>
<td>(0.25d, e)</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td>d, e</td>
<td>(d, e)</td>
<td>g</td>
<td></td>
<td>10^5d, e</td>
<td>(0.25d, e)</td>
<td>2d, e</td>
<td>0.25d, e</td>
<td>(0.25d, e)</td>
</tr>
<tr>
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<td>NL</td>
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<td>NL</td>
<td>NL</td>
</tr>
</tbody>
</table>

### Unstable (reactive)

<table>
<thead>
<tr>
<th>No.</th>
<th>H-1 or H-2</th>
<th>e, g</th>
<th>(e, g)</th>
<th>g</th>
<th>(g)</th>
<th>10e, g</th>
<th>(0.25e, g)</th>
<th>2e, g</th>
<th>0.25e, g</th>
<th>(0.25e, g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td></td>
<td>d, e</td>
<td>(d, e)</td>
<td>g</td>
<td></td>
<td>10^5d, e</td>
<td>(0.25d, e)</td>
<td>2d, e</td>
<td>0.25d, e</td>
<td>(0.25d, e)</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>d, e</td>
<td>(d, e)</td>
<td>g</td>
<td></td>
<td>10^5d, e</td>
<td>(0.25d, e)</td>
<td>2d, e</td>
<td>0.25d, e</td>
<td>(0.25d, e)</td>
</tr>
<tr>
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<td>NL</td>
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<td>NL</td>
<td>NL</td>
</tr>
</tbody>
</table>

### Water reactive

<table>
<thead>
<tr>
<th>No.</th>
<th>H-2</th>
<th>d, e</th>
<th>(d, e)</th>
<th>g</th>
<th>(g)</th>
<th>10d, e</th>
<th>(0.25d, e)</th>
<th>2d, e</th>
<th>0.25d, e</th>
<th>(0.25d, e)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td></td>
<td>10d</td>
<td>(10d)</td>
<td>g</td>
<td></td>
<td>10^5d, e</td>
<td>(0.25d, e)</td>
<td>2d, e</td>
<td>0.25d, e</td>
<td>(0.25d, e)</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>10d</td>
<td>(10d)</td>
<td>g</td>
<td></td>
<td>10^5d, e</td>
<td>(0.25d, e)</td>
<td>2d, e</td>
<td>0.25d, e</td>
<td>(0.25d, e)</td>
</tr>
<tr>
<td>1</td>
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<td>NL</td>
<td>NL</td>
<td>NL</td>
<td>NL</td>
<td>NL</td>
<td>NL</td>
<td>NL</td>
</tr>
</tbody>
</table>

For SI: 1 cubic foot = 0.02832 m³, 1 pound = 0.454 kg, 1 gallon = 3.785 L.

NA = Not Applicable, NL = Not Limited, UD = Unclassified Detonable.

a. For use of control areas, see Section 5003.8.3.

b. The aggregate quantity in use and storage shall not exceed the quantity listed for storage.

c. The quantities of alcoholic beverages in retail and wholesale sales occupancies shall not be limited providing the liquids are packaged in individual containers not exceeding 1.3 gallons. In retail and wholesale sales occupancies, the quantities of medicines, foodstuff or consumer products and cosmetics containing not more than 50 percent by volume of water-miscible liquids with the remainder of the solutions not being flammable shall not be limited, provided that such materials are packaged in individual containers not exceeding 1.3 gallons.

d. Maximum allowable quantities shall be increased 100 percent in buildings equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1. Where Note e also applies, the increase for both notes shall be applied accumulatively.

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h. Containing not more than the maximum allowable quantity per control area of Class IA, Class IB or Class IC flammable liquids.

i. The maximum allowable quantity shall not apply to fuel oil storage complying with Section 603.3.2.

j. Quantities in parenthesis indicate quantity units in parenthesis at the head of each column.

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l. Net weight of pyrotechnic composition of the fireworks. Where the net weight of the pyrotechnic composition of the fireworks is not known, 25 percent of the gross weight of the fireworks including packaging shall be used.

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o. Densely-packed baled cotton that complies with the packing requirements of ISO 8115 shall not be included in this material class.

p. The following shall not be included in determining the maximum allowable quantities:

1. Liquid or gaseous fuel in fuel tanks on vehicles.
2. Liquid or gaseous fuel in fuel tanks on motorized equipment operated in accordance with this code.
4. Liquid fuels in piping systems and fixed appliances, regulated by the International Mechanical Code.
5. Alcohol-based hand rubs classified as Class I or II liquids in dispensers that are installed in accordance with Sections 5705.5 and 5705.5.1. The location of the alcohol-based hand rub (ABHR) dispensers shall be provided in the construction documents.

q. Where manufactured, generated or used in such a manner that the concentration and conditions create a fire or explosion hazard based on information prepared in accordance with Section 104.7.2.

**Reason:** The deletion of the reference to footnote "d" from the Explosives, Division 1.4G line is a cleanup following the successful action of F289-13. Without this deletion the effects of F289-13 will be negated since consumer fireworks are classified as 1.4G explosives and the continuance of footnote "d" would allow the 100% increase when sprinklers are present. Please refer to the supporting statement of F289-13 for additional information.

(Supporting statement of F289-13)

*Based on an October 2007 report entitled "Fire Safety in Consumer Fireworks Storage and Retail Facilities – Hazard Assessment", the NFPA Standards Council began a lengthy discussion on the amount of consumer fireworks that should be effectively permitted in retail establishments and some the built-in safety requirements that should be associated with that amount. To date the effective allowable amount in the NFPA standards has been 125 pounds net with an available increase to 250 pounds if the building is protected throughout with an approved automatic sprinkler system installed in accordance with NFPA 13. This same provision is mirrored in the IFC in all respects for the maximum allowable quantity of consumer fireworks, including the increase for sprinkler protection, and like the IFC, to allow a building to contain more than that, the NFPA standard would require additional construction requirements akin to those for a Group H-3 building.

Beginning with the October 2007 report, the NFPA Standards Council has since called into question the appropriateness and reasoning of an increase based on sprinkler protection in the absence of test data justifying the increase. Because of the lack of test data to determine at what level or quantity of consumer fireworks above 125 pounds net could or should have the benefit of sprinkler protection, the Standards Council has ordered the issuance of a Tentative Interim Amendment (TIA), in process at the time of this submission, eliminating the option of an increase for sprinkler protection until such time as acceptable test data is submitted to justify an increase and to what level of increase it could be. Therefore, due to the TIA, the maximum amount of consumer fireworks in the NFPA standard for retail establishments is limited to 125 pounds net. There will be no provision for increasing the amount due to sprinkler protection. In addition, with the TIA the maximum size of consumer firework storage buildings will be limited to 12,000 ft² in area. Full background information may be found at the document information tab at www.nfpa.org/1124.

*For the same reasons, until such time as testing is completed, or if ever completed, this change is to delete the reference to footnote "d" that provided a 100% increase to the amount of consumer fireworks allowed if sprinkler protection is provided, when it has been revealed that the original increase was not based on a credible, verifiable series of tests to determine what the appropriate sprinkler design density should be for what may be typical of the quantities of consumer fireworks present in retail establishments and still not become a Group H-3 building.*

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire safety and hazardous materials in new and existing buildings and facilities and the protection of life and property in wildland urban interface areas. In 2014 and 2015 the Fire-CAC has held 5 open meetings. In addition, there were numerous conference calls, Regional Work Group and Task Group meetings for the current code development cycle, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC

**Cost Impact:** Will not increase the cost of construction

This will not increase the cost of construction it simply reduces the amount of 1.4G explosives permitted in a building equipped throughout with an automatic sprinkler system. This is consistent with the deletion of the same footnote for consumer fireworks that was removed for the 2015 IFC and IBC.
EXPLOSIVE. A chemical compound, mixture or device, the primary or common purpose of which is to function by explosion. The term includes, but is not limited to, dynamite, black powder, pellet powder, initiating explosives, detonators, safety fuses, squibs, detonating cord, igniter cord, igniters and display fireworks, 1.3G igniters.

The term "Explosive" includes any material determined to be within the scope of USC Title 18: Chapter 40 and also includes any material classified as an explosive other than consumer fireworks, 1.4G by the hazardous materials regulations of DOTn 49 CFR Parts 100-185.

High explosive. Explosive material, such as dynamite, which can be caused to detonate by means of a No. 8 test blasting cap where unconfined.

Low explosive. Explosive material that will burn or deflagrate when ignited. It is characterized by a rate of reaction that is less than the speed of sound. Examples of low explosives include, but are not limited to, black powder, safety fuse, igniters, igniter cord, fuse lighters, fireworks, 1.3G and propellants, 1.3C.

Mass-detonating explosives. Division 1.1, 1.2 and 1.5 explosives alone or in combination, or loaded into various types of ammunition or containers, most of which can be expected to explode virtually instantaneously when a small portion is subjected to fire, severe concussion, impact, the impulse of an initiating agent or the effect of a considerable discharge of energy from without. Materials that react in this manner represent a mass explosion hazard. Such an explosive will normally cause severe structural damage to adjacent objects. Explosive propagation could occur immediately to other items of ammunition and explosives stored sufficiently close to and not adequately protected from the initially exploding pile with a time interval short enough so that two or more quantities must be considered as one for quantity-distance purposes.

UN/DOTn Class 1 explosives. The former classification system used by DOTn included the terms "high" and "low" explosives as defined herein. The following terms further define explosives under the current system applied by DOTn for all explosive materials defined as hazard Class 1 materials. Compatibility group letters are used in concert with the division to specify further limitations on each division noted (for example, the letter G identifies the material as a pyrotechnic substance or article containing a pyrotechnic substance and similar materials).

Division 1.1. Explosives that have a mass explosion hazard. A mass explosion is one which affects almost the entire load instantaneously.

Division 1.2. Explosives that have a projection hazard but not a mass explosion hazard.

Division 1.3. Explosives that have a fire hazard and either a minor blast hazard or a minor projection hazard or both, but not a mass explosion hazard.

Division 1.4. Explosives that pose a minor explosion hazard. The explosive effects are largely confined to the package and no projection of fragments of appreciable size or range is to be expected. An external fire must not cause virtually instantaneous explosion of almost the entire contents of the package.

Division 1.5. Very insensitive explosives. This division is comprised of substances that have a
mass explosion hazard but which are so insensitive that there is very little probability of initiation or of transition from burning to detonation under normal conditions of transport.

**Division 1.6.** Extremely insensitive articles which do not have a mass explosion hazard. This division is comprised of articles that contain only extremely insensitive detonating substances and which demonstrate a negligible probability of accidental initiation or propagation.

**FIREWORKS.** Any composition or device for the purpose of producing a visible or an audible effect for entertainment purposes by combustion, deflagration or detonation that meets the definition of 1.4G fireworks or 1.3G fireworks.

**Fireworks, 1.4G.** Small fireworks devices containing restricted amounts of pyrotechnic composition designed primarily to produce visible or audible effects by combustion. Such 1.4G fireworks which comply or deflagration that complies with the construction, chemical composition and labeling regulations of the DOTn for Fireworks, UN 0336, and the U.S. Consumer Product Safety Commission as set forth in CPSC 16 CFR Parts 1500 and 1507, are not explosive materials for the purpose of this code.

**Fireworks, 1.3G.** Large fireworks devices, which are explosive materials, intended for use in fireworks displays and designed to produce audible or visible effects by combustion, deflagration or detonation. Such 1.3G fireworks include, but are not limited to, firecrackers containing more than 130 milligrams (2 grains) of explosive composition, aerial shells containing more than 40 grams of pyrotechnic composition and other display pieces which exceed the limits for classification as 1.4G fireworks. Such 1.3G fireworks are also described as Fireworks, UN 0335 by the DOTn.

**TABLE 5003.1.1 [IBC(F307.1(1)]
MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A PHYSICAL HAZARD\textsuperscript{a, j, m, n, p}

<table>
<thead>
<tr>
<th>MATERIAL</th>
<th>CLASS</th>
<th>GROUP WHEN THE MAXIMUM ALLOWABLE QUANTITY IS EXCEEDED</th>
<th>STORAGE\textsuperscript{b}</th>
<th>USE-CLOSED SYSTEMS\textsuperscript{b}</th>
<th>USE-OPEN SYSTEMS\textsuperscript{b}</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Solid pounds (cubic feet)</td>
<td>Liquid gallons (pounds)</td>
<td>Gas (cubic feet at NTP)</td>
<td>Solid pounds (cubic feet)</td>
</tr>
<tr>
<td>Combustible dust</td>
<td>NA</td>
<td>H-2</td>
<td>See Note q</td>
<td>NA</td>
<td>See Note q</td>
</tr>
<tr>
<td>Combustible fibers\textsuperscript{g}</td>
<td>Loose or Baled\textsuperscript{b}</td>
<td>H-3</td>
<td>(100) (1,000)</td>
<td>NA</td>
<td>(100) (1,000)</td>
</tr>
<tr>
<td>Combustible liquid\textsuperscript{c, i}</td>
<td>II</td>
<td>H-2 or H-3</td>
<td>NA</td>
<td>120\textsuperscript{d,e}</td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td>IIIA</td>
<td>H-2 or H-3</td>
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<td>330\textsuperscript{d, e}</td>
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<td></td>
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<td>13,200\textsuperscript{e, f}</td>
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<td>Consumer fireworks</td>
<td>1.4G</td>
<td>H-2</td>
<td>125</td>
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<tr>
<td>Cryogenic Flammable</td>
<td>NA</td>
<td>H-2</td>
<td>NA</td>
<td>45\textsuperscript{d}</td>
<td>NA</td>
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<td>Cryogenic Inert</td>
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<tr>
<td>Cryogenic Oxidizing</td>
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<td>NA</td>
<td>45\textsuperscript{d}</td>
<td>NA</td>
</tr>
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<td>Division 1.1</td>
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<td>1\textsuperscript{e, g}</td>
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<td>0.25\textsuperscript{g}</td>
<td>(0.25)\textsuperscript{g}</td>
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<td>(1)\textsuperscript{e, g}</td>
<td>0.25\textsuperscript{g}</td>
<td>(0.25)\textsuperscript{g}</td>
</tr>
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<td>1\textsuperscript{g}</td>
<td>(1)\textsuperscript{g}</td>
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<td>CLASS</td>
<td>GROUP</td>
<td>MATERIAL</td>
<td>STORAGE</td>
<td>USE-CLOSED SYSTEMS</td>
<td>USE-OPEN SYSTEMS</td>
</tr>
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<td>---------</td>
<td>--------------------</td>
<td>-----------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Solid</td>
<td>Liquid</td>
<td>Gas</td>
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<td></td>
<td></td>
<td></td>
<td>pounds</td>
<td>gallons</td>
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</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(cubic feet)</td>
<td>(pounds)</td>
<td>feet</td>
</tr>
<tr>
<td>UD</td>
<td>H-1</td>
<td>Organic peroxide</td>
<td>1&lt;sup&gt;e&lt;/sup&gt;, g</td>
<td>(1)&lt;sup&gt;e&lt;/sup&gt;, g</td>
<td>NA</td>
</tr>
<tr>
<td>I</td>
<td>H-2</td>
<td></td>
<td>5&lt;sup&gt;d&lt;/sup&gt;, e</td>
<td>(5)&lt;sup&gt;d&lt;/sup&gt;, e</td>
<td>1&lt;sup&gt;d&lt;/sup&gt;</td>
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<td>H-3</td>
<td></td>
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<td>(125)&lt;sup&gt;d&lt;/sup&gt;, e</td>
<td>125&lt;sup&gt;d&lt;/sup&gt;</td>
</tr>
<tr>
<td>IV</td>
<td>NA</td>
<td></td>
<td>NL</td>
<td>NL</td>
<td>NL</td>
</tr>
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<td>NL</td>
<td>NL</td>
</tr>
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<td>4</td>
<td>H-1</td>
<td>Oxidizer</td>
<td>1&lt;sup&gt;g&lt;/sup&gt;</td>
<td>(1)&lt;sup&gt;e&lt;/sup&gt;, g</td>
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<tr>
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<td></td>
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<td>(10)&lt;sup&gt;d&lt;/sup&gt;, e</td>
<td>2&lt;sup&gt;d&lt;/sup&gt;</td>
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<td>(4,000)&lt;sup&gt;e&lt;/sup&gt;, f</td>
<td>4,000&lt;sup&gt;f&lt;/sup&gt;</td>
</tr>
<tr>
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<td>H-3</td>
<td>Oxidizing gas</td>
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<td>NA</td>
<td>1,500&lt;sup&gt;d&lt;/sup&gt;, e</td>
</tr>
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<td>2</td>
<td>NA</td>
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<td>H-1</td>
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<td>4&lt;sup&gt;e&lt;/sup&gt;, g</td>
<td>(4)&lt;sup&gt;e&lt;/sup&gt;, g</td>
<td>50&lt;sup&gt;e&lt;/sup&gt;, g</td>
</tr>
<tr>
<td>3</td>
<td>H-1 or H-2</td>
<td></td>
<td>10&lt;sup&gt;d&lt;/sup&gt;, e</td>
<td>(10)&lt;sup&gt;d&lt;/sup&gt;, e</td>
<td>10&lt;sup&gt;d&lt;/sup&gt;</td>
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<tr>
<td>2</td>
<td>H-3</td>
<td></td>
<td>50&lt;sup&gt;d&lt;/sup&gt;, e</td>
<td>(50)&lt;sup&gt;d&lt;/sup&gt;, e</td>
<td>750&lt;sup&gt;d&lt;/sup&gt;, e</td>
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<td></td>
<td>NL</td>
<td>NL</td>
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</tr>
<tr>
<td>3</td>
<td>H-2</td>
<td>Water reactive</td>
<td>5&lt;sup&gt;d&lt;/sup&gt;, e</td>
<td>(5)&lt;sup&gt;d&lt;/sup&gt;, e</td>
<td>50&lt;sup&gt;d&lt;/sup&gt;, e</td>
</tr>
<tr>
<td>2</td>
<td>H-3</td>
<td></td>
<td>50&lt;sup&gt;d&lt;/sup&gt;, e</td>
<td>(50)&lt;sup&gt;d&lt;/sup&gt;, e</td>
<td>50&lt;sup&gt;d&lt;/sup&gt;, e</td>
</tr>
<tr>
<td>1</td>
<td>NA</td>
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5. Alcohol-based hand rubs classified as Class I or III liquids in dispensers that are installed in accordance with Sections 5705.5 and 5705.5.1. The location of the alcohol-based hand rub (ABHR) dispensers shall be provided in the construction documents.

q. Where manufactured, generated or used in such a manner that the concentration and conditions create a fire or explosion hazard based on information prepared in accordance with Section 104.7.2.

**5601.1.3 Fireworks.** The possession, manufacture, storage, sale, handling and use of fireworks are prohibited.

**Exceptions:**

1. Storage and handling of fireworks as allowed in Section 5604.

2. Manufacture, assembly and testing of fireworks as allowed in Section 5605.

3. The use of fireworks for fireworks displays as allowed in Section 5608.

4. The possession, storage, sale, handling and use of specific types of Division 1.4G fireworks where allowed by applicable laws, ordinances and regulations, provided such fireworks and facilities comply with NFPA 1124, CPSC 16 CFR Parts 1500 and 1507, and DOTn 49 CFR Parts 100–185, as applicable for consumer fireworks.

**TABLE 5601.8.1 (3)**
### APPLICATION OF SEPARATION DISTANCE (Q-D) TABLES—DIVISION 1.4 EXPLOSIVES\textsuperscript{a, b, c, d}

<table>
<thead>
<tr>
<th>ITEM</th>
<th>MAGAZINE</th>
<th>Q-D</th>
<th>OPERATING BUILDING</th>
<th>Q-D</th>
<th>INHABITED BUILDING</th>
<th>Q-D</th>
<th>PUBLIC TRAFFIC ROUTE</th>
<th>Q-D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Magazine</td>
<td>Table 5604.5.2(3)</td>
<td>IMD</td>
<td>Table 5604.5.2(3)</td>
<td>ILD or IPD</td>
<td>Table 5604.5.2(3)</td>
<td>IBD</td>
<td>Table 5604.5.2(3)</td>
<td>PTR</td>
</tr>
<tr>
<td>Operating building</td>
<td>Table 5604.5.2(3)</td>
<td>ILD or IPD</td>
<td>Table 5604.5.2(3)</td>
<td>ILD or IPD</td>
<td>Table 5604.5.2(3)</td>
<td>IBD</td>
<td>Table 5604.5.2(3)</td>
<td>PTR</td>
</tr>
<tr>
<td>Inhabited building</td>
<td>Table 5604.5.2(3)</td>
<td>IBD</td>
<td>Table 5604.5.2(3)</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
<td></td>
</tr>
<tr>
<td>Public traffic route</td>
<td>Table 5604.5.2(3)</td>
<td>PTR</td>
<td>Table 5604.5.2(3)</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
<td></td>
</tr>
</tbody>
</table>

For SI: 1 foot = 304.8 mm.

a. The minimum separation distance (D\textsubscript{o}) shall be not less than 50 feet.

b. Linear interpolation between tabular values in the referenced Q-D table shall not be allowed.

c. For definitions of Quantity-Distance abbreviations IBD, ILD, IMD, IPD and PTR, see Chapter 2.

d. This table shall not apply to consumer fireworks, 1.4G.

### TABLE 5604.3

**STORAGE AMOUNTS AND MAGAZINE REQUIREMENTS FOR EXPLOSIVES, EXPLOSIVE MATERIALS AND FIREWORKS, 1.3G MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA**

<table>
<thead>
<tr>
<th>NEW UN/DOTn DIVISION</th>
<th>OLD DOTn CLASS</th>
<th>ATF/OSHA CLASS</th>
<th>INDOOR\textsuperscript{a} (pounds)</th>
<th>OUTDOOR (pounds)</th>
<th>MAGAZINE TYPE REQUIRED</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Unprotected</td>
<td>Cabinet</td>
<td>Sprinklers</td>
</tr>
<tr>
<td>1.1\textsuperscript{b}</td>
<td>A</td>
<td>High</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>1.2</td>
<td>A</td>
<td>High</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>1.2</td>
<td>B</td>
<td>Low</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>1.3</td>
<td>B</td>
<td>Low</td>
<td>0</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>1.4\textsuperscript{c}</td>
<td>B</td>
<td>Low</td>
<td>0</td>
<td>0</td>
<td>50</td>
</tr>
<tr>
<td>1.5</td>
<td>C</td>
<td>Low</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

\textsuperscript{a} For SI: 1 foot = 304.8 mm.

\textsuperscript{b} For definitions of Quantity-Distance abbreviations IBD, ILD, IMD, IPD and PTR, see Chapter 2.

\textsuperscript{c} This table shall not apply to consumer fireworks, 1.4G.
For SI: 1 pound = 0.454 kg, 1 pound per gallon = 0.12 kg per liter, 1 ounce = 28.35 g.

a. A factor of 10 pounds per gallon shall be used for converting pounds (solid) to gallons (liquid) in accordance with Section 5003.1.2.

b. Black powder shall be stored in a Type 1, 2, 3 or 4 magazine as provided for in Section 5604.3.1.

c. This table shall not apply to consumer fireworks, 1.4G.

### TABLE 5604.5.2 (3)

**TABLE OF DISTANCES (Q-D) FOR BUILDINGS AND MAGAZINES CONTAINING EXPLOSIVES—DIVISION 1.4C**

<table>
<thead>
<tr>
<th>QUANTITY OF DIVISION 1.4 EXPLOSIVES (NET EXPLOSIVES WEIGHT)</th>
<th>DISTANCES IN FEET</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pounds over Pounds not over</td>
<td>Inhabited Building Distance (IBD)</td>
</tr>
<tr>
<td>50 Not Limited</td>
<td>100</td>
</tr>
</tbody>
</table>

For SI: 1 foot = 304.8 mm, 1 pound = 0.454 kg.

a. A separation distance of 100 feet is required for buildings of other than Type I or Type II construction as defined in the International Building Code.

b. For earth-covered magazines, specific separation is not required.

1. Earth cover material used for magazines shall be relatively cohesive. Solid or wet clay and similar types of soil are too cohesive and shall not be used. Soil shall be free from unsanitary organic matter, trash, debris and stones heavier than 10 pounds or larger than 6 inches in diameter. Compaction and surface preparation shall be provided, as necessary, to maintain structural integrity and avoid erosion. Where cohesive material cannot be used, as in sandy soil, the earth cover over magazines shall be finished with a suitable material to ensure structural integrity.

2. The earth fill or earth cover between earth-covered magazines shall be either solid or sloped, in accordance with the requirements of other construction features, but not less than 2 feet of earth cover shall be maintained over the top of each magazine. To reduce erosion and facilitate maintenance operations, the cover shall have a slope of 2 horizontal to 1 vertical.

c. Restricted to articles, including articles packaged for shipment, that are not regulated as an explosive under Bureau of Alcohol, Tobacco, Firearms and Explosives regulations, or unpacked articles used in process operations that do not propagate a detonation or deflagration between articles. This table shall not apply to consumer fireworks, 1.4G.

### SECTION 5609 TEMPORARY STORAGE OF CONSUMER FIREWORKS 1.4G (Consumer Fireworks)

5609.1 General. Where the display or temporary storage of consumer fireworks, 1.4G (Consumer Fireworks) is allowed by Section 5601.1.3, Exception 4, such display or storage shall comply with the applicable requirements of NFPA 1124.

Reason: Summary of change:
1. Reverse action of Code Change B3-97 and F18-98 that were based on absent or defective reasoning.

What is the "purpose" of stating fireworks are not explosive? What's the reason? How do you determine or apply the purpose when the purpose is unknown? Therefore, this coordinated set of changes is to reverse changes made that were based on absent or defective reasoning. The history is as follows.

The IFC definition language noting that consumer fireworks should not be considered "explosive materials for the purpose of this code" originated through BOCA code change F97-99 which was built upon BOCA code change B3-97 of the previous cycle. The proponent at the time stated the change was to "revise the definitions for consumer fireworks and display to be more closely aligned with the definitions contained in the 1997 IFC Uniform Fire Code including 1999 Accumulative Supplement and the 1999 BOCA National Fire Prevention Code." What was lacking in those originating changes was the information to support and describe what the "purpose" was supposed to be and is to be continued.

**B3-97**

In looking back for the UFC and BOCA fire codes that were referenced in the F97-99 change to the IFC, code change B3-97 introduced language through the BOCA building code claiming consumer fireworks are not explosive materials and did not provide any technical substantiation to support such claim. It might be acceptable to say the proponent was making the claim as a means to justify reclassifying the storage and/or sale of consumer fireworks from an H-1 to an H-3 building by saying that it "appears reasonable" given the comparison for other H-3 commodities but that was not the issue in the proposed change.

**B18-98**

The next BOCA cycle saw the introduction of F18-98 changing the definition of consumer fireworks, 1.4G as "not explosive materials for the purpose of this code". The committee hearing the change at the time denied the proposal with a conference action to amend. Subsequently the proponent brought the issue back in the form of an amendment. But here again, a technical substantiation was not provided and again, the information to support and describe what the "purpose" was totally absent.

(At the time of this submission copies of the UFC code changes referenced above had not been located but it is suspected the supporting statements closely resembled those submitted to BOCA.)

This same F18-98 change, as amended, carved out consumer fireworks from BOCA's MAQ table to "correlate with code change B3-97 to the 1996 BOCA National Building Code" to be shown as a Group H-3 building instead of a Group H-1. At the time the proponent also stated that it was to "correlate definitions used in the BOCA National Fire Prevention Code and Building Code with terminology used in the new DOTn/UN classifications and regulations and NFPA standards." That may be true to a point and it's that point that gets to the heart of the reason behind this proposed change, which is, DOTn 49 CFR Parts 100-177, U.S Consumer Products Safety Commission as set forth in CPSC 16 CFR, UN 0336, NFPA standards 495, 1123, 1124, and 1126 **did not and do not** contain language saying consumer fireworks are not explosive for any purpose. Checking back to pamphlets published at the time by the Institute of Makers of Explosives; the U.S. Department of Justice, Bureau of Alcohol, Tobacco, Firearms and Explosives, AFT Publication 5400.7; the American Pyrotechnics Association Standard 87-1, nothing was found stating consumer fireworks are not explosive. In fact, everything found has fireworks labeled as "explosive" without distinction for either 1.4G "consumer fireworks" or a 1.4G professional pyrotechnic device such as the "gerb" that was used and ignited The Station nightclub fire in Rhode Island.

Comparative research in the more current versions of the documents referenced in the definitions of explosives and fireworks reveal the following:

- DOTn 49 CFR, Parts 100-177, a 923 page document about the manner in which all HazMat is to be transported on the public highway, the word "firework" appears 32 times. The word "explosive" appears 1,150 The words "firework" and "explosives" do not appear or are linked together in the same sentence or any paragraphs for the affect of saying consumer fireworks are not explosive.
- DOTn 49 CFR, Part 178, a 251 page document on the "Specifications for Packagings" when transporting, the word "firework" appears zero (0) times and the word "explosive" appears 3 times. Therefore at no time do they appear or are linked together in the same sentence or any paragraph for the affect of saying consumer fireworks are not explosive.
- DOTn 49 CFR, Part 178, a 251 page document on the "Specifications for Packagings" when transporting, the word "firework" appears zero (0) times and the word "explosive" appears 3 times. Therefore at no time do they appear or are linked together in the same sentence or any paragraph for the affect of saying consumer fireworks are not explosive.
- CPC 16 CFR, Part 1500, a 110 page document on the "Hazardous Substances and Articles; Administration and Enforcement Regulations" of the "Federal Hazardous Substances Act Regulations", the word "firework" appears 26 times. The word "explosive" appears 19 times. The words "firework" and "explosives" do not
appear or are linked together in the same sentence or any paragraphs for the effect of saying consumer fireworks are not

- CPC 16 CFR, Part 15070, “Firework Devices” the word “firework” appears 9 times. The word “explosive” appears zero (0) times. Therefore at no time do they appear or are linked together in the same sentence or any paragraph.

The reinforcing point is, again, even Federal regulations do not make a statement that consumer fireworks are not explosive for some unknown purpose. The same is still true for ATF, IME, APA Standard 87-1, and NFPA 1, 495, 1123 and 1124.

It was the accumulative results of B3-97 and F18-98 that lent themselves to being referenced in the supporting statement for IFC code change F97-99 to support or justify “align(ment)”.

That portion of the proposed definition change to Fireworks, 1.4G to include “deflagration” is a resurrection of a previously used descriptor and is to more accurately reflect the functioning of some consumer fireworks. While a sparkler or fountain in a consumer firework may operate through combustion, simple combustion does not necessarily mean enough force will be produced quickly enough for the device to function in a desired manner. If the pyrotechnic material does not deflagrate, the consumer grade flaming balls of roman candles may not launch; and aerial devices may not have enough expelling force to obtain the needed altitude. Firecrackers have to, at minimum, deflagrate. Rockets have to deflagrate. Aerial devices have to deflagrate. Anything with a report must, at minimum, deflagrate.

If it is agreed through the coming code cycle that consumer fireworks are indeed "explosive" for the purpose of the code, then code changes F265-07/08, F266-07/08 and F267-07/08 must also be reversed because those changes are built upon the definition of fire works.

The change to Table 5603.1.1(1) is a change to reflect that consumer fireworks are indeed properly classified as an Explosive 1.4G and it’s not necessary to have a separate line with identical threshold values, including all footnotes, in order to determine at what point a building would be or should be classified as a Group H-3. It’s redundancy within the same table. In reality, at least at the model code level, other than the deletion of language saying consumer fireworks are not explosive, the net effect of the change to Table 5603.1.1(1) will be zero to what is taking place in the world of consumer fireworks manufacturing, storage, sale and use.

The insertion of the words "as applicable" in Section 5601.1.3, Exception 4 is editorial and is to reflect that not all things in the reference material may be applicable.

It should also be noted that this is essentially a resubmission of code change F186-09/10.

Attachments: BOCA Code Changes B3-97, F18-98; IFC Code Change F96-99; Excerpts from DOTn and ATF, proposed changes and final actions on F265-07/08, F266-07/08 and F267-07/08; Extracts from 49 CFR, Parts 100-177; Extracts from ATF Regulations.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire safety and hazardous materials in new and existing buildings and facilities and the protection of life and property in wildland urban interface areas. In 2014 and 2015 the Fire-CAC has held 5 open meetings. In addition, there were numerous conference calls, Regional Work Group and Task Group meetings for the current code development cycle, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC web site at: FCAC

Cost Impact: Will not increase the cost of construction

This now simply clarifies that Class 1.4G fireworks are considered as explosives and should be addressed this way. A separate line item will no longer be included but it will still be considered as Group H-3 if the MAQ is exceeded.

F347-16 : TABLE 5003.1.1
O'BRIAN10516
5003.1.5 High-hazard Group H occupancy  The use of a building or structure, or a portion thereof, that involves the manufacturing, processing, generation or storage of materials that constitute a physical or health hazard in quantities in excess of those allowed in control areas complying with Section 5003.8.3, based on the maximum allowable quantity limits for control areas set forth in Tables 5003.1.1(1) and 5003.1.1(2) shall be classified as a high-hazard Group H occupancy. Hazardous occupancies are classified in Groups H-1, H-2, H-3, H-4 and H-5 in accordance with the International Building Code. Hazardous materials stored or used on top of roofs or canopies shall be classified as outdoor storage or use and shall comply with this code.

Add new text as follows:

5003.1.5.1 Uses other than Group H  The storage, use or handling of hazardous materials as described in one or more of the following items shall not cause the occupancy to be classified as Group H, but it shall be classified as the occupancy that it most nearly resembles:

1. Buildings and structures occupied for the application of flammable finishes, provided that such buildings or areas conform to the requirements of Chapter 24 of this code and Section 416 of the International Building Code.

2. Wholesale and retail sales and storage of flammable and combustible liquids in mercantile occupancies conforming to Chapter 57.

3. Closed piping system containing flammable or combustible liquids or gases utilized for the operation of machinery or equipment.

4. Cleaning establishments that utilize combustible liquid solvents having a flash point of 140°F (60°C) or higher in closed systems employing equipment listed by an approved testing agency, provided that this occupancy is separated from all other areas of the building by 1-hour fire barriers in accordance with Section 707 of the International Building Code or 1-hour horizontal assemblies in accordance with Section 711 of the International Building Code, or both.

5. Cleaning establishments that utilize a liquid solvent having a flash point at or above 200°F (93°C).


7. Refrigeration systems.

8. The storage or utilization of materials for agricultural purposes on the premises.

9. Stationary batteries utilized for facility emergency power, uninterruptible power supply or telecommunication facilities, provided that the batteries are equipped with safety venting caps and ventilation is provided in accordance with the International Mechanical Code.

10. Corrosive personal or household products in their original packaging used in retail display.
11. Commonly used corrosive building materials.

12. Buildings and structures occupied for aerosol storage shall be classified as Group S-1, provided that such buildings conform to the requirements of Chapter 51.

13. Display and storage of nonflammable solid and nonflammable or noncombustible liquid hazardous materials in quantities not exceeding the maximum allowable quantity per control area in Group M or S occupancies complying with Section 5003.8.3.5.

14. The storage of black powder, smokeless propellant and small arms primers in Groups M and R-3 and special industrial explosive devices in Groups B, F, M and S, provided such storage conforms to the quantity limits and requirements of this code.

Reason: The Group classification language for H Group occupancies is from the Chapter 3 technical language portion of the IBC. When added to the IFC for guidance it was inserted in Chapter 2. Under normal code writing policy definitions should not contain technical requirements. In the case of H Group classifications the technical triggers within the Group language have a direct relationship with the MAQ tables located within Chapter 50. Currently, once you identify an occupancy of having materials over the MAQ there is no trigger language within Chapter 50 identifying the H Group classification or pointing the user back to Chapter 2 for the trigger language. You are faced with the question, if I have identified an existing F-1 Group occupancy that has hazardous materials exceeding the MAQ permitted that cannot be solved through the control area concept, what next? Do you simply apply the various requirements that apply when the MAQ is exceeded and let them go on operating as a F-1 Group?

The proper action is to have the materials exceeding the MAQ removed, or to have the F-1 occupancy go through the change of occupancy process to the appropriate H Group occupancy. Currently Chapter 50 does not provide any code language trigger to that effect. Since a definition is by policy not a technical requirement there is no way to cite Chapter 2 of the IFC to effect compliance.

Additionally, there is no language directly in Chapter 50 identifying those occupancies/activities that are not to be classified as an H Group provided they are in compliance with various requirements of the IFC and IBC.

This proposal is to take the language from Chapter 2 and repeat the language at new Sections 5003.1.5 and 5003.1.5.1 to improve linkage and applicability of the technical provisions of the group classification including the identification of those activities that would not be considered H Group occupancies even if quantities exceeded the MAQ tables. The language in 5003.1.5 is modified slightly to eliminate a reference to IBC Section 415 and to add a pointer to the IBC for subcategory classifications.

It is intended that these provisions will be correlated with any of the source items listed in [F] 307.1.1 "Uses other than Group H" should the source items be modified or added to.

Cost Impact: Will not increase the cost of construction

This proposal does not add any requirements, therefore there will not be an increase in construction costs. There is a strong possibility that this proposal would reduce costs by providing for better correlation of Chapter 50 with the high hazard group requirements of the IBC and by identifying those activities that are not to be considered H group occupancies directly in Chapter 50.
IFC: 5003.2.2.1, 5005.1.12 (New).

Proponent: Martin Gresho, representing FP2FIRE (marty@fp2fire.com)

2015 International Fire Code

Revise as follows:

5003.2.2.1 Design and construction. Piping, tubing, valves, fittings and related components used for hazardous materials shall be in accordance with the following:

1. Piping, tubing, valves, fittings and related components shall be designed and fabricated from materials that are compatible with the material to be contained and shall be of adequate strength and durability to withstand the pressure, structural and seismic stress and exposure to which they are subject.

2. Piping and tubing shall be identified in accordance with ASME A13.1 to indicate the material conveyed.

3. Readily accessible manual valves or automatic remotely activated fail-safe emergency shutoff valves shall be installed on supply piping and tubing at the following locations:
   3.1. The point of use.
   3.2. The tank, cylinder or bulk source.

4. Manual emergency shutoff valves and controls for remotely activated emergency shutoff valves shall be identified and the location shall be clearly visible, accessible and indicated by means of a sign.

5. Backflow prevention or check valves shall be provided where the backflow of hazardous materials could create a hazardous condition or cause the unauthorized discharge of hazardous materials.

6. Where gases or liquids having a hazard ranking of:

   Health Class 3 or 4
   Flammability Class 4
   Instability Class 3 or 4
   in accordance with NFPA 704 are carried in pressurized piping above 15 pounds per square inch gauge (psig) (103 kPa), an approved means of leak detection and emergency shutoff or excess flow control shall be provided. Where the piping originates from within a hazardous material storage room or area, the excess flow control shall be located within the storage room or area. Where the piping originates from a bulk source, the excess flow control shall be located as close to the bulk source as practical.

Exceptions:

1. Piping for inlet connections designed to prevent backflow.
2. Piping for pressure relief devices.

Add new text as follows:

5005.1.12 Emergency Isolation.
Where gases or liquids having a hazard ranking of:

Health Class 3 or 4
Flammability Class 4
Instability Class 3 or 4
in accordance with NFPA 704 are carried in pressurized piping above 15 pounds per square inch gauge (psig) (103 kPa), an approved means of leak detection and emergency shutoff or excess flow control shall be provided. Where the piping originates from within a hazardous material storage room or area, the excess flow control shall be located within the storage room or area. Where the piping originates from a bulk source, the excess flow control shall be located as close to the bulk source as practical.

**Exceptions:**
1. Piping for inlet connections designed to prevent backflow.
2. Piping for pressure relief devices.

**Reason:** Relocate 5003.2.2.1 (6) from Section 5003 where it applies to any amount (below and above MAQ) to Section 5005 for use, dispensing and handling greater than MAQ.

Substantiation: The requirement for an approved means of leak detection and emergency shutoff or excess flow control for the most hazardous classes of gases and liquids >15 psig is a good requirement but this should not be a requirement for any amount (no matter how small) of the subject gases or liquids. Instead this is a requirement for use that is justified when applied only to quantities in excess of the applicable MAQ. The proposal relocates the text from 5003 GENERAL REQUIREMENTS to 5005 USE, DISPENSING AND HANDLING where it applies only > MAQ. This requirement is appropriate in 5005 (USE) and not also in 5004 (STORAGE) because the activity described is use not storage.

This change is in alignment with 2016 NFPA 55 COMPRESSED GASES AND CRYOGENIC FLUIDS CODE (see 7.3.1.12 and 7.3.1.12.3 excerpted from 55 below. Note that NFPA 55 Table 6.3.1.1 is the MAQ Table)

7.3.1.12 Emergency Isolation.
7.3.1.12.1 Where compressed gases having a hazard ranking in one or more of the following hazard classes in accordance with NFPA 704 are carried in pressurized piping above a gauge pressure of 15 psi (103 kPa), an approved method of emergency isolation shall be provided:
1. Health hazard Class 3 or Class 4
2. Flammability Class 4
3. Instability Class 3 or Class 4

7.3.1.12.2 Approved means of meeting the requirements for emergency isolation shall include any of the following:
1. Automatic shutoff valves, located as close to the bulk source as practical, tied to leak detection systems
2. Attended control stations where trained personnel can monitor alarms or supervisory signals and can trigger emergency responses
3. A constantly monitored control station with an alarm and remote shut off of the gas supply system
4. Excess flow valves at the bulk source

7.3.1.12.3 The requirements of 7.3.1.12 shall not be required for the following:
1. Piping for inlet connections designed to prevent backflow at the source
2. Piping for pressure relief devices
3. Where the source of the gas is not in excess of the quantity threshold as indicated in Table 6.3.1.1

**Bibliography:** [NFPA 55] [Compressed Gases and Cryogenic Fluids Code] [NFPA] [2016] [28]

**Cost Impact:** Will not increase the cost of construction
The cost of construction will not be increased as a result of this change. It is possible that it will decrease. As currently written an approved means of leak detection and emergency shutoff or excess flow control is required for the subject gases or liquids at any amount. As proposed the requirement will have a threshold for the requirement which is the MAQ. There will be no impact to the cost of construction for projects where the materials exceed MAQ because the requirements already apply. There will be a decrease to the cost of construction for projects where the inventory is less than MAQ because the requirements will clearly not apply.
F350-16
IFC: 5003.3.1.

Proponent: Michael O'Brian representing the Fire Code Action Committee (FCAC@icc safe.org)

2015 International Fire Code

Revise as follows:

5003.3.1 Unauthorized discharges. Where
In the event hazardous materials are released in quantities reportable under state, federal or local regulations, the fire code official shall be notified and the following procedures required in accordance with Sections 5003.3.1.1 through 5003.3.1.4.

Reason: The code text previously read 'when', but at the time of the global change in the I-Codes from 'when' to 'where', this item was also changed. Most of the revisions to where are appropriate, however in this case, the term doesn't fit. Rather than reinsert "when", the text is revised to simply refer to the release event. There is no change in intent or application of this section.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire safety and hazardous materials in new and existing buildings and facilities and the protection of life and property in wildland urban interface areas. In 2014 and 2015 the Fire-CAC has held 5 open meetings. In addition, there were numerous conference calls, Regional Work Group and Task Group meetings for the current code development cycle, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC

Cost Impact: Will not increase the cost of construction
This is only a clarification of code requirements.

F350-16 : 5003.3.1- 
O'BRIAN11021
F351-16

IFC: 5003.4.

Proponent: Jay Weightman, representing Colorado Springs Fire Department, Division of the Fire Marshal (jweightman@springsgov.com)

2015 International Fire Code

Revise as follows:

5003.4 Material Safety Data Sheets. Material Safety Data Sheets (MSDS) shall be readily available on the premises for hazardous materials regulated by this chapter code. Where a hazardous substance is One or more of the following methods shall be used to provide SDS's on the premises:

1. Hard copies
2. Website
3. Phone
4. Other approved methods.

Hazardous materials developed in a laboratory, available information shall be documented.

Exception: Designated hazardous waste.

- Exception: Designated hazardous waste.

Reason: By changing from Material Safety Data Sheets to Safety Data Sheets, it brings the IFC up to the new OSHA requirements. Also it allows for other options, other than hard copies, not currently in the IFC, such as on-line websites, by phone to an operator that looks up the requested information, or other means as approved by the authority having jurisdiction. Many big box stores have far too many items to keep an accurate hard copy on-site.

Cost Impact: Will not increase the cost of construction

There is no substantial cost to this change with the larger options available.
**2015 International Fire Code**

**TABLE 5003.8.2**

<table>
<thead>
<tr>
<th>Material</th>
<th>Class</th>
<th>Solids and liquids (tons)(^a, b)</th>
<th>Gases (cubic feet)(^a, b)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explosives</td>
<td>Division 1.1</td>
<td>Maximum Allowable Quantity</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Division 1.2</td>
<td>Maximum Allowable Quantity</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Division 1.3</td>
<td>Maximum Allowable Quantity</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Division 1.4</td>
<td>Maximum Allowable Quantity</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Division 1.4(^c)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Division 1.5</td>
<td>Maximum Allowable Quantity</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Division 1.6</td>
<td>Maximum Allowable Quantity</td>
<td></td>
</tr>
<tr>
<td>Oxidizers</td>
<td>Class 4</td>
<td>Maximum Allowable Quantity</td>
<td>Maximum Allowable Quantity</td>
</tr>
<tr>
<td>Unstable (reactives) detonable</td>
<td>Class 3 or 4</td>
<td>Maximum Allowable Quantity</td>
<td>Maximum Allowable Quantity</td>
</tr>
<tr>
<td>Oxidizer, liquids and solids</td>
<td>Class 3</td>
<td>1,200</td>
<td>Not Applicable</td>
</tr>
<tr>
<td></td>
<td>Class 2</td>
<td>2,000</td>
<td></td>
</tr>
<tr>
<td>Organic peroxides</td>
<td>Detonable</td>
<td>Maximum Allowable Quantity</td>
<td>Not Applicable</td>
</tr>
<tr>
<td></td>
<td>Class I</td>
<td>Maximum Allowable Quantity</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Class II</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Class III</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>Unstable (reactives) nondetonable</td>
<td>Class 3</td>
<td>1</td>
<td>2,000</td>
</tr>
<tr>
<td></td>
<td>Class 2</td>
<td>25</td>
<td>10,000</td>
</tr>
<tr>
<td>Water reagents</td>
<td>Class 3</td>
<td>1</td>
<td>Not Applicable</td>
</tr>
<tr>
<td></td>
<td>Class 2</td>
<td>25</td>
<td></td>
</tr>
</tbody>
</table>
For SI: 1 pound = 0.454 kg, 1 cubic foot = 0.02832 m³, 1 ton = 2000 lbs. = 907.2 kg.

a. For materials that are detonable, the distance to other buildings or lot lines shall be as specified in accordance with Section 415.6 of the International Building Code and Chapter 56 based on the trinitrotoluene (TNT) equivalence of the material, whichever is greater. For materials classified as explosives, the required separation distances shall be as specified in Chapter 56.

b. "Maximum Allowable Quantity" means the maximum allowable quantity per control area set forth in Table 5003.1.1(1).

c. Limited to Division 1.4 materials and articles, including articles packaged for shipment, that are not regulated as an explosive under Bureau of Alcohol, Tobacco, Firearms and Explosives regulations, or unpackaged articles used in process operations that do not propagate a detonation or deflagration between articles, providing the net explosive weight of individual articles does not exceed 1 pound.

2015 International Building Code

<table>
<thead>
<tr>
<th>Material</th>
<th>Class</th>
<th>Solids and Liquids (tons)</th>
<th>Gases (cubic feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explosives</td>
<td>Division 1.1 Division 1.2 Division 1.3 Division 1.4 Division 1.4c Division 1.5 Division 1.6</td>
<td>Maximum Allowable Quantity Maximum Allowable Quantity Maximum Allowable Quantity Maximum Allowable Quantity Maximum Allowable Quantity 1 Maximum Allowable Quantity Maximum Allowable Quantity</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Oxidizers</td>
<td>Class 4</td>
<td>Maximum Allowable Quantity</td>
<td>Maximum Allowable Quantity</td>
</tr>
<tr>
<td>Unstable (reactives) detonable</td>
<td>Class 3 or 4</td>
<td>Maximum Allowable Quantity</td>
<td>Maximum Allowable Quantity</td>
</tr>
<tr>
<td>Oxidizer, liquids and solids</td>
<td>Class 3 Class 2</td>
<td>1,200 2,000</td>
<td>Not Applicable Not Applicable</td>
</tr>
<tr>
<td>Organic peroxides</td>
<td>Detonable Class I Class II Class III</td>
<td>Maximum Allowable Quantity Maximum Allowable Quantity 25 Maximum Allowable Quantity 50</td>
<td>Not Applicable Not Applicable Not Applicable</td>
</tr>
<tr>
<td>Unstable (reactives) nondetonable</td>
<td>Class 3 Class 2</td>
<td>1 25</td>
<td>2,000 10,000</td>
</tr>
<tr>
<td>Water reactives</td>
<td>Class 3</td>
<td>1</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>----------------</td>
<td>---------</td>
<td>---</td>
<td>----------------</td>
</tr>
<tr>
<td></td>
<td>Class 2</td>
<td>25</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Pyrophoric gases</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
<td>2,000</td>
</tr>
</tbody>
</table>

For SI: 1 ton = 906 kg, 1 cubic foot = 0.02832 m³, 1 pound = 0.454 kg.

a. For materials that are detonable, the distance to other buildings or lot lines shall be in accordance with Section 415.6 of this code and Chapter 56 of the *International Fire Code* based on trinitrotoluene (TNT) equivalence of the material, whichever is greater. For materials classified as explosives, see Chapter 56 of the *International Fire Code*.

b. "Maximum Allowable Quantity" means the maximum allowable quantity per control area set forth in Table 307.1(1).

c. Limited to Division 1.4 materials and articles, including articles packaged for shipment, that are not regulated as an explosive under Bureau of Alcohol, Tobacco, Firearms and Explosives (BATF) regulations or unpackaged articles used in process operations that do not propagate a detonation or deflagration between articles, provided the net explosive weight of individual articles does not exceed 1 pound.

**Reason:** There is a disconnect between the IFC and IBC with regard to the footnotes in these two tables. The tables are identical, however the footnotes are not.

With regard to buildings containing materials which are detonable, Footnote a in the IFC refers to the IBC for separation distances while Footnote a in the IBC refers back to Chapter 56 in the IFC. This reference in the IFC should simply send the code user to IFC Chapter 56. Chapter 56 contains the criteria for building separations based on the quantity of explosive material in the building.

The revision in Footnote c is simply an editorial revision to provide consistency between the two codes.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire safety and hazardous materials in new and existing buildings and facilities and the protection of life and property in wildland urban interface areas. In 2014 and 2015 the Fire-CAC has held 5 open meetings. In addition, there were numerous conference calls, Regional Work Group and Task Group meetings for the current code development cycle, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: [FCAC](http://www.icc.org)

**Cost Impact:** Will not increase the cost of construction

This proposal provides correlation between the IBC and IFC.
F353-16
5003.8.3.2; IBC [F] 414.2.2,
Proponent: Ali Fattah, City of San Diego Development Services Department (afattah@sandiego.gov)

2015 International Fire Code

Revise as follows:

5003.8.3.2 (IBC [F] 414.2.2) Percentage of maximum allowable quantities. The percentage of maximum allowable quantities of hazardous materials per control area allowed at each floor level within a building shall be in accordance with Table 5003.8.3.2. Each portion of a building separated by one or more fire walls that comply with the provisions of Section 706 of the International Building Code shall be considered a separate building where no openings are located in the fire wall.

Reason: This code change is necessary due to the recently approved Group A code G130-15 that modified Section 706.1. The intent of the code change was to remove scoping provisions from Ch 7 and for sections that permit the use of fire walls to reference the construction requirements in Ch 7. Additionally the reason statement for code change stated that code users were requiring that all utilities be separated since the separated buildings are considered separate buildings.

When the Building Code Action Committee proposed the code change in Group A Section 706.1.1 was left unchanged. Section 706.1.1 requires that a party wall to be constructed to comply with the requirements for fire walls how ever openings are prohibited through the wall. Two buildings sharing a common "party wall" on a lot line separating the two buildings can comply with what is being proposed in this code change with the Group A code change results.

A party wall is described as "Any wall located on a lot line between adjacent buildings, which is used or adapted for joint service between the two buildings, shall be constructed as a fire wall in accordance with Section 706. Party walls shall be constructed without openings and shall create separate buildings."

The proposed code change references Section 706 with a modifier specifically to ensure that:

1. The wall is constructed as is required as a Fire wall in the IBC and not as an area separation wall in a legacy code such as the Uniform Building Code.
2. No openings are permitted in the wall and as such the separation will be more reliable in that it will not include communicating openings that are frequently not maintained to function properly.

If the allowance in IBC Section 706.1.1.1 is used to create two separate buildings, then a total of 8 control areas would be allowed in a 1-story building. By permitting the application of fire walls in Section 706, with no openings, for control area purposes, that same building can still have 8 control areas, but 4 control areas will be separated from the other 4 by a fire wall which has a fire-resistance rating the same as a code permitted party.

This code change allows buildings with multiple tenants to eliminate the current need for multiple tenants to share a common control area. It makes it possible for tenants to have their own control area thereby improving the reliability of material use, handling and storage inventories since they will be under the control of one tenant and not the building owner. This will increase accountability. Prohibiting openings in the fire wall addresses concerns that fire doors may not be maintained and that transportation of hazardous materials between the buildings may violate materials inventory limitations based on the allowable quantities in the Ch 4 IBC tables. In the event of a fire, the fire wall protects the hazardous materials in one building from a fire on the fire side of the fire wall in the other building.

Cost Impact: Will not increase the cost of construction
This code change gives another tool to designers to design safe buildings where the use of hazardous materials is controlled.
**2015 International Fire Code**

5003.8.3.2 ([F] 414.2.2) **Percentage of maximum allowable quantities.** The percentage of maximum allowable quantities of hazardous materials per control area allowed at each floor level-story within a building shall be in accordance with Table 5003.8.3.2.

**Revise as follows:**

**TABLE 5003.8.3.2 ([F] 414.2.2)**

**DESIGN AND NUMBER OF CONTROL AREAS**

<table>
<thead>
<tr>
<th>FLOOR-LEVEL STORY</th>
<th>PERCENTAGE OF THE MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA</th>
<th>NUMBER OF CONTROL AREAS PER FLOOR STORY</th>
<th>FIRE-RESISTANCE RATING FOR FIRE BARRIERS IN HOURS&lt;sup&gt;b&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Above grade plane</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Higher than 9</td>
<td>5</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>7-9</td>
<td>5</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>6</td>
<td>12.5</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>12.5</td>
<td>2</td>
<td>2</td>
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<tr>
<td>4</td>
<td>12.5</td>
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<tr>
<td>3</td>
<td>50</td>
<td>3</td>
<td>1</td>
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<tr>
<td>2</td>
<td>75</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>1</td>
<td>100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Below grade plane</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>75</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>50</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Lower than 2</td>
<td>Not Allowed</td>
<td>Not Allowed</td>
<td>Not Allowed</td>
</tr>
</tbody>
</table>

<sup>a</sup> Percentages shall be of the maximum allowable quantity per control area shown in Tables 5003.1.1(1) and 5003.1.1(2), with all increases allowed in the footnotes to those tables.

<sup>b</sup> Separation shall include fire barriers and horizontal assemblies as necessary to provide separation from other portions of the building.

**Reason:** The IBC and IFC limit the number of control areas within a building on a per story basis due to the difficulties of fire fighting as the height of a building increases. The codes trigger requirements based on the number of stories above or below grade plane and the location above and below the level of exit discharge which is a defined term defined as a story. It is therefore an anomaly that the term level and floor are used in lieu of the defined term story.

This code change revises the undefined term level to story. The IBC/IFC refer to stories which include basements...
which are stories below grade plane. Additionally mezzanines are floor levels within stories. As a result a control area in a basement is in a story below grade plane and a control area on the second story is on the second story above grade plane.

This proposal eliminates the possible confusion from the term level or floor, that can include mezzanines.

Cost Impact: Will not increase the cost of construction
This is an editorial code change. Should not result in an increase in the cost of construction since many code users interpret the codes as the proposed revisions state.
2015 International Fire Code

5003.8.3.4 (IBC [F]414.2.4) Fire-resistance-rating requirements. The required fire-resistance rating for fire barriers shall be in accordance with Table 5003.8.3.2. The floor assembly of the control area and the construction supporting the floor of the control area shall have a fire-resistance rating of not less than 2 hours.

**Exception:** The floor assembly of the control area and the construction supporting the floor of the control area is allowed to be 1-hour fire-resistance rated in buildings of Type IIA, IIIA, IV and VA construction, provided that both of the following conditions exist:

1. The building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.
2. The building is three stories or less above grade plane.

**Reason:** The interior construction of Types IIIA and VA construction, can be built of the exact same material as type IV construction so long that it is calculated or tested to be one hour fire resistance rated. Type IV construction is preferable for hazardous occupancies to Type IIIA or Type VA construction from an allowable area standpoint in the current code due to performance. Since Type IIIA and Type VA can be built out of exactly the same material as long as it is one hour, and since the control area is separated from the balance of the building by one hour construction, there is no reason to exclude type IV from this exception from two hour fire resistance rating of the floor assembly and supporting construction for the control area in buildings three stories or less and fully sprinklered with a NFPA 13 sprinkler system.

**Cost Impact:** Will not increase the cost of construction
This code proposal provides more options to the existing exception and will not increase cost.
F356-16
5003.8.3.5 (New), 5003.8.3.5, 5003.8.3.5.2 (New), 5003.8.3.5.3 (New), IBC [F] 414.2.5 (New), [F] 414.2.5, [F]414.2.5.2 (New), [F] 414.2.5.3 (New)

Proponent: Homer Maiel, PE, representing ICC Tri-Chapter (Peninsula, East Bay, Monterey Bay) (hmaiel@gmail.com)

2015 International Fire Code

5003.8.3.5 Hazardous materials in Group M display and storage areas and in Group S storage areas. Hazardous materials located in Group M and Group S occupancies shall be in accordance with Sections 5003.8.3.5.1 through 5003.8.3.5.3.

5003.8.3.5.1 Non flammable solids and non flammable and noncombustible liquids. Hazardous material in Group M display and storage areas and in Group S storage areas. The aggregate quantity of nonflammable solid and nonflammable or noncombustible liquid hazardous materials allowed within a single control area of a Group M display and storage area or a Group S storage area is allowed to exceed the maximum allowable quantities per control area specified in Tables 5003.1.1(1) and 5003.1.1(2) without classifying the building or use as a Group H occupancy, provided that the materials are displayed and stored in accordance with Section 5003.11. 

5003.8.3.5.2 Flammable and combustible Liquids

In Group M occupancy wholesale and retail sales uses, indoor storage of flammable and combustible liquids shall not exceed the maximum allowable quantities per control area as indicated in Table 5704.3.4.1, provided that the materials are displayed and stored in accordance with Chapter 57.

-  

5003.8.3.5.3 Aerosols. The maximum quantity of aerosol products in Group M occupancy retail display areas, storage areas adjacent to retail display areas and retail storage areas shall be in accordance with Chapter 51.

2015 International Building Code

Add new text as follows:

[F] 414.2.5 Hazardous material in Group M display and storage areas in Group S storage areas. Hazardous materials located in Group M and Group S occupancies shall be in accordance with Sections 414.2.5.1 through 414.2.5.3.

[F] 414.2.5 414.2.5.1 Hazardous material in Group M display. Non flammable solid and storage areas non flammable and in Group S storage areas non combustible liquids. The aggregate quantity of nonflammable solid and nonflammable or noncombustible liquid hazardous materials permitted within a single control area of a Group M display and storage area, a Group S storage area or an outdoor control area is permitted to exceed the maximum allowable quantities per control area specified in Tables 307.1(1) and 307.1(2) without classifying the building or use as a Group H occupancy, provided that the materials are displayed and stored in accordance with the International Fire Code and quantities do not exceed the maximum allowable specified in Table 414.2.5(1).

[F]414.2.5.2 Hazardous material in Group M wholesale and retail sales uses. In Group M
occupancy wholesale and retail sales uses, indoor storage of flammable and combustible liquids shall not exceed the maximum allowable quantities per control area as indicated in Table 414.2.5(2), provided that the materials are displayed and stored in accordance with the International Fire Code.

[F] 414.2.5.3 Aerosols. The maximum quantity of aerosol products in Group M occupancy retail display areas, storage areas adjacent to retail display areas and retail storage areas shall be in accordance with the International Fire Code.

Reason: The intent of this proposal is to break up this one section into three to address each subject to differentiate between the uses. Additionally to keep the codes consistent the similar section in IFC 5003 is also being addressed. These sections are different therefore must be shown independently. There are no technical changes.

Cost Impact: Will not increase the cost of construction
This proposal will not increase the cost of construction.
F357-16

IFC: 5003.9, 5003.9.11 (New).

Proponent: John Williams, CBO, representing Adhoc Healthcare Committee (AHC@iccsafe.org)

2015 International Fire Code

Revise as follows:

5003.9 General safety precautions. General precautions for the safe storage, handling or care of hazardous materials shall be in accordance with Sections 5003.9.1 through 5003.9.10.

5003.9.11 Emergency showers and eyewash stations. In Group I-2 Condition 2, where the eyes or body of any a person are at risk for exposure to corrosive materials, suitable facilities for quick drenching or flushing of the eyes or body emergency showers or eyewash stations shall be provided within the work area for immediate emergency use. The emergency showers and eyewash stations shall be installed in accordance with the International Plumbing Code.

Reason: Corrosive materials are used in some medical processes and expose individuals to risk. When they are present there is need for emergency showers or eyewash stations to provide an opportunity for first aid. These devices are required by CMMS and are part of the K Tag inspection program. The ICC is seeking parity with the NFPA codes for hospital survey validation and this is a necessary code addition.

This proposal is submitted by the ICC Ad Hoc Committee on Healthcare (AHC). The AHC was established by the ICC Board to evaluate and assess contemporary code issues relating to hospitals and ambulatory healthcare facilities. This is a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. In 2014 and 2015 the ICC Ad Hoc Committee has held 4 open meetings and numerous Work Group meetings and conference calls for the current code development cycle which included members of the committees as well as any interested party to discuss and debate the proposed changes. Information on the AHC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the AHC effort can be downloaded from the AHC website at: AHC.

Cost Impact: Will not increase the cost of construction

Hospitals across the nation are currently required to provide eye wash stations where employees are exposed to corrosive materials. Providing this requirement in the Code will ensure that buildings can be inspected appropriately.
2015 International Fire Code

Revise as follows:

5003.9.8 Separation of incompatible materials. Incompatible materials in storage and storage of materials that are incompatible with materials in use shall be separated where the stored materials are in containers having a capacity of more than 5 pounds (2 kg) or 0.5 gallon (2 L) or any amount of compressed gases. Separation shall be accomplished by:

1. Segregating incompatible materials in storage by a distance of not less than 20 feet (6096 mm).
2. Isolating incompatible materials in storage by a noncombustible partition extending not less than 18 inches (457 mm) above and to the sides of the stored material.
3. Storing liquid and solid materials in hazardous material storage cabinets.
4. Storing compressed gases in gas cabinets or exhausted enclosures in accordance with Sections 5003.8.5 and 5003.8.6. Materials that are incompatible shall not be stored within the same cabinet or exhausted enclosure.

Materials that are incompatible shall not be stored within the same cabinet or exhausted enclosure.

Reason: Currently, the text in the charging section only contains thresholds for separation of solid and liquid materials. There is no threshold for the separation of compressed gases and this creates confusion as to when to apply these requirements. This is certainly the intent of the section, as is evidenced by the fact that Item 4 addresses compressed gases, but we don't measure compressed gases in pounds or gallons. The first revision in the charging statement correlates with the requirement in Section 5303.7.1 which requires all incompatible compressed gases to comply with this section.

The second revision occurs in Item 4. The second sentence addresses materials which are either solid, liquid or gas, but Item 4 only addresses gases. This is a standalone requirement and is moved to a separated paragraph in this section. This requirement was shown as a separate paragraph in the 2000 IFC and there is no indication of a modification in the 2003 edition. It appears that it was an editorial error when it became part of Item 4.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire safety and hazardous materials in new and existing buildings and facilities and the protection of life and property in wildland urban interface areas. In 2014 and 2015 the Fire-CAC has held 5 open meetings. In addition, there were numerous conference calls, Regional Work Group and Task Group meetings for the current code development cycle, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC

Cost Impact: Will not increase the cost of construction
This proposal is only a clarification of the requirements.
F359-16
IFC: 5004.3.
Proponent: Sarah Rice, The Preview Group, representing Preview Group (srice@preview-group.com)

2015 International Fire Code
Revise as follows:

5004.3 Ventilation. Indoor storage areas and storage buildings shall be provided with mechanical exhaust ventilation or natural ventilation where natural ventilation can be shown to be acceptable for the materials as stored.

Exceptions:
1. Storage areas for flammable solids complying with Chapter 59.
2. Ventilation is not required in areas where flammable and combustible liquids are stored in containers and no dispensing is conducted.

Reason: This change is intended to correlate the provisions in the IFC to those in NFPA 30; Flammable & Combustible Liquids Code (currently referenced in the IFC). Currently the requirement for ventilation is found in Chapter 50; Hazardous Materials - General Provisions (Section 5004; Storage). As currently written, Section 5004 is applicable to the "Storage of hazardous materials in amounts exceeding the maximum allowable quantity per control area as set forth in Section 5003.1 shall be in accordance with Sections 5001, 5003 and 5004." Note it says "hazardous materials" - not specific types of hazardous materials, but ALL types of hazardous materials. The code change seeks to refine the provisions in Section 5004, and specifically 5004.6 to be applicable to the correct materials and conditions where the materials are used or stored.

When it comes to flammable and combustible liquids, the go-to document for anyone looking for the best regulations for storing flammable and/or combustible liquids - including the IFC - is NFPA 30. Years ago when NFPA 30 did not address flammable and combustible liquids as it does now, unfortunately it took several significant incidents to prompt the fire protection community to realize that changes had to be made to NFPA 30. The 2015 edition of NFPA 30 addresses the storage and dispensing of flammable and combustible liquids, and it is time that the IFC start to put more reliance on the content of NFPA 30 instead of trying to correlate the regulations in a piecemeal fashion.

The 2015 edition of NFPA 30; Flammable & Combustible Liquids Code, in Chapter 9 Storage of Liquids in Containers – General Requirements, and specifically in Section 9.14 states "Liquid storage areas where dispensing is conducted shall be provided with ventilation that meets the requirements of Section 18.6." With affirmation of this found in NFPA 30 Section 18.6 Ventilation for Dispensing Areas which reads "Liquid storage areas where dispensing is conducted shall be provided with a gravity system or a continuous mechanical exhaust ventilation system. Mechanical ventilation shall be used if Class I liquids are dispensed within the room."

The proposed language makes it clear that ventilation is not required where flammable and/or combustible liquids are stored when dispensing is not conducted.

Cost Impact: Will not increase the cost of construction
The proposed change, if successful will decrease the cost of construction as the requirement for ventilation will be reduced.
F360-16
IFC: 5004.7.1.

Proponent: Michael O'Brian representing the Fire Code Action Committee (FCAC@iccsafe.org)

2015 International Fire Code

Revise as follows:

5004.7.1 Exempt applications. Standby or emergency power is not required for mechanical ventilation systems for any of the following:

1. Storage of Class IB and Class IC flammable and Class II and III combustible liquids in closed containers not exceeding $6\frac{1}{2}$ gallons (25 L) capacity.
2. Storage of Class 1 and 2 oxidizers.
4. Storage of asphyxiating, irritant and radioactive gases.

Reason: Editorial. Currently the code specifies the classes of flammable liquids which fit into Item 1, but not include the classes for combustible. This has led to confusion and assumption that only Class IB and Class IC fall under Item 1.

The section itself is an exception specifying where standby power or emergency power are not required. If standby or emergency power is not required for ventilation systems where Class I liquids are stored, then it is certainly not required where Class II or III are stored.

This clarifies the intent of this item.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire safety and hazardous materials in new and existing buildings and facilities and the protection of life and property in wildland urban interface areas. In 2014 and 2015 the Fire-CAC has held 5 open meetings. In addition, there were numerous conference calls, Regional Work Group and Task Group meetings for the current code development cycle, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC

Cost Impact: Will not increase the cost of construction
This is a clarification of the current requirement in the code.
Add new definition as follows:

SECTION 202 DEFINITIONS

AEROSOL COOKING SPRAY PRODUCTS. Aerosol cooking spray products are those aerosol products designed to deliver a vegetable oil or a solid or nonflammable liquid to reduce sticking on cooking and baking surfaces, or to be applied to food, or both. These products have a chemical heat of combustion that is greater than 8600 Btu/lb (20 kj/g) and contain not more than 18 percent by weight of flammable propellant.

Revise as follows:

5103.2 Identification. Cartons or outer packaging shall be identified on not less than one exterior side with the classification level of the aerosol products contained within the carton as follows:

LEVEL ________ AEROSOLS

Add new text as follows:

5103.2.1 Aerosol Products. Cartons or outer packaging containing aerosol products in metal containers or glass and plastic containers 4 fl.oz. (118 ml) or less shall be clearly marked as follows:

LEVEL ________ AEROSOLS

5103.2.2 Aerosol Cooking Spray Products. Cartons or outer packaging containing aerosol cooking spray products in metal containers shall be clearly marked as follows:

AEROSOL COOKING SPRAY

5104.2.2 Aerosol Cooking Spray Products. Storage of aerosol cooking spray products in A, B, E, F, and R occupancies shall not be more than 1000 lbs (454 kg) net weight.

5104.3.3 Aerosol Cooking Spray Products. Solid pile, palletized, or rack storage of aerosol cooking spray products in a general-purpose warehouse shall not be more than 2500 lbs (1135 kg) net weight, unless protected in accordance with NFPA 30B.

Revise as follows:

5104.7 Storage in Group M occupancies. Storage of Level 2 and 3 aerosol products and aerosol cooking spray products in occupancies in Group M shall comply with Table 5104.7. Retail display shall comply with Section 5106.

TABLE 5104.7
MAXIMUM QUANTITIES OF LEVEL 2 AND 3 AEROSOL PRODUCTS AND AEROSOL COOKING SPRAY PRODUCTS IN RETAIL STORAGE AREAS
### Table 5106.2.1
**MAXIMUM QUANTITIES OF LEVEL 2 AND 3 AEROSOL PRODUCTS AND AEROSOL COOKING SPRAY PRODUCTS IN RETAIL DISPLAY AREAS**

<table>
<thead>
<tr>
<th>Floor</th>
<th>Nonsegregated storage&lt;sup&gt;a, b&lt;/sup&gt;</th>
<th>Segregated storage</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Storage cabinets&lt;sup&gt;b&lt;/sup&gt;</td>
<td>Separated from retail area&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
<tr>
<td>Basement</td>
<td>Not Permitted</td>
<td>Not Permitted</td>
<td>Not Permitted</td>
</tr>
<tr>
<td>Ground floor</td>
<td>2,500</td>
<td>5,000</td>
<td>Note d</td>
</tr>
<tr>
<td>Upper floors</td>
<td>500</td>
<td>1,000</td>
<td>Note d</td>
</tr>
</tbody>
</table>

For SI: 1 pound = 0.454 kg, 1 square foot = 0.0929 m<sup>2</sup>.

a. The total aggregate quantity on display and in storage shall not exceed the maximum retail display quantity indicated in Section 5106.3.

b. Storage quantities indicated are the maximum permitted in any 50,000-square-foot area.

c. The storage area shall be separated from the retail area with a 1-hour fire-resistance-rated assembly.

d. See Table 5104.3.2.

**Add new text as follows:**

**5104.8 Storage of Aerosol Cooking Spray Products.** Aerosol cooking spray products shall be permitted to be stored in a general-purpose warehouse.

**5104.8.1 Mixed Storage.** Where aerosol cooking spray products are mixed with other higher hazard aerosol products the provided isolation, storage height restrictions and protection shall be based on the highest hazard aerosol product present.

**5104.8.2 Storage Conditions.** The storage and handling of aerosol cooking spray products shall comply with this Chapter and NFPA 30B.

**Revise as follows:**

**5106.1 General.** This section shall apply to the retail display of 500 pounds (227 kg) or more of Level 2 and 3 aerosol products and aerosol cooking spray products.

**5106.2.1 Maximum quantities in retail display areas.** Aerosol products and aerosol cooking spray products in retail display areas shall not exceed quantities needed for display and normal merchandising and shall not exceed the quantities in Table 5106.2.1.
For SI: 1 pound = 0.454 kg, 1 square foot = 0.0929 m².

a. The total quantity shall not exceed 1,000 pounds net weight in any one 100-square-foot retail display area.

b. Per 25,000-square-foot retail display area.

c. Minimum Ordinary Hazard Group 2 wet-pipe automatic sprinkler system throughout the retail sales occupancy.

Add new text as follows:

**5106.2.2 Aerosol cooking spray products storage conditions and automatic fire sprinkler protection.** The storage and handling of aerosol cooking spray products shall comply with this Chapter and NFPA 30B.

**Reason:** Classification of aerosol products was developed by Factory Mutual in the early 1990’s. This was based on a large number of fire tests, on palletized aerosol products, and a test program obtaining data on various formulas and an array of steel and aluminum container sizes.

Based on all initial testing, it was determined that materials with a flash point over 500 F could be ignored regarding their contribution to an aerosol product fire. However, some aerosol products are designed to deliver a vegetable oil, or like substance, to reduce sticking on cooking or baking surfaces. These products may have very high levels of oils with flash points over 500 F. A fire test of this type of product at a much later date showed that it could not be protected as a Class III Commodity. The exemption for these materials with a flash point over 500 F was removed from NFPA 30B.

Subsequently, Factory Mutual conducted large scale fire tests on these cooking spray products. A protection scheme was developed and is contained in Tables 6.3.2.3 (a and b) in the 2015 edition of NFPA 30B and referenced in this code change proposal. The protection is greater than that required for a Class III Commodity, but less than that for Level 2 aerosol products. Therefore Level 2 or 3 protection is also acceptable for these products and is allowed.

As a result, products of this type with a Chemical Heat of Combustion equal to or less than 8600 Btu/lb (20 kj/g) are still classified and carton marked as Level 1 Aerosol. Products of this type with >18% flammable propellant are to have their Chemical Heat of Combustion determined and classified and carton marked as Level 2 or 3 Aerosol based on the Chemical Heat of Combustion.

**Cost Impact:** Will not increase the cost of construction

It may reduce those costs by allowing these materials in existing building stock when adequately protected.
F362-16
IFC: 5103.2, 5103.2.1 (New), 5103.2.2 (New), 5104.1.2 (New), 5104.2.2.1 (New).

Proponent: Patrick McLaughlin, representing Consumer Specialty Products Association (pmclaugma@aol.com)

2015 International Fire Code

Revise as follows:

5103.2 Identification. Cartons or outer packaging shall be identified on not less than one exterior side with the classification level of the aerosol products contained within the carton as follows:

LEVEL ________ AEROSOLS

Add new text as follows:

5103.2.1 Aerosol Products Cartons or outer packing containing aerosol products in metal containers or glass and plastic containers 4 fl. oz. (118 ml) or less shall be clearly marked as follows:

LEVEL ________ AEROSOLS

5103.2.2 Plastic Aerosol Products Cartons or outer packaging containing aerosol products in plastic containers greater than 4 fl. oz. (118 ml) shall be clearly marked as follows:

PLASTIC AEROSOL 1 (or X)

5104.1.2 Plastic Aerosol X Products Plastic aerosol X products are those products, in containers larger than 4 fl. oz. (118 ml), that do not meet the criteria provided in Section 5104.1.1.

5104.2.2.1 Storage, Use or Handling The storage, use or handling of plastic aerosol X products shall be prohibited.

Reason: Plastic aerosol X products are allowed in some codes but not recognized in the International Fire Code. This proposal clarifies what they are, and that they are not allowed. Also, plastic aerosol marking, which is the same as required in other codes, is required so the enforcing agency can identify the product. The industry is currently planning research on other products and when an appropriate protection strategy is developed, a code change will be submitted to recognize and allow them.

Cost Impact: Will not increase the cost of construction. It may reduce those costs by identifying aerosols so that the enforcing agency can easily identify that they are properly stored, used or handled.
F363-16

202, 907.2.16 (IBC [F] 907.2.16), 5102.1, 5104.1.1, 5104.3, 5104.3.1, 5104.3.2,
5106.2.2, 5106.3, 5106.3.2, 5106.3.3, 5106.4, 5106.5, 5106.5.1, 5106.5.2,
5106.5.6, 5106.5.7, IBC [F] 307.1.1, [F] 307.2, 311.2, [F] 414.1.2.1

Proponent: Patrick McLaughlin, Representing Consumer Specialty Products Association
(pmclaugma@aol.com)

2015 International Fire Code

Revise as follows:

SECTION 202 DEFINITIONS

AEROSOL CONTAINER. A metal can or plastic container, up to a maximum size of 33.8 fl.oz. (1000 ml) or a glass or plastic bottle, up to a maximum size of 4 fl.oz. (118 ml), that is designed and intended to dispense an aerosol.

AEROSOL PRODUCT. A product combination of a container, a propellant and a material that is dispensed from an aerosol container by a propellant.

Aerosol products shall be classified by means of the calculation of their chemical heats of combustion and shall be designated Level 1, Level 2 or Level 3.

Level 1 aerosol products. Those with a total chemical heat of combustion that is less than or equal to 8,600 British thermal units per pound (Btu/lb) (20 kJ/g).

Level 2 aerosol products. Those with a total chemical heat of combustion that is greater than 8,600 Btu/lb (20 kJ/g), but less than or equal to 13,000 Btu/lb (30 kJ/g).

Level 3 aerosol products. Those with a total chemical heat of combustion that is greater than 13,000 Btu/lb (30 kJ/g).

Add new definition as follows:

AEROSOL PRODUCT WAREHOUSE. No change to text.

Revise as follows:

5102.1 Definitions. The following terms are defined in Chapter 2:

AEROSOL PRODUCT.
Level 1 aerosol products.
Level 2 aerosol products.
Level 3 aerosol products.

AEROSOL CONTAINER.

AEROSOL PRODUCT WAREHOUSE.

PROPELLANT.

RETAIL DISPLAY AREA.

5104.1.1 Plastic containers Aerosol 1 Products. Aerosol products in plastic containers larger than 4 fluid ounces (118 ml), but not to exceed 33.8 fluid ounces (1000 ml), shall be allowed only where in accordance with this section. The commodity classification shall be Class III commodities, as defined in NFPA 13 where any of the following conditions are met:

1. Base product has no fire point where tested in accordance with ASTM D 92, and nonflammable propellant.
2. Base product has no sustained combustion as tested in accordance with Appendix

3. Base product contains up to 20 percent by volume (15.8 percent by weight) of ethanol and/or isopropyl alcohol in an aqueous mix, and nonflammable propellant.

4. Base product contains 4 percent by weight or less of an emulsified flammable liquefied gas propellant within an aqueous base. The propellant shall remain emulsified for the life of the product. Where such propellant is not permanently emulsified, the propellant shall be nonflammable.

5104.3 Storage in general purpose warehouses. Aerosol product storage in general purpose warehouses utilized only for warehousing-type operations involving mixed commodities shall comply with Section 5104.3.1 or 5104.3.2.

5104.3.1 Nonsegregated storage. Storage consisting of solid pile, palletized or rack storage of Level 2 and 3 aerosol products not segregated into areas utilized exclusively for the storage of aerosols products shall comply with Table 5104.3.1.

5104.3.2 Segregated storage. Storage of Level 2 and 3 aerosol products segregated into areas utilized exclusively for the storage of aerosols products shall comply with Table 5104.3.2 and Sections 5104.3.2.1 and 5104.3.2.2.

5106.2.2 Display of containers aerosol products. Level 2 and 3 aerosol containers products shall not be stacked more than 6 feet (1829 mm) high from the base of the aerosol product array to the top of the aerosol product array unless the containers aerosol products are placed on fixed shelving or otherwise secured in an approved manner. Where storage or retail display is on shelves, the height of such storage or retail display to the top of aerosol containers products shall not exceed 8 feet (2438 mm).

5106.3 Aerosol product display and normal merchandising exceeding 8 feet (2438 mm) high. Aerosol product display and merchandising exceeding 8 feet in height shall be in accordance with Sections 5106.3.1 through 5106.3.3.

5106.3.2 Automatic sprinkler protection. Aerosol product display and merchandising areas shall be protected by an automatic sprinkler system based on the requirements set forth in Tables 6.3.2.7(a) through 6.3.2.7(l) of NFPA 30B and the following:

1. Protection shall be based on the highest level of aerosol product in the array and the packaging method of the storage located more than 6 feet (1829 mm) above the finished floor.
2. Where using the cartoned aerosol product tables of NFPA 30B, uncartoned or display-cut Level 2 and 3 aerosols aerosol products shall be permitted not more than 6 feet (1829 mm) above the finished floor.
3. The design area for Level 2 and 3 aerosols aerosol products shall extend not less than 20 feet (6096 mm) beyond the Level 2 and 3 aerosol product display and merchandising areas.
4. Where ordinary and high-temperature ceiling sprinkler systems are adjacent to each other, noncombustible draft curtains shall be installed at the interface.

5106.3.3 Separation of Level 2 and 3 aerosol product areas. Separation of Level 2 and 3 aerosol product areas shall comply with the following:

1. Level 2 and 3 aerosol product display and merchandising areas shall be separated from each other by not less than 25 feet (7620 mm). See Table 5106.2.1.
2. Level 2 and 3 aerosol product display and merchandising areas shall be separated from flammable and combustible liquids storage and display areas by one or a combination of the following:

   2.1. Segregating areas from each other by horizontal distance of not less than 25 feet (7620 mm).
   2.2. Isolating areas from each other by a noncombustible partition extending not less than 18 inches (457 mm) above the merchandise.
   2.3. In accordance with Section 5106.5.

3. Where Item 2.2 is used to separate Level 2 or 3 aerosol products from flammable or combustible liquids, and the aerosol products are located within 25 feet (7620 mm) of flammable or combustible liquids, the area below the noncombustible partition shall be liquid tight at the floor to prevent spilled liquids from flowing beneath the aerosol products.

### TABLE 5106.4
**MAXIMUM STORAGE QUANTITIES FOR STORAGE AREAS ADJACENT TO RETAIL DISPLAY OF LEVEL 2 AND 3 AEROSOLS AEROSOL PRODUCTS**

<table>
<thead>
<tr>
<th>Floor</th>
<th>Unseparated&lt;sup&gt;a,b&lt;/sup&gt;</th>
<th>Separated</th>
<th>Storage Cabinets&lt;sup&gt;b&lt;/sup&gt;</th>
<th>1-hour Occupancy Separation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basement</td>
<td>Not Allowed</td>
<td>Not Allowed</td>
<td>Not Allowed</td>
<td>Not Allowed</td>
</tr>
<tr>
<td>Ground</td>
<td>2,500</td>
<td>5,000</td>
<td>In accordance with Sections 6.3.4.36.4.4.3 and 6.3.4.4.4 of NFPA 30B</td>
<td></td>
</tr>
<tr>
<td>Upper</td>
<td>500</td>
<td>1,000</td>
<td>In accordance with Sections 6.3.4.36.4.4.3 and 6.3.4.4.4 of NFPA 30B</td>
<td></td>
</tr>
</tbody>
</table>

For SI: 1 pound = 0.454 kg, 1 square foot = 0.0929 m<sup>2</sup>.

<sup>a</sup> The aggregate quantity in storage and retail display shall not exceed the quantity limits for retail display.

<sup>b</sup> In any 50,000-square-foot area.

### 5106.5 Special protection design for Level 2 and 3 aerosols aerosol products adjacent to flammable and combustible liquids in double-row racks.

The display and merchandising of Level 2 and 3 aerosol products adjacent to flammable and combustible liquids in double-row racks shall be in accordance with Sections 5106.5.1 through 5106.5.8 or Section 5106.3.3.

#### 5106.5.1 Fire protection.

Fire protection for the display and merchandising of Level 2 and 3 aerosol products in double-row racks shall be in accordance with Table 7.4.1 7.5.1 and Figure 7.4.1 7.5.1 of NFPA 30B.

#### 5106.5.2 Cartoned aerosol products.

Level 2 and 3 aerosol products displayed or
merchandised more than 8 feet (2438 mm) above the finished floor shall be in cartons.

5106.5.6 Horizontal barriers. Horizontal barriers constructed of minimum $\frac{3}{8}$-inch-thick (10 mm) plywood or minimum 0.034-inch (0.086 mm) (No. 22 gage) sheet metal shall be provided and located in accordance with Table 7.4.1 7.5.1 and Figure 7.4.1 7.5.1 of NFPA 30B where in-rack sprinklers are installed.

5106.5.7 Class I, II, III, IV and plastic commodities. Class I, II, III, IV and plastic commodities located adjacent to Level 2 and 3 aerosol products shall be protected in accordance with NFPA 13.

907.2.16 Aerosol storage uses. Aerosol product storage rooms and general-purpose warehouses containing aerosol products shall be provided with an approved manual fire alarm system where required by this code.

2015 International Building Code

Revise as follows:

[F] 307.1.1 Uses other than Group H. An occupancy that stores, uses or handles hazardous materials as described in one or more of the following items shall not be classified as Group H, but shall be classified as the occupancy that it most nearly resembles.

1. Buildings and structures occupied for the application of flammable finishes, provided that such buildings or areas conform to the requirements of Section 416 and the International Fire Code.
2. Wholesale and retail sales and storage of flammable and combustible liquids in mercantile occupancies conforming to the International Fire Code.
3. Closed piping system containing flammable or combustible liquids or gases utilized for the operation of machinery or equipment.
4. Cleaning establishments that utilize combustible liquid solvents having a flash point of 140°F (60°C) or higher in closed systems employing equipment listed by an approved testing agency, provided that this occupancy is separated from all other areas of the building by 1-hour fire barriers constructed in accordance with Section 707 or 1-hour horizontal assemblies constructed in accordance with Section 711, or both.
5. Cleaning establishments that utilize a liquid solvent having a flash point at or above 200°F (93°C).
7. Refrigeration systems.
8. The storage or utilization of materials for agricultural purposes on the premises.
9. Stationary batteries utilized for facility emergency power, uninterruptable power supply or telecommunication facilities, provided that the batteries are provided with safety venting caps and ventilation is provided in accordance with the International Mechanical Code.
10. Corrosive personal or household products in their original packaging used in retail display.
11. Commonly used corrosive building materials.
12. Buildings and structures occupied for aerosol product storage shall be classified as Group S-1, provided that such buildings conform to the requirements of the International Fire Code.
13. Display and storage of nonflammable solid and nonflammable or noncombustible

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liquid hazardous materials in quantities not exceeding the maximum allowable quantity per control area in Group M or S occupancies complying with Section 414.2.5.

14. The storage of black powder, smokeless propellant and small arms primers in Groups M and R-3 and special industrial explosive devices in Groups B, F, M and S, provided such storage conforms to the quantity limits and requirements prescribed in the International Fire Code.

[F] 307.2 Definitions. The following terms are defined in Chapter 2:

AEROSOL PRODUCT
Level 1 aerosol products.
Level 2 aerosol products.
Level 3 aerosol products.
AEROSOL CONTAINER.
BALED COTTON.
BALED COTTON, DENSELY PACKED.
BARRICADE.
Artificial barricade.
Natural barricade.
BOILING POINT.
CLOSED SYSTEM.
COMBUSTIBLE DUST.
COMBUSTIBLE FIBERS.
COMBUSTIBLE LIQUID.
Class II.
Class IIIA.
Class IIIB.
COMPRESSED GAS.
CONTROL AREA.
CORROSIVE.
CRYOGENIC FLUID.
DAY BOX.
DEFLAGRATION.
DETONATION.
DISPENSING.
EXPLOSION.
EXPLOSIVE.
High explosive.
Low explosive.
Mass-detonating explosives.
UN/DOTn Class 1 explosives.
Division 1.1.
Division 1.2.
Division 1.3.
Division 1.4.
Division 1.5.
Division 1.6.
FIREWORKS.
Fireworks, 1.3G.
Fireworks, 1.4G.
FLAMMABLE GAS.
FLAMMABLE LIQUEFIED GAS.
FLAMMABLE LIQUID.
Class IA.
Class IB.
Class IC.
FLAMMABLE MATERIAL.
FLAMMABLE SOLID.
FLASH POINT.
HANDLING.
HAZARDOUS MATERIALS.
HEALTH HAZARD.
HIGHLY TOXIC.
INCOMPATIBLE MATERIALS.
INERT GAS.
OPEN SYSTEM.
OPERATING BUILDING.
ORGANIC PEROXIDE.
Class I.
Class II.
Class III.
Class IV.
Class V.
Unclassified detonable.
OXIDIZER.
Class 4.
Class 3.
Class 2.
Class 1.
OXIDIZING GAS.
PHYSICAL HAZARD.
PYROPHORIC.
PYROTECHNIC COMPOSITION.
TOXIC.
UNSTABLE (REACTIVE) MATERIAL.
Class 4.
Class 3.
Class 2.
Class 1.
WATER-REACTIVE MATERIAL.
Class 3.
Class 2.
Class 1.

311.2 Moderate-hazard storage, Group S-1. Storage Group S-1 occupancies are buildings occupied for storage uses that are not classified as Group S-2, including, but not limited to, storage of the following:
Aerosols Aerosol products, Levels 2 and 3
Aircraft hangar (storage and repair)
Bags: cloth, burlap and paper
Bamboos and rattan
Baskets
Belting: canvas and leather
Books and paper in rolls or packs
Boots and shoes
Buttons, including cloth covered, pearl or bone
Cardboard and cardboard boxes
Clothing, woolen wearing apparel
Cordage
Dry boat storage (indoor)
Furniture
Furs
Glues, mucilage, pastes and size
Grains
Horns and combs, other than celluloid
Leather
Linoleum
Lumber
Motor vehicle repair garages complying with the maximum allowable quantities of hazardous materials listed in Table 307.1(1) (see Section 406.8)
Photo engravings
Resilient flooring
Silks
Soaps
Sugar
Tires, bulk storage of
Tobacco, cigars, cigarettes and snuff
Upholstery and mattresses
Wax candles

[F] 414.1.2.1 Aerosols Aerosol Products. No change to text.

Reason: This proposal brings the IFC/IBC terminology in line with the referenced standard, NFPA 30B Code for the Manufacture and Storage of Aerosol Products, 2015 Edition. Also, a code reference that was in error is updated.

Cost Impact: Will not increase the cost of construction
There is no impact on the cost of construction as the proposal only updates terminology and references.
2015 International Fire Code

SECTION 5301 GENERAL

Revise as follows:

5301.1 Scope. Storage, use and handling of compressed gases in compressed gas containers, cylinders, tanks and systems shall comply with this chapter and NFPA 55, including those gases regulated elsewhere in this code. Partially full compressed gas containers, cylinders or tanks containing residual gases shall be considered as full for the purposes of the controls required.

Liquefied natural gas for use as a vehicular fuel shall also comply with NFPA 52 and NFPA 59A.

Compressed gases classified as hazardous materials shall also comply with Chapter 50 for general requirements and chapters addressing specific hazards, including Chapters 58 (Flammable Gases), 60 (Highly Toxic and Toxic Materials), 63 (Oxidizers, Oxidizing Gases and Oxidizing Cryogenic Fluids) and 64 (Pyrophoric Materials).

Compressed hydrogen (CH₂) for use as a vehicular fuel shall also comply with the applicable portions of Chapters 23 and 58 of this code, the International Fuel Gas Code and NFPA 2.

Cutting and welding gases shall also comply with Chapter 35.

LP-gas shall also comply with Chapter 61 and the International Fuel Gas Code.

Exceptions:

1. Gases used as refrigerants in refrigeration systems (see Section 606).
2. Compressed natural gas (CNG) for use as a vehicular fuel shall comply with Chapter 23, NFPA 52 and the International Fuel Gas Code.
3. Cryogenic fluids shall comply with Chapter 55.

CHAPTER 58 FLAMMABLE GASES AND FLAMMABLE CRYOGENIC FLUIDS

SECTION 5801 GENERAL

5801.1 Scope. The storage and use of flammable gases and flammable cryogenic fluids shall be in accordance with this chapter, NFPA 2 and NFPA 55. Compressed gases shall also comply with Chapter 53 and cryogenic fluids shall also comply with Chapter 55. Flammable cryogenic fluids shall comply with Section 5806. Hydrogen motor fuel-dispensing stations and repair garages and their associated above-ground hydrogen storage systems shall also be designed, constructed and maintained in accordance with Chapter 23 and NFPA 2.

Exceptions:

1. Gases used as refrigerants in refrigeration systems (see Section 606).
2. Liquefied petroleum gases and natural gases regulated by Chapter 61.
4. Pyrophoric gases in accordance with Chapter 64.

Reason: Striking the reference to “vehicle fuels” for the reference to NFPA 2 in Section 5301.1 and relocating the reference in Section 5801.1 recognizes that NFPA 2 addresses uses of hydrogen beyond the use as a motor fuel.
and includes applications not addressed in NFPA 55 such as the following NFPA 2 chapters:
Ch. 12 Hydrogen Fuel Cell Power Systems
Ch. 13 Hydrogen Generation Systems
Ch. 14 Combustion Applications
Ch. 15 Special Atmospheres

**Cost Impact:** Will not increase the cost of construction
The modifications are more of a clarification than a technical change. The codes already have linkage to NFPA 2 and the designer/code official would seek out NFPA 2 for hydrogen applications not clearly covered by current IFC language.
IFC: 5301.1.
Proponent: Bruce Swiecicki, representing National Propane Gas Association (bswiecicki@npga.org)

2015 International Fire Code
Revise as follows:

5301.1 Scope. Storage, use and handling of compressed gases in compressed gas containers, cylinders, tanks and systems shall comply with this chapter and NFPA 55, including those gases regulated elsewhere in this code. Partially full compressed gas containers, cylinders or tanks containing residual gases shall be considered as full for the purposes of the controls required.

Liquefied natural gas for use as a vehicular fuel shall also comply with NFPA 52 and NFPA 59A.

Compressed gases classified as hazardous materials shall also comply with Chapter 50 for general requirements and chapters addressing specific hazards, including Chapters 58 (Flammable Gases), 60 (Highly Toxic and Toxic Materials), 63 (Oxidizers, Oxidizing Gases and Oxidizing Cryogenic Fluids) and 64 (Pyrophoric Materials).

Compressed hydrogen (CH₂) for use as a vehicular fuel shall also comply with Chapters 23 and 58 of this code, the International Fuel Gas Code and NFPA 2.

Cutting and welding gases shall also comply with Chapter 35.

Exceptions:
1. Gases used as refrigerants in refrigeration systems (see Section 606).
2. Compressed natural gas (CNG) for use as a vehicular fuel shall comply with Chapter 23, NFPA 52 and the International Fuel Gas Code.
3. Cryogenic fluids shall comply with Chapter 55.
4. LP-gas shall also comply with Chapter 61 and the International Fuel Gas Code.

Reason: Chapter 53 provides generic requirements for compressed gases. Liquefied petroleum gases are addressed in Chapter 61 and have specific requirements assigned to them. LP-gases should not be required to comply with Chapter 53.

Requiring LP-gases to also comply with the provisions in Chapter 53 is often redundant and in the same cases leads to conflicting requirements. For example, the requirements in 5303.4 address container marking requirements and reference CGA Standard C-7. However, those requirements conflict with those in Chapter 61, which references NFPA 58 "LP-Gas Code" for the provisions that are not specified in Chapter 61. NFPA 58 does not reference CGA Standard C-7 for container marking requirements.

Much of Chapter 53 is not even applicable to the storing, handling and transportation of LP-gas. Rather than complicate the jobs of compliance and enforcement by including LP-gas in a chapter that is minimally applicable, the code user should be directed to the specific requirements contained in Chapter 61.
Cost Impact: Will not increase the cost of construction
This proposal will not increase the cost of construction and will simplify the enforcement of the code with respect to LP-gas.
2015 International Fire Code

SECTION 5306 MEDICAL GASES

5306.1 General. Medical gases gas storage at health care-related facilities intended for patient care, inhalation or sedation including, but not limited to, analgesia systems for dentistry, podiatry, veterinary and similar uses shall comply with Sections 5306.2 through 5306.4 in addition to other requirements of this chapter and Section 427 of the International Building Code.

5306.2 Interior supply location. Medical Storage of medical gases shall be stored in areas dedicated to the storage of such gases without other storage or uses. Where containers of medical gases in quantities greater than the permit amount are located inside buildings, they shall be in a 1-hour exterior room, a 1-hour interior room or a gas cabinet in accordance with Section 5306.2.1, 5306.2.2 or 5306.2.3, respectively. Rooms or areas where medical gases are stored or used in quantities exceeding the maximum allowable quantity per control area as set forth in Section 5003.1 shall be in accordance with the International Building Code for high-hazard Group H occupancies.

5306.2.1 One-hour exterior rooms. A 1-hour exterior room shall be a room or enclosure separated from the remainder of the building by fire barriers constructed in accordance with Section 707 of the International Building Code or horizontal assemblies constructed in accordance with Section 711 of the International Building Code, or both, with a fire-resistance rating of not less than 1 hour. Openings between the room or enclosure and interior spaces shall be self-closing smoke- and draft-control assemblies having a fire protection rating of not less than 1 hour. Rooms shall have not less than one exterior wall that is provided with not less than two nonclosable louvered vents. Each vent shall have a minimum free opening area of 24–36 square inches (155 cm²) for each 1,000 cubic feet (28 m³) at normal temperature and pressure (NTP) of gas stored in the room and shall be not less than 72 square inches (465 cm²) in aggregate free opening area. One vent shall be within 6 inches (152 mm) of the floor and one shall be within 6 inches (152 mm) of the ceiling. Rooms shall be provided with not less than one automatic sprinkler to provide container cooling in case of fire.

5306.2.2 One-hour interior room. Where an exterior wall cannot be provided for the room, a 1-hour interior room or enclosure shall be provided and separated from the remainder of the building by fire barriers constructed in accordance with Section 707 of the International Building Code or horizontal assemblies constructed in accordance with Section 711 of the International Building Code, or both, with a fire-resistance rating of not less than 1 hour. Openings between the room or enclosure and interior spaces shall be self-closing smoke- and draft-control assemblies having a fire protection rating of not less than 1 hour. An automatic sprinkler system shall be installed within the room. The room shall be exhausted through a duct to the exterior. Supply and exhaust ducts shall be enclosed in a 1-hour-rated shaft enclosure from the room to the exterior. Approved mechanical ventilation shall comply with the International Mechanical Code and be provided at a minimum rate of 1 cubic foot per minute per square foot [0.00508 m³/(s · m²)] of the area of the room.
5306.2.3 Gas cabinets. Gas cabinets shall be constructed in accordance with Section 5003.8.6 and shall comply with the following:

1. Constructed of not less than 0.097 inch (2.5mm) No. 12ga steel.
2. Provided with self-closing limited access ports or noncombustible windows to give access to equipment controls.
3. The average velocity of ventilation at the face of access ports or windows shall be not less than 200 feet per minute (1.02 m/s) with not less than 150 feet per minute (0.76 m/s) at any point of the access port or window.
4. Exhausted to the exterior through dedicated exhaust duct sysem installed in accordance with Chapter 5 of the International Mechanical Code.
5. They shall be connected to an exhaust system.

5306.3 Exterior supply locations. Oxidizer medical gas systems located on the exterior of a building with quantities greater than the permit amount shall be located in accordance with Section 6304.2.1.

5306.4 Transfilling. Transfilling areas and operations including, but not limited to, ventilation and separation, shall comply with NFPA 99.

5306.5 Medical gas systems. Medical gas systems including, but not limited to, distribution piping, supply manifolds, connections, pressure regulators and relief devices and valves, shall be installed in accordance with NFPA 99 and the general provisions of this chapter. Existing medical gas systems shall be maintained in accordance with the maintenance, inspection and testing provisions of NFPA 99 for medical gas systems.

CHAPTER 53 COMPRESSED GASES

Reason: In the Group A Committee Hearings in Long Beach, proposal G127 was approved as Modified by Public Comment. That proposal added the Medical Gas construction requirements found in the International Fire Code into the International Building Code. During this process we discovered the IFC code language did not provide clear direction on how to construct fire separation between gas storage rooms and the remainder of the building. This was corrected in G127. Per recommendation of the General Committee, this proposal is intended to provide consistency between the IBC and the IFC by adding the same clarifying language to the IFC. There are no substantive changes proposed to the requirements of IFC 5306.

Cost Impact: Will not increase the cost of construction
There is no change to the code requirements therefore no added cost.
2015 International Fire Code

5306.1 General. Medical gases at health care-related facilities intended for patient care, inhalation or sedation including, but not limited to, analgesia systems for dentistry, podiatry, veterinary and similar uses care shall comply with Sections 5306.2 through 5306.4 in addition to other requirements of this chapter.

Reason: The laundry list is not inclusive enough for hospital facilities and ambulatory care facilities. This proposal is a cleanup in language. The terms "patient or veterinary care" cover all of the intended uses listed in the existing section.

This proposal is submitted by the ICC Ad Hoc Committee on Healthcare (AHC). The AHC was established by the ICC Board to evaluate and assess contemporary code issues relating to hospitals and ambulatory healthcare facilities. This is a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. In 2014 and 2015 the ICC Ad Hoc Committee has held 4 open meetings and numerous Work Group meetings and conference calls for the current code development cycle which included members of the committees as well as any interested party to discuss and debate the proposed changes. Information on the AHC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the AHC effort can be downloaded from the AHC website at: AHC.

Cost Impact: Will not increase the cost of construction

The scope of the document has not changed, we have just eliminated unnecessary descriptors.
2015 International Fire Code

5306.2 Interior supply location. Medical gases shall be stored in areas dedicated to the storage of such gases without other storage or uses. Where containers of medical gases in quantities greater than the permit amount are located inside buildings, they shall be in a 1-hour exterior room, a 1-hour interior room or a gas cabinet in accordance with Section 5306.2.1, 5306.2.2 or 5306.2.3, respectively. Rooms or areas where medical gases are stored or used in quantities exceeding the maximum allowable quantity per control areas as set forth in Section 5003.1 shall be in accordance with the International Building Code for high-hazard Group H occupancies.

5306.2.1 One-hour exterior rooms. A 1-hour exterior room shall be a room or enclosure separated from the remainder of the building by fire barriers constructed in accordance with Section 707 of the International Building Code or horizontal assemblies constructed in accordance with Section 711 of the International Building Code, or both, with a fire-resistance rating of not less than 1 hour. Openings between the room or enclosure and interior spaces shall be self-closing smoke- and draft-control assemblies having a fire protection rating of not less than 1 hour. Rooms shall have not less than one exterior wall that is provided with not less than two nonclosable louvered vents. Each vent shall have a minimum free opening area of 24 square inches (155 cm²) for each 1,000 cubic feet (28 m³) at normal temperature and pressure (NTP) of gas stored in the room and shall be not less than 72 square inches (465 cm²) in aggregate free opening area. One vent shall be within 6 inches (152 mm) of the floor and one shall be within 6 inches (152 mm) of the ceiling. Rooms shall be provided with not less than one automatic sprinkler to provide container cooling in case of fire.

Revise as follows:

5306.2.2 One-hour interior room. Where an exterior wall cannot be provided for the room, a 1-hour interior room shall be a room or enclosure separated from the remainder of the building by fire barriers constructed in accordance with Section 707 of the International Building Code or horizontal assemblies constructed in accordance with Section 711 of the International Building Code, or both, with a fire-resistance rating of not less than 1 hour. Openings between the room or enclosure and interior spaces shall be self-closing smoke- and draft-control assemblies having a fire protection rating of not less than 1 hour. An automatic sprinklers shall be installed within the room. The room shall be exhausted through a duct to the exterior. Supply and exhaust ducts shall be enclosed in a 1-hour-rated shaft enclosure from the room to the exterior. Approved mechanical ventilation shall comply with the International Mechanical Code and be provided at a minimum rate of 1 cubic foot per minute per square foot [0.00508 m³/(s · m²)] of the area of the room.

Reason: Section 5306.2 requires that interior supply locations be rated, but it does not describe the construction to be used. Consistent with the action on G127, we are requesting that the language in these sections be revised.

This change and G127, describes the types of vertical and horizontal assemblies needed to do this. This proposal is submitted by the ICC Ad Hoc Committee on Healthcare (AHC). The AHC was established by the ICC Board to evaluate and assess contemporary code issues relating to hospitals and ambulatory healthcare facilities. This is a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. In 2014 and 2015 the ICC Ad Hoc Committee has held 4 open meetings and numerous Work Group meetings and conference calls for the current code development cycle which included members of the committees as well as any interested party to
discuss and debate the proposed changes. Information on the AHC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the AHC effort can be downloaded from the AHC website at: AHC.

**Cost Impact:** Will not increase the cost of construction
Not change in the construction requirement, this section only adds clarity on how to do it.
2015 International Fire Code

Revise as follows:

SECTION 5307 CARBON DIOXIDE (CO₂) SYSTEMS USED IN BEVERAGE DISPENSING APPLICATIONS COMPRESSED GASES NOT OTHERWISE REGULATED

Add new text as follows:

5307.1 General. Compressed gases in storage or use not regulated by the material-specific provisions of Chapters 6, 54, 55 and 60 through 67, including asphyxiant, irritant and radioactive gases, shall comply with this section in addition to other requirements of this chapter.

5307.2 Ventilation. Indoor storage and use areas and storage buildings shall be provided with ventilation in accordance with the requirements of Section 5004.3. Where mechanical ventilation is provided, the systems shall be operational during such time as the building or space is occupied.

Exceptions:
1. Where an alarm system complying with Section 5307.2.1 is provided.
2. Carbon dioxide systems used in beverage dispensing applications shall comply with Section 5307.3.

5307.2.1 Alarm system. In rooms or areas not provided with ventilation in accordance with Section 5307.2, a gas detection system complying with Section 916 or, where approved, an oxygen depletion alarm system, either of which initiates audible and visible alarm signals in the room or area where sensors are installed, shall be provided.

5307.3 General Carbon dioxide (CO₂) systems used in beverage dispensing applications. Carbon dioxide systems with more than 100 pounds (45.4 kg) of carbon dioxide used in beverage dispensing applications shall comply with Sections 5307.2 through 5307.5.2 Section 5307.3.1.

Delete without substitution:

5307.2 Permits. Permits shall be required as set forth in Section 105.6.

5307.3 Equipment. The storage, use, and handling of liquid carbon dioxide shall be in accordance with Chapter 53 and the applicable requirements of NFPA 55, Chapter 13. Insulated liquid carbon dioxide systems shall have pressure relief devices vented in accordance with NFPA 55.

5307.4 Protection from damage. Carbon dioxide systems shall be installed so the storage tanks, cylinders, piping and fittings are protected from damage by occupants or equipment during normal facility operations.

5307.5 5307.3.1 Required protection. Ventilation Where carbon dioxide storage tanks, cylinders, piping and equipment are located indoors, rooms or areas containing carbon dioxide
storage tanks, cylinders, piping and fittings and other areas where a leak of carbon dioxide can collect would be expected to accumulate shall be provided with either mechanical ventilation in accordance with the requirements of Section 5307.5.1 or an emergency alarm system 5004.3 and designed to maintain the room containing carbon dioxide at a negative pressure in accordance relation to the surrounding area.

**Exception:** A gas detection system complying with Section 5307.5.2 916 with an alarm activation threshold not exceeding 5,000 parts per million (9,000 mg/m$^3$) shall be permitted in lieu of mechanical ventilation.

**SECTION 5308 - COMPRESSED GASES NOT OTHERWISE REGULATED**

5308.1 General. Compressed gases in storage or use not regulated by the material-specific provisions of Chapters 6, 54, 55 and 60 through 67, including asphyxiant, irritant and radioactive gases, shall comply with this section in addition to other requirements of this chapter.

5308.2 Ventilation. Indoor storage and use areas and storage buildings shall be provided with mechanical exhaust ventilation or natural ventilation in accordance with the requirements of Section 5004.3 or 5005.1.9. Where mechanical ventilation is provided, the systems shall be operational during such time as the building or space is occupied.

**SECTION 916 GAS DETECTION SYSTEM**

916.1 Gas Detection Activation. Where a gas detection system is required elsewhere in this code, a gas detection alarm shall be initiated when any sensor detects a concentration of gas exceeding the following thresholds:

1. For flammable gases, a gas concentration exceeding 25 percent of the lower flammable limit (LFL).
2. For non-flammable gases, a gas concentration exceeding 1/2 of the IDLH, unless a different threshold is specified by the section of this code requiring gas detection.

Upon activation of a gas detection alarm, alarm signals or other required responses shall be as specified by the section of this code requiring a gas detection system. Audible and visible alarm signals associated with a gas detection alarm shall be distinctive from fire alarm and carbon monoxide alarm signals.

**Reason:** Sections 5307 and 5308 currently overlap because 5308 regulates all compressed gases that are not regulated by IFC Chapters 6, 54, 55 and 60 through 67. That would include CO2 used for beverage dispensing. Although 5308 might be given precedence over 5307 for CO2 used for beverage dispensing based on the "specific over general" rule that applies to conflicting regulations in the code, there is no reason for the code to create this ambiguity. It makes more sense to have the regulations for all asphyxiant gases in one section.

Accordingly, this proposal recommends consolidating Sections 5307 and 5308. In the process of consolidating the sections, the need for some additional revisions became evident, as follows:

1. Current Section 5308.2 (proposed herein to be moved to 5307.2) always requires that ventilation be provided for indoor storage and use areas and storage buildings. A new exception has been suggested that would allow substituting a detection and alarm system for ventilation, recognizing that this is actually a safer alternative for odorless gases. The proposal also recognizes, when approved by the fire official, use of an oxygen depletion alarm in lieu of gas detection, which is an alternative detection method sometimes used to protect environments at risk of exposure to high concentrations of asphyxiant gases. Clearly, it is better to warn of a pending hazardous situation vs. simply providing the prescriptively required 1 cfm/sqft ventilation, which may or may not be adequate to prevent onset of a hazardous concentration of fugitive gas depending on the leak scenario. Allowing detection and alarm in lieu of ventilation also recognizes that continuously operating exhaust fans are very inefficient from an energy conservation perspective, particularly when removing conditioned air that must be replaced by conditioned air.
2. Current Section 5307.2 has been proposed for deletion because it simply duplicates requirements in Section 5301.2, which require permits for all compressed gases to meet Section 105.6.

3. Current Section 5307.3 has been proposed for deletion because CO2 equipment is required to comply with Chapter 53 regardless of whether this section restates that fact. In addition, the references to NFPA 55 are not needed because Section 5301 already requires storage, use and handling of all compressed gases to comply with NFPA 55, except as modified by the IFC.

4. Current Section 5307.4 has been proposed for deletion because Section 5303.5.2 requires physical protection for all compressed gas containers, cylinders, tanks and systems that could be exposed to physical damage. The need to restate this for CO2 beverage dispensing systems, particularly in a different way, is not evident.

5. Current Section 5307.5 has been retained as new Section 5307.3.1 and editorially cleaned up. It has been retained, rather than relying on the general ventilation requirements in Section 5307.2 because the existing provisions for CO2 use for beverage dispensing operations have supplemental requirements to maintain the area at negative pressure vs. surrounding areas and because the alternative provisions allowing the use of gas detection in lieu of ventilation specify a unique alarm threshold for detectors.

**Cost Impact:** Will not increase the cost of construction

The proposal is largely a consolidation of existing requirements with editorial clarification. The proposed new options for using gas detection and alarm systems in lieu of ventilation systems are not mandatory and therefore have no cost impact since an owner can choose to not use them.
2015 International Fire Code

105.6.4 Carbon dioxide systems used in beverage dispensing applications. An operational permit is required for insulated liquid carbon dioxide systems used in beverage dispensing applications having more than 100 pounds of carbon dioxide regulated by Section 5307.1.

<table>
<thead>
<tr>
<th>TYPE OF GAS</th>
<th>AMOUNT (cubic feet at NTP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrosive</td>
<td>200</td>
</tr>
<tr>
<td>Flammable (except cryogenic fluids and liquefied petroleum gases)</td>
<td>200</td>
</tr>
<tr>
<td>Highly toxic</td>
<td>Any Amount</td>
</tr>
<tr>
<td>Inert and simple asphyxiant(^a)</td>
<td>6,000</td>
</tr>
<tr>
<td>Liquid carbon dioxide systems</td>
<td>See Section 5307.1</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>
</tbody>
</table>

For SI: 1 cubic foot = 0.02832 m\(^3\).

\(^a\) For carbon dioxide used in beverage dispensing applications, see Section 105.6.4.

Add new definition as follows:

**SECTION 202 DEFINITIONS**

**INSULATED LIQUID CARBON DIOXIDE SYSTEM.** An assembly of equipment consisting of one or more insulated carbon dioxide containers, interconnecting piping, pressure regulators, and pressure relief devices.

Revise as follows:

**908.7 Carbon Insulated liquid carbon dioxide (CO\(_2\)) systems.** Emergency alarm systems in
accordance with Section 5307.5.2 shall be provided where required for compliance with Section 5307.5.2 5307.9.

SECTION 5307 INSULATED LIQUID CARBON DIOXIDE (CO₂) SYSTEMS USED IN BEVERAGE DISPENSING APPLICATIONS

5307.1 General. Carbon
The design, installation and maintenance of insulated liquid carbon dioxide systems with more than 100 pounds (45.4 kg) of liquid carbon dioxide, or systems of any quantity of liquid carbon dioxide used in beverage dispensing applications with remote fill connections shall comply with Sections 5307.2 through 5307.5.2 5307.13.

5307.2 Permits. Permits shall be required as set forth in Section 105.6 105.6.4.

Add new text as follows:

5307.2.1 Construction documents. The following information shall be provided with the application for permit:

1. Total aggregate quantity of liquid CO₂ in pounds or cubic feet at normal temperature and pressure.
2. Location and total volume of the room where the liquid CO₂ will be located. Identify whether the room is at grade or below grade.
3. Location of containers relative to equipment, building openings and means of egress.
4. Manufacturer’s specifications and pressure rating, including cut sheets, of all piping and tubing to be used.
5. A piping and instrumentation diagram that shows piping support and remote fill connections.
6. Details of container venting, including but not limited to vent line size, material and termination location.
7. Alarm and detection system and equipment, where applicable.
8. Seismic support for containers.

Revise as follows:

5307.3 Equipment. The storage, use, and handling of liquid carbon dioxide shall be in accordance with Chapter 53 and the applicable requirements of NFPA 55, Chapter 13. Insulated Materials in contact with liquid carbon dioxide systems shall have pressure relief devices vented in accordance with NFPA 55 be rated for use at a temperature of -109.3°F (-78.5°C).

Add new text as follows:

5307.4 Pressure relief and vent piping. Liquid carbon dioxide containers shall be provided with pressure relief devices and vent piping in accordance with NFPA 55. The devices shall be located to minimize tampering, damage and obstruction to flow. Pressure relief devices shall be piped to discharge outdoors in an above grade, unenclosed location. The point of discharge shall comply with Section 5307.6.

5307.5 Indicators. Liquid carbon dioxide containers shall be provided with pressure gauges and liquid level gauges or indicators. Where the filling connection is remote from the storage container, an approved means shall be provided to determine when the container is filled to its design capacity that is visible from the filling location.

5307.6 Fill connections and vent terminations. Fill connections and vent terminations shall
be installed above grade, outdoors in an unenclosed, free airflow area. The fill connection shall be located so not to impede means of egress or the operation of sidewalk cellar entrance doors, including during the delivery process and shall be located:

1) At least 36 in. (915 mm) from any door or operable window
2) At least 36 in. (915 mm) above grade
3) At least 10 ft. (3.1 m) horizontally from air intakes at the same level or lower elevation
4) At least 10 ft. (3.1 m) from stairwells that lead below grade

5307.7 Piping systems. Piping for insulated liquid carbon dioxide systems shall be located to protect against mechanical damage and heat sources. Piping shall be supported to protect against strain on piping and fittings, and designed to accommodate expansion, contraction and vibration. Piping, tubing, hoses and fittings shall be designed to a minimum bursting pressure at least four times the system design pressure.

Revise as follows:

5307.8 Protection from damage. Carbon insulated liquid carbon dioxide systems shall be installed so the storage tanks, cylinders, piping and fittings are protected from damage by occupants or equipment during normal facility operations.

Add new text as follows:

5307.9 Gas detection system. A continuous gas detection system shall be provided in the room or indoor area in which container systems are filled and used, in areas where the heavier than air gas can congregate and in below grade outdoor locations. Carbon dioxide sensors shall be provided within 12 inches (305 mm) of the floor in the area where the gas is most likely to accumulate or leaks are most likely to occur. The system shall be designed to detect and notify at a low level alarm and a high level alarm as follows.

1. The threshold for activation of the low level alarm shall not exceed a carbon dioxide concentration of 5,000 ppm (9,000 mg/m³) Time Weighted Average (TWA) over 8 hours. When carbon dioxide is detected at the low level alarm, the system shall activate an audible and visible supervisory alarm at a normally attended location within the building.
2. The threshold for activation of the high level alarm shall not exceed a carbon dioxide concentration of 30,000 ppm (54,000 mg/m³). When carbon dioxide is detected at the high level alarm, the system shall activate an audible and visible evacuation alarm in an approved location.

5307.10 Signage. Hazard identification signs shall be posted at the entrance to the room and confined area where liquid carbon dioxide containers are located. The sign shall be a minimum 8 in. (200 mm) wide and 6 in. (150 mm) high and indicate:

- CAUTION – CARBON DIOXIDE GAS
  Ventilate the area before entering.
  A high carbon dioxide (CO2) gas concentration
  In this area can cause asphyxiation.

5307.11 Seismic and structural design. Liquid carbon dioxide system containers and piping shall comply with the seismic design requirements in Chapter 16 of the International Building
Code and shall not exceed the floor loading limitation of the building.

5307.12 Outdoor installations. Outdoor installations of insulated liquid carbon dioxide (CO₂) systems shall be in accordance with NFPA 55, Section 13.7.

5307.13 Container refilling. Insulated liquid carbon dioxide (CO₂) containers shall not be refilled indoors unless a remote fill connection is provided in accordance with Section 5307.6.

Delete without substitution:

5307.5 Required protection. Where carbon dioxide storage tanks, cylinders, piping and equipment are located indoors, rooms or areas containing carbon dioxide storage tanks, cylinders, piping and fittings and other areas where a leak of carbon dioxide can collect shall be provided with either ventilation in accordance with Section 5307.5.1 or an emergency alarm system in accordance with Section 5307.5.2.

5307.5.1 Ventilation. Mechanical ventilation shall be in accordance with the International Mechanical Code and shall comply with all of the following:

1. Mechanical ventilation in the room or area shall be at a rate of not less than 1 cubic foot per minute per square foot \(0.00508 \text{ m}^3/(\text{s} \cdot \text{m}^2)\).
2. Exhaust shall be taken from a point within 12 inches (305 mm) of the floor.
3. The ventilation system shall be designed to operate at a negative pressure in relation to the surrounding area.

5307.5.2 Emergency alarm system. An emergency alarm system shall comply with all of the following:

1. Continuous gas detection shall be provided to monitor areas where carbon dioxide can accumulate.
2. The threshold for activation of an alarm shall not exceed 5,000 parts per million (9,000 mg/m³).
3. Activation of the emergency alarm system shall initiate a local alarm within the room or area in which the system is installed.

Reason: This proposal was developed by a Fire Code Action Committee working group consisting of FCAC, industry and fire service representatives.

Last code cycle Section 5307 was added to cover liquid CO₂ systems used for beverage dispensing, which addressed a safety gap that had resulted in asphyxiation fatalities. An increased use of CO₂ in applications other than beverage dispensing has raised concerns with additional asphyxiation incidents, which are addressed by this proposal.

This proposal accomplishes three things, (1) expands the scope of section 5307 to cover insulated liquid CO₂ installations used in all applications, not just beverage dispensing, (2) covers insulated liquid CO₂ systems with remote fill connections, and (3) correlates with requirements in the 2016 edition of NFPA 55, and the National Board Inspection Code (NBIC). Comments on specific proposed changes are:

105.6.4, Table 105.6.9 – Revised the operational permit criteria (1) to cover liquid CO₂ systems other than those used for beverage dispensing, (2) relocate the threshold amount from section 105.6.4 and Table 105.6.9, to Section 5307.1

105.7.3 – Requires a construction permit for installation and modification of insulated liquid CO₂ systems.

Introduces a new Chapter 2 definition for Insulated Liquid Carbon Dioxide System that is consistent with, but not identical to definitions in NFPA 55.

5307.2.1 – New section on construction documents, which provides the fire code official with the information
needed to evaluate the suitability of the installation.

5307.3 – Pressure relief is now covered by section 5307.4. The temperature limitation for materials is based on 2016 NFPA 55, Section 13.4 requirements.

5307.4 – These requirements are consistent with 2016 NFPA 55 section 13.3.1.2, but provide more definitive requirements for the vent pipe discharge location, and a 5 lb. capacity was added to the exception.

5307.5 – These requirements are consistent with 2016 NFPA 55, Section 13.3.2.

5307.6 – These requirements are consistent with 2016 NFPA 55, Section 13.9.1.1 and safety measures for remote fill connections in NBIC Section S3.3.

5307.7 - These requirements are consistent with 2016 NFPA 55, Section 13.3.3.

5307.8 - These existing requirements are consistent with 2016 NFPA 55, Section 13.10.3.

5307.5, 5307.6 (2015 IFC) – NFPA 55 does not recognize the use of mechanical ventilation in lieu of an emergency alarm (gas detection) system. These sections are being deleted for consistency.

5307.9 – This section replaces Section 5307.5.2 in the 2015 IFC. These requirements are similar to 2016 NFPA 55, Section 13.6.2. They also include the detection levels in NBIC S3.4. The alarm threshold of 5,000 ppm is the 8-hour TWA PEL. This threshold will trigger an alarm at a normally attended location which will notify staff that there is a situation which needs attention and concern with long term exposure. The alarm threshold of 30,000 ppm is the 15-minute TWA STEL. This threshold will trigger an audible and visual alarm to allow for evacuation of the area or building as appropriate.

5307.10 - These requirements are consistent with 2016 NFPA 55, Section 13.6.3.

5307.11 – These requirements provide a link to seismic and structural requirements in the IBC.

5307.12 – This directs the code user to applicable NFPA 55 requirements for outdoor installations.

5307.13 – New section that prohibits refilling liquid CO₂ containers where the refill connection would be located indoors.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire safety and hazardous materials in new and existing buildings and facilities and the protection of life and property in wildland urban interface areas. In 2014 and 2015 the Fire-CAC has held 5 open meetings. In addition, there were numerous conference calls, Regional Work Group and Task Group meetings for the current code development cycle, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: [FCAC](#).

**Cost Impact:** Will increase the cost of construction

The cost of construction will be increased for CO2 systems that were not previously regulated by this section.
F371-16
IFC: 105.6.4, 105.6.9, 5307, 5307.1, 5307.10 (New), 5307.10.1 (New), 5307.10.2 (New), 5307.11 (New), 5307.11.1 (New), 5307.11.2 (New), 5307.12 (New), 5307.2, 5307.2 (New), 5307.3, 5307.3 (New), 5307.3.1 (New), 5307.4, 5307.4 (New), 5307.5, 5307.5 (New), 5307.5.1, 5307.5.2, 5307.6 (New), 5307.6.1 (New), 5307.6.2 (New), 5307.7 (New), 5307.7.1 (New), 5307.7.2 (New), 5307.7.3 (New), 5307.7.3.1 (New), 5307.7.3.2 (New), 5307.8 (New), 5307.8.1 (New), 5307.9 (New), 5307.9.1 (New), 5307.9.2 (New), 5307.9.2.1 (New), 5307.9.3 (New), 5307.9.3.1 (New), 5307.9.3.2 (New).

Proponent: Jay Weightman, representing Colorado Springs Fire Department, Division of the Fire Marshal (jweightman@springsgov.com)

2015 International Fire Code

Revise as follows:

105.6.4 Carbon dioxide systems used in beverage dispensing applications. An operational permit is required for carbon dioxide and inert gas systems used in beverage dispensing applications having more than carbonation, equipment operation or other system functions when the system exceeds 100 pounds of carbon dioxide.

<table>
<thead>
<tr>
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<th>AMOUNT (cubic feet at NTP)</th>
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<tbody>
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<td>Corrosive</td>
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<tr>
<td>Flammable (except cryogenic fluids and liquefied petroleum gases)</td>
<td>200</td>
</tr>
<tr>
<td>Highly toxic</td>
<td>Any Amount</td>
</tr>
<tr>
<td>Inert and simple asphyxiant&lt;sup&gt;a&lt;/sup&gt;</td>
<td>6,000</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>
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</tbody>
</table>

For SI: 1 cubic foot = 0.02832 m<sup>3</sup>.

<sup>a</sup> For carbon dioxide used in beverage dispensing applications, systems and inert gas systems, see Section 105.6.4.

SECTION 5307 INERT GAS AND CARBON DIOXIDE (CO<sub>2</sub>) SYSTEMS USED IN BEVERAGE DISPENSING APPLICATIONS
5307.1 General. Carbon dioxide and inert gas systems with more than 100 pounds (45.4 kg) of carbon dioxide used in beverage dispensing applications, carbonation, equipment operation or other system functions shall comply with Sections 5307.2 through 5307.5.2 this Section, Chapter 53, Chapter 55 or NFPA 55 Chapter 13 as appropriate. Such systems include compressed gas containers, insulated containers for refrigerated liquids, manifolded cylinders and other carbon dioxide or inert gas systems having a capacity of 100 pounds (874 standard cubic feet [scf] or greater. This section shall apply to all applications in new and existing buildings.

**Delete without substitution:**

5307.2 -Permits. Permits shall be required as set forth in Section 105.6.

5307.3 -Equipment. The storage, use, and handling of liquid carbon dioxide shall be in accordance with Chapter 53 and the applicable requirements of NFPA 55, Chapter 13. Insulated liquid carbon dioxide systems shall have pressure relief devices vented in accordance with NFPA 55.

5307.4 -Protection from damage. Carbon dioxide systems shall be installed so the storage tanks, cylinders, piping and fittings are protected from damage by occupants or equipment during normal facility operations.

5307.5 -Required protection. Where carbon dioxide storage tanks, cylinders, piping and equipment are located indoors, rooms or areas containing carbon dioxide storage tanks, cylinders, piping and fittings and other areas where a leak of carbon dioxide can collect shall be provided with either ventilation in accordance with Section 5307.5.1 or an emergency alarm system in accordance with Section 5307.5.2.

**Add new text as follows:**

5307.2 Permits. A permit shall be required where the quantity meets or exceeds the permit threshold set forth in Section 105.6.4.

5307.3 Location. Portable or manifolded cylinders and containers for use with carbon dioxide and inert gas systems inside of a building shall be located at least 10 feet (3 m) from elevators, stairways, corridors, exits or in areas normally used, or intended to be used as a means of egress.

5307.3.1 Electrical locations. Cylinders, containers and systems shall not be located where they could become part of an electrical circuit.

5307.4 Security. Compressed gas containers, cylinders, tanks, portable containers and systems shall be secured against accidental dislodgement, shifting or upset and against access by unauthorized personnel in accordance with Sections 5303.5.1 through 5303.5.3. Stationary containers shall be secured to foundations in accordance with the International Building Code. Nesting shall be an acceptable means of securing containers.

5307.5 Secure area. Containers, piping, valves pressure relief devices, regulating equipment and other appurtenances shall be protected against unauthorized entry or tampering.

5307.5.1 Ventilation. Mechanical ventilation shall be in accordance with the International Mechanical Code and shall comply with all of the following:

1. Mechanical ventilation in the room or area shall be at a rate of not less than 1 cubic foot per minute per square foot \(0.00508 \text{ m}^3/(\text{s} \cdot \text{m}^2)\).
2. Exhaust shall be taken from a point within 12 inches (305 mm) of the floor.
3. The ventilation system shall be designed to operate at a negative pressure in relation to the surrounding area.

Delete without substitution:

5307.5.2 Emergency alarm system. An emergency alarm system shall comply with all of the following:

1. Continuous gas detection shall be provided to monitor areas where carbon dioxide can accumulate.
2. The threshold for activation of an alarm shall not exceed 5,000 parts per million (9,000 mg/m³).
3. Activation of the emergency alarm system shall initiate a local alarm within the room or area in which the system is installed.

Add new text as follows:

5307.6 Compressed gas containers, cylinders and tanks. Compressed gas containers, cylinders and tanks for use with carbon dioxide and inert gas systems shall comply with the general requirements of Section 5303 and this Section.

5307.6.1 Storage of Compressed gases. Storage of compressed gas systems for use with carbon dioxide and inert gas shall comply with Section 5304.

5307.6.2 Use and handling of compressed gas systems. Compressed gas systems for carbon dioxide and inert gases shall comply with Section 5305 and this section.

5307.7 Insulated Containers Insulated containers used for liquid carbon dioxide shall comply with the requirements of this Section, Sections 5503 through 5505 and NFPA Chapter 13.

5307.7.1 Storage. Storage of containers used in carbon dioxide and inert gas systems shall comply with Section 5504.

5307.7.2 Use and handling. The use and handling of containers used in carbon dioxide and inert gas systems shall comply with the requirements of Section 5505.

5307.7.3 Pressure relief devices. Insulated containers shall be required to be equipped with pressure relief devices as required by Section 5503.2 in this code.

5307.7.3.1 Piped outdoors. Pressure relief devices on site-filled containers located in the building shall be piped outdoors where discharge will not impinge on the structure, personnel or means of egress and will not create a hazardous concentration of carbon dioxide.

5307.7.3.2 Location. Pressure relief devices shall be located to minimize tampering, damage and obstruction of flow.

5307.8 Ventilation. Mechanical ventilation shall be installed in addition to a detection and alarm system as required in this Section. All compressed gas systems shall have ventilation installed as required by Sections 5001.3.3.8, 5004.3 through 5004.1 and the International mechanical code. Construction plan data and a technical report by a registered design professional shall be submitted to the fire code official demonstrating compliance with the requirements. Approved plans and permits for ventilation from the governing mechanical authority shall be prima facie
Evidence for compliance.

**Exception:** Where the installation of a mechanical ventilation system in an existing building is impractical, an approved gas detection system installed in accordance with Section 5307.9 must be sufficient to allow proper notification of the occupants.

**5307.8.1 Non-continuous ventilation.** Where the gas detection system activates the ventilation system upon reaching the alarm thresholds as set forth in Section 5307.9.3 such ventilation is not required to be continuous.

**5307.9 Detection of a gas or vapor.** Detection shall be installed for all carbon dioxide and inert gas systems that meet the thresholds shown in 5307.1.

**5307.9.1 Detectors.** Any detection device used for carbon dioxide and inert gas systems shall be suitable for the use intended and shall be listed.

**5307.9.2 Location of detection sensor.** Sensors for gas detection systems shall be located in the same room or area, as close as possible to the system supply and at the height indicated in Table 5307.9.2.

<table>
<thead>
<tr>
<th>GAS NAME</th>
<th>SPECIFIC GRAVITY (AIR=1.00)</th>
<th>DISTANCE FROM FLOOR (inches)</th>
<th>DISTANCE FROM CEILING (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Helium</td>
<td>0.138</td>
<td>-</td>
<td>12 to 18</td>
</tr>
<tr>
<td>Neon</td>
<td>0.697</td>
<td>-</td>
<td>12 to 24</td>
</tr>
<tr>
<td>Nitrogen</td>
<td>0.9737</td>
<td>48 to 75</td>
<td>-</td>
</tr>
<tr>
<td>Argon</td>
<td>1.38</td>
<td>12 to 18</td>
<td>-</td>
</tr>
<tr>
<td>Carbon Dioxide</td>
<td>1.53</td>
<td>12 to 18</td>
<td>-</td>
</tr>
<tr>
<td>Krypton</td>
<td>2.89</td>
<td>12 to 18</td>
<td>-</td>
</tr>
<tr>
<td>Xenon</td>
<td>4.53</td>
<td>12 to 18</td>
<td>-</td>
</tr>
</tbody>
</table>

**5307.9.2.1 Point of use detection.** Where the point of use is remote from the supply, a detection and alarm systems is required for each point of use.

**5307.9.3 Detection alarm.** Rooms or areas where container systems are site-filled and used indoors or enclosed outdoor locations shall be provided with a gas detection and alarm system.

**5307.9.3.1 Carbon dioxide detection.** For carbon dioxide, the detection system shall be
capable of notifying personnel in the immediate area of a leak at 5,000 parts per million (ppm). Upon reaching 30,000 ppm this system shall notify all building occupants of a mandatory evacuation.

**5307.9.3.2 Other gas detection.** For other gases, an oxygen deficiency detection system shall be provided and shall be capable of notifying all occupants in the building when the oxygen level drops below 19.5 percent.

**5307.10 Piping** Piping for all carbon dioxide and inert gas systems shall be located and supported to protect against damage from strain on piping and fittings, the effects of expansion, contraction and vibration, mechanical damage and heat sources.

**5307.10.1 Piping requirements.** Piping, tubing, hoses and fittings shall be designed to a bursting pressure of at least four times the system design pressure.

**5307.10.2 Pipe labeling.** All piping associated with carbon dioxide and inert gas systems shall be labeled in accordance with ASME A13.1 to indicate the material conveyed and the direction of flow.

**5307.11 Signage** A warning sign shall be posted at the entrance to the building, room, enclosure or confined area where the system is located.

**5307.11.1 Inert gas systems.** Inert gas systems shall have a sign stating:

**CAUTION - INERT GAS**
If alarm is sounding
Ventilate the area before entering
A high inert gas concentration in this
Area can cause suffocation

**5307.11.2 Carbon dioxide systems** Carbon dioxide systems shall have a sign stating:

**CAUTION - CARBON DIOXIDE GAS**
If alarm is sounding
Ventilate the area before entering
A high inert gas concentration in this
Area can cause suffocation

**5307.12 System Signage.** Signage for insulated containers shall be placed on the head of the container indicating inlet, outlet and pressure relief. A highly visible sign shall also be installed indicating the valve for the emergency shut off.

**Reason:** Inert compressed gas systems, as well as inert cryogenic gas systems, are being used inside new and existing buildings and spaces without benefit of providing an alarm system in conjunction with proper ventilation. Examples of this would be the convenience stores and restaurants using carbon dioxide in poorly ventilated areas with no detection system. Also tire stores, brewerries and micro-breweries using nitrogen and carbon dioxide to freshen and carbonate alcoholic beverages. This section was changed to provide more definitive guidelines for safety of the compressed gas systems in buildings and spaces. Most of the references listed in this proposal are standard references found elsewhere in the fire code.

The oxygen level of 19.0 percent is a medically recognized figure where the "normal average adult" will show signs of hypoxia and confusion. The level of 19.5 percent for the alarm threshold will allow the "normal average adult" to recognize the alarm and be able to exit the building at an appropriate time.

The carbon dioxide level of 5,000 parts per million (ppm) alarms to notify the occupants in the immediate area that there is a potential leak and needs to be corrected. The 30,000 ppm alarms to notify the building occupants to exit the building before reaching the "Immediate Danger to Life or Health (IDLH)" for carbon dioxide which is 40,000 ppm.
**Cost Impact:** Will increase the cost of construction

This proposal will increase the cost of construction depending on the number of gas sources and points of use and ventilation requirements.

For those businesses on an outside wall, ventilation will add some cost but not a great amount. For those businesses with no outside wall, ventilation can add a moderate to larger cost of construction. A portion of this code proposal states that when an approved gas detection system is installed and it is impractical to install a ventilation system (no inside wall), the gas detection system will be sufficient, thereby reducing the cost of construction.

The CO2 meter costs range from approximately $150.00 per unit up to approximately $900.00 per unit depending on the choice of the customer. Most of the units researched on-line show that the normal price range, for most manufacturers, is in the $700.00 to $900.00 per unit range.

For products, other than carbon dioxide, the oxygen sensors for product detection can range from $150.00 per unit to over $2,000.00 per unit, depending on whether the unit is portable or statically mounted and the functions available.
105.6.5 Carbon dioxide enrichment systems. An operational permit is required for carbon dioxide enrichment systems having more than 874 cu. ft. scf (100 pounds) of carbon dioxide.

### TABLE 105.6.9
PERMIT AMOUNTS FOR COMPRESSED GASES

<table>
<thead>
<tr>
<th>TYPE OF GAS</th>
<th>AMOUNT (cubic feet at NTP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon dioxide enrichment systems</td>
<td>874 (100 lbs)</td>
</tr>
<tr>
<td>Corrosive</td>
<td>200</td>
</tr>
<tr>
<td>Flammable (except cryogenic fluids and liquefied petroleum gases)</td>
<td>200</td>
</tr>
<tr>
<td>Highly toxic</td>
<td>Any Amount</td>
</tr>
<tr>
<td>Inert and simple asphyxiant(^a)</td>
<td>6,000</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>
</tbody>
</table>

For SI: 1 cubic foot = 0.02832 m\(^3\).

\(^a\) For carbon dioxide used in beverage dispensing applications, see Section 105.6.4.

Add new definition as follows:

**SECTION 202 DEFINITIONS**

**CARBON DIOXIDE ENRICHMENT SYSTEM** A system where carbon dioxide gas is intentionally introduced into an indoor environment, typically for the purpose of stimulating plant growth.
908.8 **Carbon dioxide enrichment systems.** A gas detection system shall be provided in rooms and indoor areas in which carbon dioxide enrichment processes are located in accordance with Section 5308.3.4.

5308.3 **Carbon dioxide enrichment systems.** The design, installation and maintenance of carbon dioxide enrichment systems with more than 100 pounds (874 cu. feet scf) of carbon dioxide, or carbon dioxide enrichment systems with any quantity of carbon dioxide with remote fill connections shall comply with Sections 5308.3.1 through 5308.3.8.

5308.3.1 **Permits.** Permits shall be required as set forth in Section 105.6.5.

5308.3.2 **Documentation.** The following information shall be provided with the application for permit:

1. Total aggregate quantity of liquid CO2 in pounds or cubic feet at normal temperature and pressure.
2. Location and total volume of the room where the carbon dioxide enrichment operation will be conducted. Identify whether the room is at grade or below grade.
3. Location of containers relative to equipment, building openings and means of egress.
4. Manufacturer's specifications and pressure rating, including cut sheets, of all piping and tubing to be used.
5. A piping and instrumentation diagram that shows piping support and remote fill connections.
6. Details of container venting, including but not limited to vent line size, material and termination location.
7. Alarm and detection system and equipment, if applicable.
8. Seismic support for containers.

5308.3.3 **Equipment.** Pressure relief, vent piping, fill indicators, fill connections, vent terminations, piping system, and the storage, use, and handling of the carbon dioxide shall be in accordance with Chapter 53 and NFPA 55.

5308.3.4 **Gas detection system.** A continuous gas detection system shall be provided in the room or indoor area in which the carbon dioxide enrichment process is located, in the room or indoor area in which the container systems are located, and in areas where the heavier than air gas can congregate. Carbon dioxide sensors shall be provided within 12 inches (305 mm) of the floor in the area where the gas is most likely to accumulate or leaks are most likely to occur. The system shall be designed to detect and notify at a low level alarm and high level alarm.

1. The threshold for activation of the low level alarm shall not exceed a carbon dioxide concentration of 5,000 ppm (9,000 mg/m3) Time Weighted Average (TWA) over 8 hours.
2. The threshold for activation of the high level alarm shall not exceed a carbon dioxide concentration of 30,000 ppm (54,000 mg/m3). When carbon dioxide is detected at the high level alarm, the system shall activate an audible and visible alarm in an approved location.

5308.3.4.1 **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.

5308.3.5 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 the *International Mechanical Code* that complies with all of the following:

1. Mechanical ventilation in the room or area shall be at a rate of not less than 1 cubic foot per minute per square foot.
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 of the floor.
4. The ventilation system piping shall terminate outdoors in an approved location.

5308.3.6 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 where the carbon dioxide containers are located. The sign shall be a minimum 8 in. (200 mm) wide and 6 in. (150 mm) high and indicate:

**CAUTION – CARBON DIOXIDE GAS**
Ventilate the area before entering.
A high carbon dioxide (CO2) gas concentration
In this area can cause asphyxiation.

5308.3.7 Seismic and structural design. Carbon dioxide system containers and piping shall comply with the seismic design requirements in Chapter 16 of the *International Building Code* and shall not exceed the floor loading limitation of the building.

5308.3.8 Container refilling. Carbon dioxide containers shall not be refilled indoors unless a remote fill connection is provided.

**Reason:** The number of indoor marijuana cultivation facilities is expanding rapidly across the country, and an increasing number of them are using carbon dioxide enrichment systems to stimulate plant growth. This is creating a potential asphyxiation hazard that is not currently regulated in codes or standards.

Jurisdictions where these processes are found are having to adopt local regulation to mitigate the asphyxiation hazard. The hazard is of particular concern because asphyxiant gas is intentionally being introduced into indoor occupiable rooms and areas.

The hazard is the same whether the systems use liquid insulated CO2 system or CO2 gas containers.

The proposal is based in part on Clark County, NV guidelines, and requirements proposed for protecting insulated liquid CO2 systems. In particular:

The 100 lb. threshold is based on insulated liquid CO2 threshold.
The definition was created to describe the system covered.

The two level gas detection system detection levels and activation criteria is based on Clark County and the FCAC insulated liquid CO2 system proposal.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire safety and hazardous materials in new and existing buildings and facilities and the protection of life and property in wildland urban interface areas. In 2014 and 2015 the Fire-CAC has held 5 open meetings. In addition, there were numerous conference calls, Regional Work Group and Task Group meetings for the current code development cycle, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC

**Cost Impact:** Will increase the cost of construction  
This proposal will require a gas detection system, ventilation system and the system installation to comply with requirements that are not currently in the code.
2015 International Fire Code

Add new text as follows:

SECTION 5506 CRYOGENIC INERT GAS SYSTEMS

5506.1 General Cryogenic inert gas systems for beverage carbonation, equipment operation and other system functions shall comply with all sections of Chapter 55, including this section, NFPA 55 and GCA P-18. These systems shall include any insulated container with an individual capacity of 100 pounds (874 standard cubic feet [scf]) or greater. This shall also apply to all applications in new and existing buildings.

5506.2 Permits Permits are required where the quantity is greater than or equal to the permit threshold in Section 105.6.4.

5506.3 Vessel construction. Insulated containers used in inert gas systems shall be constructed in accordance with Section 5503.

5506.4 Security Cryogenic containers and systems shall be secured against accidental dislodgement and against access by unauthorized personnel.

5506.4.1 Securing of containers. Stationary containers shall be secured to foundations as required by the building code. Portable containers that are subject to shifting or upset shall be secured. Nesting shall be an acceptable means of securing containers.

5506.4.2 Security area Containers, piping, valves, pressure relief devices, regulating equipment and other appurtenances shall be protected against physical damage and tampering.

5506.4.3 Pressure relief valve protection. The pressure relief device vent lines shall be installed in such a manner to exclude or remove moisture and condensation and prevent malfunction of the pressure relief device because of freezing or ice and snow accumulations.

5506.4.4 Location Containers and systems shall not be located where they could become part of an electrical circuit.

5506.5 Storage Storage of containers used in cryogenic inert gas systems shall be in accordance with Section 5504.

5506.6 Use and handling. The use and handling of cryogenic inert gas systems shall comply with Section 5505.

5506.7 Ventilation All cryogenic inert gas systems shall have continuous mechanical ventilation as required by Section 5001.3.3.10, 5004.3, 5004.3.1 and the International Mechanical Code. Mechanical ventilation must be installed in addition to a gas detection and alarm system as required in Section 5506.8. Construction plan data and a technical report by a qualified design...
professional shall be submitted to the fire code official demonstrating compliance with the requirements. Approved plans and permits for ventilation from the governing mechanical authority shall be evidence for compliance.

**Exception**: When the installation of a mechanical ventilation system in an existing building is impractical, an approved gas detection system installed in accordance with Section 5506.8 will be sufficient to allow proper notification of the occupants.

5506.7.1 **Non-continuous ventilation.** Ventilation may be allowed to be non-continuous in nature if the gas detection system activates the ventilation system upon reaching alarm thresholds as set forth in Section 5506.8.3.

5506.8 **Detection of a gas or vapor.** Detection shall be installed for all cryogenic inert gas systems that meet the thresholds shown in 5506.1.

5506.8.1 **Detectors.** Any detection device used for cryogenic inert gas systems shall be suitable for the use intended and shall be listed.

5506.8.2 **Location of detection sensor.** Sensors for gas detection systems shall be located at the height indicated in Table 5506.8.2.

<table>
<thead>
<tr>
<th>GAS NAME</th>
<th>SPECIFIC GRAVITY AIR = 1.00</th>
<th>DISTANCE FROM FLOOR</th>
<th>DISTANCE FROM CEILING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Helium</td>
<td>0.138</td>
<td>N/A</td>
<td>12 to 18 inches</td>
</tr>
<tr>
<td>Neon</td>
<td>.697</td>
<td>N/A</td>
<td>12 to 24 inches</td>
</tr>
<tr>
<td>Nitrogen</td>
<td>0.9737</td>
<td>48 to 75 inches</td>
<td>N/A</td>
</tr>
<tr>
<td>Argon</td>
<td>1.38</td>
<td>12 to 18 inches</td>
<td>N/A</td>
</tr>
<tr>
<td>Krypton</td>
<td>2.89</td>
<td>12 to 18 inches</td>
<td>N/A</td>
</tr>
<tr>
<td>Xenon</td>
<td>4.53</td>
<td>12 to 18 inches</td>
<td>N/A</td>
</tr>
<tr>
<td>N/A = Not applicable</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5506.8.3 **Detection alarms.** Rooms or areas where container systems are site-filled and used indoors or in enclosed outdoor locations shall be provided with a gas detection and alarm system that is capable of detecting and notifying the building occupants of a gas release when it reaches one half of the IDLH of the gas or when an oxygen sensor reaches 19.5 percent oxygen level.

5506.9 **Piping.** Piping for all cryogenic inert gas systems shall be located and supported in such a manner as to protect against damage from strain on piping and fittings, the effects of expansion, contraction and vibration, mechanical damage and heat sources.

5506.9.1 **Piping requirements.** Piping, tubing, hoses and fittings shall be designed to a bursting pressure of at least four times the system design.
5506.9.2 **Pipe labeling.** All piping associated with cryogenic inert gas systems shall be identified in accordance with ASME A13.1 to indicate the material conveyed and the direction of flow.

5506.10 **Signage.** A warning sign, as required in Section 5506.10.1, shall be posted at the entrance to the building, room, enclosure or confined area where the system is located.

5506.10.1 **Cryogenic inert gas system signage.** These systems shall have a sign stating:

**CAUTION - CRYOGENIC INERT GAS**

If alarm is sounding
Ventilate the area before entering
A high inert gas concentration in this
Area can cause suffocation

**Reason:** This proposal was written to maintain consistency with new code proposal Section 5307 Inert Gas and Carbon Dioxide Systems.

Cryogenic inert gas systems, as well as inert compressed gas systems, are being used inside new and existing buildings and spaces without benefit of providing an alarm system in conjunction with proper ventilation. Examples of this would be the tire stores using nitrogen to inflate tires and breweries and micro-breweries using nitrogen and carbon dioxide to freshen and carbonate alcoholic beverages. This Section is designed to provide a guideline to safety for cryogenic gas systems in buildings and spaces. Most of the references are standard references found elsewhere in the fire code.

The oxygen level of 19.0 percent is a medically recognized figure where the "normal average adult" will show signs of hypoxia and confusion. The level of 19.5 percent for the alarm threshold will allow the "normal average adult" to recognize the alarm and be able to exit the building at an appropriate time. The "Immediate Danger to Life and Health" (IDLH) is readily found in SDS's and other on-line websites.

**Cost Impact:** Will increase the cost of construction
This proposal will increase the cost of construction depending on the number of gas sources and points of use and ventilation requirements.

For those businesses on an outside wall, ventilation will add some cost but not a great amount. For those businesses with no outside wall, ventilation can add a moderate to larger cost to the cost of construction. A portion of this code proposal states that when an approved gas detection system is installed and it is impractical to install a ventilation system (no inside wall), the gas detection system will be sufficient, thereby reducing the cost of construction.

The oxygen sensors for product detection can range from $150.00 per unit to over $2,000.00 per unit, depending on whether the unit is portable or statically mounted and the functions available.
QUANTITY-DISTANCE (Q-D). The quantity of explosivematerial and separation distance relationships providing protection. These relationships are based on levels of risk considered acceptable for the stipulated exposures and are tabulated in the appropriate Q-D tables. The separation distances specified afford less than absolute safety:

**Inhabited building distance (IBD).** The minimum separation distance between an operating building or magazine containing explosivematerials and an inhabited building or site boundary.

**Intermagazine distance (IMD).** The minimum separation distance between magazines.

**Intraline distance (ILD) or Intraplant distance (IPD).** The distance to be maintained between any two operating buildings on an explosives manufacturing site when at least one contains or is designed to contain explosives, or the distance between a magazine and an operating building.

**Minimum separation distance (Do).** The minimum separation distance between adjacent buildings occupied in conjunction with the manufacture, transportation, storage or use of explosivematerials where one of the buildings contains explosivematerials and the other building does not.

### Table 5601.8.1 (1)
**APPLICATION OF SEPARATION DISTANCE QUANTITY-DISTANCE (Q-D) TABLES—DIVISION 1.1, 1.2 AND 1.5 EXPLOSIVES**

<table>
<thead>
<tr>
<th>ITEM</th>
<th>MAGAZINE</th>
<th>QUANTITY-DISTANCE</th>
<th>OPERATING BUILDING</th>
<th>QUANTITY-DISTANCE</th>
<th>INHABITED BUILDING</th>
<th>QUANTITY-DISTANCE</th>
<th>PUBLIC TRAFFIC ROUTE</th>
<th>QUANTITY-DISTANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Magazine</td>
<td>IMD in Table 5604.5.2(1)</td>
<td>IMD</td>
<td>ILD or IPD in Table 5605.3</td>
<td>IMD</td>
<td>IBD in Table 5604.5.2(1)</td>
<td>IBD</td>
<td>PTR in Table 5604.5.2(1)</td>
<td>PTR</td>
</tr>
<tr>
<td>Operating building</td>
<td>ILD or IPD in Table 5604.5.2(1)</td>
<td>ILD or IPD in Table 5605.3</td>
<td>ILD or IPD in Table 5605.3</td>
<td>ILD or IPD in Table 5605.3</td>
<td>IBD in Table 5604.5.2(1)</td>
<td>IBD</td>
<td>PTR in Table 5604.5.2(1)</td>
<td>PTR</td>
</tr>
<tr>
<td>Inhabited building</td>
<td>IBD in Table 5604.5.2(1)</td>
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<td>IBD in Table 5604.5.2(1)</td>
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<td>IBD in Table 5604.5.2(1)</td>
<td>IBD</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Public</td>
<td>PTR in Table</td>
<td>PTR</td>
<td>PTR in Table</td>
<td>PTR</td>
<td>PTR in Table</td>
<td>PTR</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
</tr>
</tbody>
</table>
For SI: 1 foot = 304.8 mm.

a. The minimum separation distance \(D_0\) between adjacent buildings occupied in conjunction with the manufacture, transportation, storage or use of explosive materials where one of the buildings contains explosive materials and the other building does not shall be 60 feet. Where a building or magazine containing explosives is barricaded, the minimum distance shall be 30 feet.

b. Linear interpolation between tabular values in the referenced Q-D tables shall not be allowed. Nonlinear interpolation of the values shall be allowed subject to an approved technical opinion and report prepared in accordance with Section 104.7.2.

c. For definitions of Quantity-Distance abbreviations IBD, ILD, IMD, IPD and PTR, see Chapter 2.

### TABLE 5601.8.1 (2)
APPLICATION OF SEPARATION DISTANCE QUANTITY-DISTANCE (Q-D) TABLES—DIVISION 1.3 EXPLOSIVES

<table>
<thead>
<tr>
<th>ITEM</th>
<th>MAGAZINE</th>
<th>Q-D</th>
<th>OPERATING BUILDING</th>
<th>Q-D</th>
<th>INHABITED BUILDING</th>
<th>Q-D</th>
<th>PUBLIC TRAFFIC ROUTE</th>
<th>Q-D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Magazine</td>
<td>Table 5604.5.2(2)</td>
<td>IMD</td>
<td>Table 5604.5.2(2)</td>
<td>ILD or IPD</td>
<td>Table 5604.5.2(2)</td>
<td>IBD</td>
<td>Table 5604.5.2(2)</td>
<td>PTR</td>
</tr>
<tr>
<td>Operating building</td>
<td>Table 5604.5.2(2)</td>
<td>ILD or IPD</td>
<td>Table 5604.5.2(2)</td>
<td>IBD</td>
<td>Table 5604.5.2(2)</td>
<td>IBD</td>
<td>Table 5604.5.2(2)</td>
<td>PTR</td>
</tr>
<tr>
<td>Inhabited building</td>
<td>Table 5604.5.2(2)</td>
<td>IBD</td>
<td>Table 5604.5.2(2)</td>
<td>Not Applicable</td>
<td>Not</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
<td></td>
</tr>
<tr>
<td>Public traffic route</td>
<td>Table 5604.5.2(2)</td>
<td>PTR</td>
<td>Table 5604.5.2(2)</td>
<td>Not Applicable</td>
<td>Not</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
<td></td>
</tr>
</tbody>
</table>

For SI: 1 foot = 304.8 mm.

a. The minimum separation distance \(D_0\) between adjacent buildings occupied in conjunction with the manufacture, transportation, storage or use of explosive materials where one of the buildings contains explosive materials and the other building does not shall be not less than 50 feet.

b. Linear interpolation between tabular values in the referenced Q-D table shall be allowed.

c. For definitions of Quantity-Distance abbreviations IBD, ILD, IMD, IPD and PTR, see Chapter 2.

### TABLE 5601.8.1 (3)
APPLICATION OF SEPARATION DISTANCE QUANTITY-DISTANCE (Q-D) TABLES—DIVISION 1.4 EXPLOSIVES

<table>
<thead>
<tr>
<th>ITEM</th>
<th>MAGAZINE</th>
<th>Q-D</th>
<th>OPERATING BUILDING</th>
<th>Q-D</th>
<th>INHABITED BUILDING</th>
<th>Q-D</th>
<th>PUBLIC TRAFFIC</th>
<th>Q-D</th>
</tr>
</thead>
</table>

ICC COMMITTEE ACTION HEARINGS :::: April, 2016
For SI: 1 foot = 304.8 mm.

a. The minimum separation distance \(D_0\) between adjacent buildings occupied in conjunction with the manufacture, transportation, storage or use of explosive materials where one of the buildings contains explosive materials and the other building does not shall be not less than 50 feet.

b. Linear interpolation between tabular values in the referenced Q-D table shall not be allowed.

c. For definitions of Quantity-Distance abbreviations IBD, ILD, IMD, IPD and PTR, see Chapter 2.

d. This table shall not apply to consumer fireworks, 1.4G.

**Reason:** Editorial. All three of these tables contain extra columns that simply indicate which entry to use on the referenced tables. The proposal simplifies the tables by adding the referenced measurement of ‘Q-D’ into the referral to the appropriate table.

\(D_0\) is deleted since it is only used in the footnotes on the tables. The criteria in the definition that one building contains explosive material and the other does not is added to the footnote in each table. The criteria in the definition is only used in these footnotes in the the entire IFC, so it serves a greater benefit for the code user to have the criteria in the footnote rather than the definition.

As an example of the end result of these revisions, Table 5601.8.1(1) (excluding footnotes) will look like this:

**TABLE 5601.8.1(1)**

APPLICATION OF QUANTITY-DISTANCE (Q-D) TABLES—DIVISION 1.1, 1.2 and 1.5 EXPLOSIVES \(^{a,b,c}\)

<table>
<thead>
<tr>
<th>ITEM</th>
<th>MAGAZINE</th>
<th>OPERATING BUILDING</th>
<th>INHABITED BUILDING</th>
<th>PUBLIC TRAFFIC ROUTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAGAZINE</td>
<td>IMD in Table 5604.5.2(1)</td>
<td>ILD or IPD in Table 5605.3</td>
<td>IBD in Table 5604.5.2(1)</td>
<td>PTR in Table 5604.5.2(1)</td>
</tr>
<tr>
<td>OPERATING BUILDING</td>
<td>ILD or IPD in Table 5605.3</td>
<td>ILD or IPD in Table 5605.3</td>
<td>IBD in Table 5604.5.2(1)</td>
<td>PTR in Table 5604.5.2(1)</td>
</tr>
<tr>
<td>INHABITED BUILDING</td>
<td>IBD in Table 5604.5.2(1)</td>
<td>IBD in Table 5604.5.2(1)</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>PUBLIC TRAFFIC ROUTE</td>
<td>PTR in Table 5604.5.2(1)</td>
<td>PTR in Table 5604.5.2(1)</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
</tr>
</tbody>
</table>
This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire safety and hazardous materials in new and existing buildings and facilities and the protection of life and property in wildland urban interface areas. In 2014 and 2015 the Fire-CAC has held 5 open meetings. In addition, there were numerous conference calls, Regional Work Group and Task Group meetings for the current code development cycle, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC

**Cost Impact:** Will not increase the cost of construction
This is a clarification change with no impact on application or enforcement.
2015 International Fire Code

5605.5.1.1 Wet collector. When collecting explosives dust, a wet collector system shall be used. Wetting agents shall be compatible with the explosives. Collector systems shall be interlocked with process power supplies so that the process cannot continue without the collector systems also operating.

Add new text as follows:

5605.5.1.1.1 Testing The interlocks required by Section 5605.5.1.1 shall be tested annually and a record shall be kept in accordance with Section 107.3.

Reason: In the IFC, some safety interlocks require testing and others don't. The purpose of this code change is to work towards a consistent approach by requiring safety interlocks to be tested.

Cost Impact: Will not increase the cost of construction
No cost increase is expected from this code change proposal. This code change is for the testing of existing equipment only. As a result, it does not require a change in construction and there is no cost increase.
2015 International Fire Code

Revise as follows:

5701.2 Nonapplicability. This chapter shall not apply to liquids as otherwise provided in other laws or regulations or chapters of this code, including:

1. Specific provisions for flammable liquids in motor fuel-dispensing facilities, repair garages, airports and marinas in Chapter 23.
2. Medicines, foodstuffs, cosmetics and commercial or institutional products containing not more than 50 percent by volume of water-miscible liquids and with the remainder of the solution not being flammable, provided that such materials are packaged in individual containers not exceeding 1.3 gallons (5 L).
3. Quantities of alcoholic beverages in retail or wholesale sales or storage occupancies, provided that the liquids are packaged in individual containers not exceeding 1.3 gallons (5 L).
4. Storage and use of fuel oil in tanks and containers connected to oil-burning equipment. Such storage and use shall be in accordance with Section 603. For abandonment of fuel oil tanks, this chapter applies.
5. Refrigerant liquids and oils in refrigeration systems (see Section 606).
6. Storage and display of aerosol products complying with Chapter 51.
7. Storage and use of liquids that do not have a fire point when tested in accordance with ASTM D 92.
8. Liquids with a *flash point* greater than 95°F (35°C) in a water-miscible solution or dispersion with a water and inert (noncombustible) solids content of more than 80 percent by weight, which do not sustain combustion.
9. Liquids without *flash points* that can be flammable under some conditions, such as certain halogenated hydrocarbons and mixtures containing halogenated hydrocarbons.
10. The storage of distilled spirits and wines in wooden barrels and casks.
11. Commercial cooking oil storage tank systems located within a building and designed and installed in accordance with Section 610 and NFPA 30.
12. The use of less than 10 alcohol wipes in a single room where each wipe contains less than 0.10 ounces of flammable liquids.

**Reason:** It is impractical to require protections systems for such small quantities of alcohol use, especially in hospitals and clinics. Requirements such as exhaust and/or classified electrical may be triggered if these small items are not exempted. The amounts proposed are far less than nail polish remover used in single family homes. The total quantity exempted per room is less than 1 oz.

**Cost Impact:** Will not increase the cost of construction
The exemption of a few alcohol swipes in facilities such as hospitals and clinics will not increase the cost of construction. This simply puts the codes in line with what is practiced out there.
F377-16
IFC: 5703.1.3 (New).

Proponent: Richard Kraus, American Petroleum Institute, representing American Petroleum Institute

2015 International Fire Code

Add new text as follows:

5703.1.3 Permanent and temporary electrical installations in areas where flammable liquids are produced, stored or handled at petroleum refineries, processing plants and bulk storage facilities shall comply with the requirements of API 500 or API 505, as applicable

Reference standards type: This reference standard is new to the ICC Code Books

Add new standard(s) as follows:

API 500 - 2012 Recommended Practice for Classification of Locations for Electrical Installations at Petroleum Facilities Classified as Class I, Division 1 and Division 2

API 505 - 2013 Recommended Practice for Classification of Locations for Electrical Installations at Petroleum Facilities Classified as Class I, Zone 0, Zone 1, and Zone 2

Reason: Table 5701.1 does not cover the new Zone Classifications now prevalent in the petroleum and chemical industries. This proposed addition of API 505 will aid to direct users and enforcers to the proper requirements for electrical zones in facilities that now follow the new criteria. API 500 and API 505 are specific to flammable liquids electrical classification. It should be noted that NFPA 70 Article 500 is derived from and follows the requirements of API 500 and API 505. Existing sections should be renumbered.

Cost Impact: Will not increase the cost of construction

This changes covers a change in nomenclature but not a change in construction or spacing requirements.

Analysis: A review of the standard(s) proposed for inclusion in the code,

- API 500 - 2012 Recommended Practice for Classification of Locations for Electrical Installations at Petroleum Facilities Classified as Class I, Division 1 and Division 2
- API 505 - 2013 Recommended Practice for Classification of Locations for Electrical Installations at Petroleum Facilities Classified as Class I, Zone 0, Zone 1, and Zone 2

with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1, 2016.
F378-16
IFC: 5703.6.2.1 (New).
Proponent: Vickie Lovell, InterCode Incorporated, representing 3M (vickie@intercodeinc.com)

2015 International Fire Code
Add new text as follows:

5703.6.2.1 Piping systems carrying combustible liquids. Piping systems carrying combustible liquids in buildings identified in Risk Categories III and IV by Table 1604.5 shall be protected with an approved assembly, or a fire-resistant pipe-protection system that has been tested in accordance with UL 1489. Where protected with a fire-resistant pipe-protection system, the system shall be installed as tested and in accordance with the manufacturer's installation instructions. The rating for such assemblies or systems shall be as required elsewhere in the code, but shall not be less than 2 hours.

Reference standards type: This reference standard is new to the ICC Code Books
Add new standard(s) as follows:
UL 1489-2015 Outline of Investigation for Fire Resistant Pipe Protection Systems Carrying Combustible Liquids
Reason: This proposal is intended to require piping systems carrying combustible liquids to be protected with an approved assembly that could be considered fire-resistant for not less than 2 hours in Risk Categories III and IV.

Products that could comply with the section are traditionally some variation of fire-resistance-rated horizontal or vertical shaft enclosures. As such, this proposal includes that option.

The proposal also includes the option of protecting the piping system using a fire-resistant pipe-protection system tested in accordance with UL 1489. The system shall be installed as tested and in accordance with the manufacturer's installation instructions. The as-tested portion of this requirement is consistent with the wording used in multiple sections for the International Building Code which uses tested designs, systems or assemblies to provide hourly ratings. Sections 714 and 715, covering Penetrations and Fire-resistant Joint Systems, respectively, are good examples. The installation instructions portion of this requirement is consistent with language added to Section 715, covering Fire-resistant Joint Systems during the just completed Group A Code Cycle.

UL 1489 addresses the fire-resistive performance of piping systems protected for an hourly rating. The Outline of Investigation compliments the two standards currently referenced in the International Fire Code for establishing fire-resistance ratings: ASTM E 119 and UL 263. The Outline of Investigation describes the same test equipment and same time-temperature fire exposure as ASTM E 119 and UL 263. However, the sample configuration has been written to specifically address pipe-protection systems. The Conditions of Acceptance follow the intent of ASTM E 119 and UL 263, but specifically address the performance requirements for fire-resistant pipe-protection systems. Specifically the Conditions of Acceptance requires 1) Resistance to the fire and hose stream exposure without developing openings in the pipe, 2) Preventing a temperature increase exceeding 325°F at any single point or 250°F at any cross section along the pipe, and 3) Prevention of fuel leakage.

UL recently published Outline of Investigation 1489. UL is currently in the process of converting Outline of Investigation 1489 into an ANSI/UL standard. It is anticipated that the new standard will be published in advance of the ICC Public Comment Hearings.

A similar proposal was recommended in Group A for high rise buildings. This proposal extends the requirement to other buildings in the two highest risk categories, which includes essential facilities where the operation of emergency and standby power is especially critical.
The proposal includes the requirement where the fuel lines are protected with a fire-resistant pipe-protection system. The system shall be installed as tested and in accordance with the manufacturer's installation instructions. The as-tested portion of this requirement is consistent with the wording used in multiple sections for the code which used tested designs, systems or assemblies to provide hourly ratings. Sections 714 and 715, covering Penetrations and Fire-resistant Joint Systems, respectively, are good examples. The installation instructions portion of this requirement are consistent with language added to Section 715, covering Fire-resistant Joint Systems during the just completed Group A Code Cycle.

**Cost Impact:** Will increase the cost of construction

This proposal will increase the cost of construction because it permits the use of proprietary systems that have been tested to an approved standard.

**Analysis:** A review of the standard(s) proposed for inclusion in the code, UL 1489-2015 Outline of Investigation for Fire Resistant Pipe Protection Systems Carrying Combustible Liquids with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1, 2016.
F379-16

IFC: 5704.2.7.6.
Proponent: Richard Kraus, American Petroleum Institute, representing American Petroleum Institute (petrosafety@verizon.net)

2015 International Fire Code

Revise as follows:

5704.2.7.6 Repair, alteration or reconstruction of tanks and piping. The repair, alteration or reconstruction, including welding, cutting and hot tapping of storage tanks and piping that have been placed in service, shall be in accordance with NFPA 30, **API 653 and API 2009**. Hot work, as defined in Section 202, on such tanks shall be conducted in accordance with Section 3510.

**Reason:** API 653, **Tank Inspection, Repair, Alteration and Reconstruction** and API 2009 **Safe Welding, Cutting and Hot Work Practices in the the Petroleum and Petrochemical Industries** are already in the IFC. Including them in this section will provide the user with specific requirements and safe work practices for these activities without having to look elsewhere in the code. Additionally, NFPA 30 only provides general safety requirements. NFPA 30 references API 2009 in its annex. NFPA references API 653 for tank maintenance and inspection but not for tank repair, alteration or maintenance. It should be noted that Section 5704.2.7 requires compliance with NFPA 30, which in turn requires compliance with API 620, 653 and 650. Adding API 653 and 2009 to this section will provide users and enforcers information without their having to go to NFPA 30 in addition to the IFC.

**Cost Impact:** Will not increase the cost of construction

These facilities should already be following the safe work practices provided in API 653 and 2009
5704.3.4.1 Maximum allowable quantity per control area. For occupancies other than Group M wholesale and retail sales uses, indoor storage of flammable and combustible liquids shall not exceed the maximum allowable quantities per control area indicated in Table 5003.1.1(1) and shall not exceed the additional limitations set forth in this section.

For Group M occupancy wholesale and retail sales uses, indoor storage of flammable and combustible liquids shall not exceed the maximum allowable quantities per control area indicated in Table 5704.3.4.1

Storage of hazardous production material flammable and combustible liquids in Group H-5 occupancies shall be in accordance with Chapter 27.

For Group S Occupancy warehouses, indoor storage flammable and combustible liquids shall not exceed the maximum allowable quantities per control area indicated in Table 5704.3.4.1(2)

<table>
<thead>
<tr>
<th>TABLE 5704.3.4.1 5704.3.4.1(1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF FLAMMABLE AND COMBUSTIBLE LIQUIDS IN WHOLESALE AND RETAIL SALES OCCUPANCIES</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TYPE OF LIQUID</th>
<th>MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA (gallons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sprinklered in accordance with footnote densities and arrangements</td>
<td>Sprinklered in accordance with Tables 5704.3.6.3(4) through 5704.3.6.3(8) and Table 5704.3.7.5.1</td>
</tr>
<tr>
<td>Class IA</td>
<td>60</td>
</tr>
<tr>
<td>Class IB, IC, II and IIIA</td>
<td>7,500&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
<tr>
<td>Class IIIB</td>
<td>Unlimited</td>
</tr>
</tbody>
</table>

For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929 m², 1 gallon = 3.785 L, 1 gallon per minute per square foot = 40.75 L/min/m².

a. Control areas shall be separated from each other by not less than a 1-hour fire barrier.

b. To be considered as sprinklered, a building shall be equipped throughout with an approved automatic sprinkler system with a design providing minimum densities as follows:

1. For uncartoned commodities on shelves 6 feet or less in height where the ceiling height does not exceed 18 feet, quantities are those allowed with a minimum sprinkler design density of Ordinary Hazard Group 2.

2. For cartoned, palletized or racked commodities where storage is 4 feet 6 inches or less in height and where the ceiling height does not exceed 18 feet, quantities are those allowed with a minimum sprinkler design density of 0.21 gallon per minute per square foot over the most remote 1,500-square-foot area.
Where wholesale and retail sales or storage areas exceed 50,000 square feet in area, the maximum allowable quantities are allowed to be increased by 2 percent for each 1,000 square feet of area in excess of 50,000 square feet, up to not more than 100 percent of the table amounts. A control area separation is not required. The cumulative amounts, including amounts attained by having an additional control area, shall not exceed 30,000 gallons.

5704.3.4.2 Occupancy quantity limits. The following limits for quantities of stored flammable or combustible liquids shall not be exceeded:

1. Group A occupancies: Quantities in Group A occupancies shall not exceed that necessary for demonstration, treatment, laboratory work, maintenance purposes and operation of equipment, and shall not exceed quantities set forth in Table 5003.1.1(1).

2. Group B occupancies: Quantities in drinking, dining, office and school uses within Group B occupancies shall not exceed that necessary for demonstration, treatment, laboratory work, maintenance purposes and operation of equipment, and shall not exceed quantities set forth in Table 5003.1.1(1).

3. Group E occupancies: Quantities in Group E occupancies shall not exceed that necessary for demonstration, treatment, laboratory work, maintenance purposes and operation of equipment, and shall not exceed quantities set forth in Table 5003.1.1(1).

4. Group F occupancies: Quantities in dining, office, and school uses within Group F occupancies shall not exceed that necessary for demonstration, laboratory work, maintenance purposes and operation of equipment, and shall not exceed quantities set forth in Table 5003.1.1(1).

5. Group I occupancies: Quantities in Group I occupancies shall not exceed that necessary for demonstration, laboratory work, maintenance purposes and operation of equipment, and shall not exceed quantities set forth in Table 5003.1.1(1).

6. Group M occupancies: Quantities in dining, office, and school uses within Group M occupancies shall not exceed that necessary for demonstration, laboratory work, maintenance purposes and operation of equipment, and shall not exceed quantities set forth in Table 5003.1.1(1). The maximum allowable quantities for storage in wholesale and retail sales areas shall be in accordance with Section 5704.3.4.1.

7. Group R occupancies: Quantities in Group R occupancies shall not exceed that necessary for maintenance purposes and operation of equipment, and shall not exceed quantities set forth in Table 5003.1.1(1).

8. Group S occupancies: Quantities in dining and office uses within Group S occupancies shall not exceed that necessary for demonstration, laboratory work, maintenance purposes and operation of equipment, and shall not exceed quantities set forth in Table 5003.1.1(1). The maximum allowable quantities for storage in warehouse storage areas shall be in accordance with Section 5704.3.4.1.

<table>
<thead>
<tr>
<th>TYPE OF LIQUID</th>
<th>MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA (GALLONS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class IA</td>
<td>60</td>
</tr>
<tr>
<td>Sprinklered in accordance with Tables 5704.3.6.3(4) through 5704.3.6.3(8) and Table 5704.3.7.5.1</td>
<td>60 Sprinklered with ESFR Systems</td>
</tr>
</tbody>
</table>

TABLE 5704.3.4.1(2)
Class IB, IC, II, and IIIA | 7,500 | 15,000
Class IIIB | Unlimited | Unlimited

For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929 m², 1 gallon = 3.785 L, 1 gallon per minute per square foot = 40.75 L/min/m².

a. Control areas shall be separated from each other by not less than a 1-hour fire barrier.
b. To be considered as sprinklered, a building shall be equipped throughout with an approved automatic sprinkler system with a design providing minimum densities as follows:
   1. For uncartoned commodities on shelves 6 feet or less in height where the ceiling height does not exceed 18 feet, quantities are those allowed with a minimum sprinkler design density of Ordinary Hazard Group 2.
   2. For cartoned, palletized or racked commodities where storage is 4 feet 6 inches or less in height and where the ceiling height does not exceed 18 feet, quantities are those allowed with a minimum sprinkler design density of 0.21 gallon per minute per square foot over the most remote 1,500-square-foot area.
c. Where warehouse storage areas exceed 80,000 square feet in area, the maximum allowable quantities are allowed to be increased by 2 percent for each 1,000 square feet of area in excess of 80,000 square feet, up to a maximum of 100 percent of the table amounts. A control area separation is not required. The cumulative amounts, including amounts attained by having an additional control area, shall not exceed 30,000 gallons.

5704.3.7 Group S Warehouse Areas. Flammable and combustible liquids in Group S occupancy warehouse uses shall be in accordance with Sections 5704.3.7.1 through 5704.3.7.5.

5704.3.7.1 Container type. Containers for Class I liquids shall be metal. **Exception:** In buildings equipped throughout with an automatic sprinkler system, Class IB and Class IC liquids is allowed in nonmetallic containers, each having a capacity of 33 ounces (0.946 L) or less.

5704.3.7.2 Container capacity. Containers for Class I liquids shall not have a capacity greater than 1 gallon (19 L).

5704.3.7.3 Fire protection and storage arrangements. Fire protection and container storage arrangements shall be in accordance with the following:

1. Storage on shelves shall not exceed 10 feet (1829 mm) in height, and shelving shall be metal.
2. Storage on pallets or in piles greater than 4 feet 6 inches (1372 mm) in height, or where the ceiling exceeds 18 feet (5486 mm) in height, shall be protected in accordance with Table 5704.3.6.3(4), and the storage heights and arrangements shall be limited to those specified in Table 5704.3.6.3(2).
3. Storage on racks greater than 4 feet 6 inches (1372 mm) in height, or where the ceiling exceeds 18 feet (5486 mm) in height shall be protected with an ESFR sprinkler systems.

5704.3.7.4 Storage plan. Where required by the fire code official, aisle and storage plans shall be submitted in accordance with Chapter 50.

**Reason:** This code change is being proposed to allow for Group S warehouse occupancies to have the same amount of flammable and combustible liquids as Group M occupancies with an increase in fire protection that is currently required for Group M occupancies. This code change request is being driven by companies that store sanitizers and that is the main flammable liquid within their storage.
The flammable liquids in the storage facility are primarily sanitizer products ranging in size and type. The entire product is individually packaged for consumer use in plastic containers not exceeding 33-fluid ounces. The individual containers are stored in the facility on pallets randomly distributed throughout the facility.

The hand sanitizers are not intended for consumption; therefore, the exemption permitted for alcoholic beverages with alcohol contents greater than 50% does not apply (though hand sanitizers are no more flammable than alcoholic beverages). These materials do comply with the individual container limitation, though they do not technically fall into the category for exemption.

Until recently, sanitizer products have not been in similar demand to alcoholic beverages. As such, the issue of storing the materials practically has only recently been realized. The most recent editions of the Codes have started addressing hand sanitizers including an exception from the hazardous materials provisions for wall mounted hand rubs containing alcohol. However, the storage of these materials is not specifically addressed in the latest editions of the codes.

The quantity limitations per the S occupancy have simply not caught up with those allowed for wholesale retail spaces compared to other occupancies. These spaces are permitted to store up to 30,000 gallons of flammable liquids in accordance with Table 5704.3.4.1 of the Fire Code in lieu of 240 gallons in accordance with the Table 5003.1.1(1) of the Fire Code. However, the increase in quantity limitations are not based on an increase in fire protection or life safety systems that are required (no additional requirements are outlined for retail spaces). In fact, the fire protection systems that can be like ESFR systems exceed those of most retail spaces.

The logic behind the increased capacity for retail operations is based upon the inherent need for retail occupancies to have larger quantities of stock available for purchase to operate effectively; this is exactly the same reason that most large Group S warehouses need this increase to be able to operate in an effective manner.

The only significant difference between a traditional wholesale retail store and the typical Group S facility is the restriction of public access. However, by restricting public access the occupant load of the space is lower than the occupant load of a traditional retail space. The occupant load factor used to determine the occupant load for a retail space on grade is 30 square feet per person, which is ten times denser than the occupant load factor associated with storage (300 square feet per person). As such, the calculated occupant load of a retail space is ten times greater than a storage space.

By restricting public access to the space, only staff is permitted in the storage area. Warehouse employees are trained to respond appropriately to a fire event and are familiar with the layout of the space, including aisles and exit paths. This combined with a lower occupant load significantly decreases the egress time for the occupants of the facility. As such, the storage space presents a lower life safety hazard than a traditional wholesale retail establishment. Property loss prevention is a larger factor than in a retail facility.

As stated above, although the storage space presents a lesser hazard to life than a retail establishment, a wholesale retailer is permitted to have a maximum of 30,000 gallons of Class IB and IC liquids. The maximum permitted quantity is ten times greater than the limit proposed for Group S warehouse facility.

The Building and Fire Codes recognize that to operate certain types of establishments, it is necessary to maintain a stock of specific products in excess of the maximum permitted control area quantities.

Retail establishments that sell alcoholic beverages require larger quantities of beverages than permitted for control areas.

To permit the sale of these materials, the codes exempt alcoholic beverages in retail and storage uses when packaged in individual containers not exceeding 1.3 gallons, regardless of the actual alcohol content. This includes alcoholic beverages that contain alcohol content of up to 90%.

Medicines, cosmetics, and foodstuffs with an alcohol content of less than 50% are exempt as well.

However, medicines, cosmetics, and foodstuffs containing more than 50% alcohol are not exempt from the quantity limitation. The hand sanitizers have an alcohol content of more than 50%. The hand sanitizers are not intended for consumption; therefore, the exemption permitted for alcoholic beverages with alcohol contents greater than 50% does not apply (though hand sanitizers are no more flammable than alcoholic beverages). Some supplies materials do comply with the individual container limitation, though they do not technically fall into the category for exemption.

Until recently, sanitizer products have not been in similar demand to alcoholic beverages. As such, the issue of storing the materials practically has only recently been realized. The most recent editions of the Codes have started addressing hand sanitizers including an exception from the hazardous materials provisions for wall mounted hand rubs containing alcohol. However, the storage of these materials is not specifically addressed in the latest editions of the codes.

A facility is approximately 600,000 square feet in area with consumer sized products (less than 33 ounce...
containers) stored randomly throughout the floor. The total proposed quantity of consumer products classified as flammable IB and IC liquids is less than 15,000 gallons distributed over the entire 600,000 square feet. This equates to 0.025 gallons or 3.2 ounces of product per square foot.

By limiting the density of materials, the potential for a fire involving the total amount of flammable liquids is low due to the random distribution of pallets throughout the 600,000 square feet of storage area.

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**Cost Impact:** Will increase the cost of construction
To be able to store the increase amounts of flammable and combustible materials, the cost of the fire protection will be increased by the installation of higher demand systems, but this is voluntary because a Group S warehouse occupancy that does not want to store these amounts, then they will fall into the existing fire sprinkler demand tables that have been used before.
LIQUID STORAGE WAREHOUSE. A building, or a portion of a building, classified as a Group H-2 or H-3 occupancy used for the storage of flammable or combustible liquids in a closed condition.

Revise as follows:

5704.3.8 Liquid storage warehouses. Buildings, and portions of buildings, used for storage of flammable or combustible liquids in quantities exceeding those set forth in Section 5704.3.4 for control areas and Section 5704.3.7 for liquid storage rooms shall comply with Sections 5704.3.8.1 through 5704.3.8.5 and shall be constructed and separated as required by the International Building Code.

Reason:
This proposal is necessary to correlate the provisions for liquid storage warehouses in the IFC to those in NFPA 30; Flammable & Combustible Liquids Code (currently referenced in the IFC). Currently confusion occurs because there is a subtle but important differences in the definition of liquid storage warehouse in the two documents.

The 2015 IFC, in Section 202 defines a liquid storage warehouse as "A building classified as a Group H-2 or H-3 occupancy used for the storage of flammable or combustible liquids in a closed condition." where the 2015 edition of NFPA 30; Flammable & Combustible Liquids Code, in Section 3.3.62.3 defines a Liquid Warehouse as "A separate, detached, or an attached building that is used for warehousing-type operations for liquids and whose exterior wall comprises at least 25 percent of the building perimeter."

There is often confusion that because teh IFC says a liquid storage warehouse is "a building" that it must be either a stand-alone building, or that there MUST be a fire wall between the liquid storage warehouse and any adjacent space.

When it comes to flammable and combustible liquids, the go-to document for anyone looking for the best regulations for storing flammable and/or combustible liquids - including the IFC - is NFPA 30. Years ago when NFPA 30 did not address flammable and combustible liquids as it does now there was a justifiable need for the IFC (or legacy fire codes) to develop provisions to address areas not in NFPA 30. Unfortunatley it took several significant incidents to prompt the fire protection community to realize that changes had to be made to NFPA 30 - and they were. The 2015 edition of NFPA 30 addresses the storage and dispensing of flammable and combustible liquids, and it is important that the key aspects the documents have in common be consistent.

The proposed language here and in Section 202 makes it clear that a liquid storage warehouse does not have to be a stand-alone bulding, or even have a fire w all from the adjacent space.

Cost Impact: Will not increase the cost of construction
The proposed change seeks to create corrdiation between the IFC and NFPA 30, and if approved w ill not increase the cost of construction.
5705.2.1 Pumps. Where positive-displacement pumps are used, they shall be provided with pressure relief discharging back to the tank, pump suction or other approved location, or shall be provided with interlocks to prevent over-pressure.

Reason: Clarification of intent. It was never the intent of this provision to require positive displacement pumps for transfer of liquids; however, the section was recently interpreted in that manner. The intent is to ensure that, where positive displacement pumps are used, they don't over-pressurize a system in the event of an abnormal condition. This section was added to NFPA 30 in the 1960s to protect liquid transfer systems that include positive displacement pumps. It was not intended to encourage, or worse require, their use.

Cost Impact: Will not increase the cost of construction

This proposal is intended to clarify application of the current provisions. No technical change is intended; therefore, there is no expected cost impact.
IFC: 5705.5.
Proponent: Christopher Moran, Jensen Hughes, representing United Technologies Corporation/Marioff (cmoran@jensenhughes.com)

2015 International Fire Code
Revise as follows:

5705.5 Alcohol-based hand rubs classified as Class I or II liquids. The use of wall-mounted dispensers containing alcohol-based hand rubs classified as Class I or II liquids shall be in accordance with all of the following:

1. The maximum capacity of each dispenser shall be 68 ounces (2 L).
2. The minimum separation between dispensers shall be 48 inches (1219 mm).
3. The dispensers shall not be installed above, below, or closer than 1 inch (25 mm) to an electrical receptacle, switch, appliance, device or other ignition source. The wall space between the dispenser and the floor or intervening counter top shall be free of electrical receptacles, switches, appliances, devices or other ignition sources.
4. Dispensers shall be mounted so that the bottom of the dispenser is not less than 42 inches (1067 mm) and not more than 48 inches (1219 mm) above the finished floor.
5. Dispensers shall not release their contents except when the dispenser is manually activated. Facilities shall be permitted to install and use automatically activated "touch free" alcohol-based hand-rub dispensing devices with the following requirements:
   5.1. The facility or persons responsible for the dispensers shall test the dispensers each time a new refill is installed in accordance with the manufacturer's care and use instructions.
   5.2. Dispensers shall be designed and must operate in a manner that ensures accidental or malicious activations of the dispensing device are minimized. At a minimum, all devices subject to or used in accordance with this section shall have the following safety features:
      5.2.1. Any activations of the dispenser shall only occur when an object is placed within 4 inches (98 mm) of the sensing device.
      5.2.2. The dispenser shall not dispense more than the amount required for hand hygiene consistent with label instructions as regulated by the United States Food and Drug Administration (USFDA).
      5.2.3. An object placed within the activation zone and left in place will cause only one activation.
6. Storage and use of alcohol-based hand rubs shall be in accordance with the applicable provisions of Sections 5704 and 5705.
7. Dispensers installed in occupancies with carpeted floors shall only be allowed in smoke compartments or fire areas equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 or an automatic water mist system installed in accordance with Section 904.11.

Reason: Water mist systems are listed and approved by UL and FM Global for use in Light and Ordinary Hazard occupancies which would cover the locations where alcohol-based hand rubs are typically located. The spaces described in this section are consistent with the listings/approvals. Automatic water mists systems provide a water efficient alternative to sprinkler systems. Water mist systems
reduce the water supply demand which can be of significance in areas where municipal water supplies may be marginal or inadequate for conventional sprinklers. Reducing the water demand for automatic fire protection systems that are tested in the same manner by recognized laboratories to conventional sprinklers, will encourage the installation of fire protection where water shortages due to drought may be a problem. Furthermore, the reduced discharge from water mist systems, compared to conventional sprinklers, in turn reduces the potential water damage.

Water have been used for years in buildings and on passenger ships specifically as a "sprinkler equivalent system" per Resolution A.800(19), November 1995 (IMO A800). The listings of the systems have been used as design guidance in buildings.

Water mist works to extinguish, suppress or control fires in fully open or enclosed compartments. Water-mist systems tested in environments identical to automatic sprinkler testing and have been found to achieve at least equal performance using less water than conventional sprinklers.

**Cost Impact:** Will not increase the cost of construction
This provides another suppression option only.
F384-16

IFC: 5706.3.5.

Proponent: Richard Kraus, American Petroleum Institute, representing American Petroleum Institute (petrosafety@verizon.net)

2015 International Fire Code

Revise as follows:

5706.3.5 Storage tanks. Storage of flammable or combustible liquids in tanks shall be in accordance with Section 5704. Setting, maintenance, inspection, operation and repair of tanks in production service shall be in accordance with API 12R1. Bolted tanks for the storage of petroleum liquids in production service shall be in accordance with API 12B. Field welded tanks for the storage of petroleum liquids in production service shall be in accordance with API 12D. Shop welded tanks for the storage of petroleum liquids in production service shall be in accordance with API 12F. Oil storage tanks or groups of tanks shall have posted in a conspicuous place, on or near such tank or tanks, an approved sign with the name of the owner or operator, or the lease number and the telephone number where a responsible person can be reached at any time.

Reference standards type: This reference standard is new to the ICC Code Books

Add new standard(s) as follows:

API 12R1-2008 Recommended Practice for Setting, Maintenance, Inspection, Operation, and Repair of Tanks in Production Service
API 12B - 2014 Specification for Bolted Tanks for Storage of Production Liquids
API 12D - 2008 Specification for field welded tanks for production liquids
API 12F - 2008 Specification for shop welded tanks for storage of production liquids

Reason: This proposed change adds pertinent API requirements for various production type tanks. (Note: All of these API specifications are presently referenced in NFPA 30 annex). This proposed change will include them in the IFC.

Cost Impact: Will not increase the cost of construction these types of tanks are all currently in service

Analysis: A review of the standard(s) proposed for inclusion in the code,

- API 12R1-2008 Recommended Practice for Setting, Maintenance, Inspection, Operation, and Repair of Tanks in Production Service
- API 12B - 2014 Specification for Bolted Tanks for Storage of Production Liquids
- API 12D - 2008 Specification for field welded tanks for production liquids
- API 12F - 2008 Specification for shop welded tanks for storage of production liquids

with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1, 2016.
F385-16

IFC: 5706.4.5.

Proponent: Richard Kraus, American Petroleum Institute, representing American Petroleum Institute (petrosafety@verizon.net)

2015 International Fire Code

Revise as follows:

5706.4.5 Storage. Storage of Class I, II and IIIA liquids in bulk plants shall be in accordance with the applicable provisions of Section 5704. Storage and handling of ethanol and gasoline ethanol blends in distribution terminals shall be in accordance with the requirements of API 1626.

Reference standards type: This reference standard is new to the ICC Code Books

Add new standard(s) as follows:

API 1626 - 2010 (addendum 2012) Storing and Handling Ethanol and Gasoline-ethanol Blends at Distribution Terminals and Filling Stations

Reason: API 1626 covers the safe storage and handling of ethanol and ethanol blends in terminals and bulk plants and would provide guidance to operators of these facilities

Cost Impact: Will not increase the cost of construction

These requirements have been in place for many years

Analysis: A review of the standard(s) proposed for inclusion in the code, API 1626 - 2010 (addendum 2012) Storing and Handling Ethanol and Gasoline-ethanol Blends at Distribution Terminals and Filling Stations with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1, 2016.
2015 International Fire Code

Add new text as follows:

5706.5.4.5 Commercial, industrial, governmental or manufacturing. Dispensing of Class I, Class II and III motor vehicle fuel from tank vehicles into the fuel tanks of motor vehicles located at commercial, industrial, governmental or manufacturing establishments, or other locations where permitted, provided such dispensing operations are conducted in accordance with the following:

1. Dispensing shall occur only at sites that have been issued a permit to conduct mobile fueling.
2. The owner of a mobile fueling operation shall provide to the jurisdiction a written response plan which demonstrates readiness to respond to a fuel spill and carry out appropriate mitigation measures, and describes the process to dispose properly of contaminated materials.
3. A detailed site plan shall be submitted with each application for a permit. The site plan shall indicate: all buildings, structures and appurtenances on site and their use or function; all uses adjacent to the lot lines of the site; the locations of all storm drain openings, adjacent waterways or wetlands; information regarding slope, natural drainage, curbing, impounding and how a spill will be retained upon the site property; and the scale of the site plan. Provisions shall be made to prevent liquids spilled during dispensing operations from flowing into buildings or off-site. Acceptable methods include, but shall not be limited to, grading driveways, raising doorills or other approved means.
4. The fire code official is allowed to impose limits on the times and days during which mobile fueling operations is allowed to take place, and specific locations on a site where fueling is permitted.
5. Mobile fueling operations shall be conducted in areas not accessible to the public or shall be limited to times when the public is not present.
6. Mobile fueling shall not take place within 15 feet (4572 mm) of buildings, property lines, combustible storage or storm drains.

Exceptions:

1. The distance to storm drains shall not apply where an approved storm drain cover or an approved equivalent that will prevent any fuel from reaching the drain is in place prior to fueling or a fueling hose being placed within 15 feet (4572 mm) of the drain. Where placement of a storm drain cover will cause the accumulation of excessive water or difficulty in conducting the fueling, such cover shall not be used and the fueling shall not take place within 15 feet (4572 mm) of a drain.
2. The distance to storm drains shall not apply for drains that direct influent to approved oil interceptors.

9. All tanks containing Class I fuel must meet DOT regulations.
10. The tank vehicle shall comply with the requirements of NFPA 385 and local, state and federal requirements. The tank vehicle’s specific functions shall include that of
supplying fuel to motor vehicle fuel tanks. The vehicle and all its equipment shall be maintained in good repair.

11. Signs prohibiting smoking or open flames within 25 feet (7620 mm) of the tank vehicle or the point of fueling shall be prominently posted on three sides of the vehicle including the back and both sides.

12. A portable fire extinguisher with a minimum rating of 40:BC shall be provided on the vehicle with signage clearly indicating its location.

13. The dispensing nozzles and hoses shall be of an approved and listed type.

14. The dispensing hose shall not be extended from the reel more than 100 feet (30 480 mm) in length.

15. Absorbent materials, nonwater-absorbent pads, a 10-foot-long (3048 mm) containment boom, an approved container with lid and a nonmetallic shovel shall be provided to mitigate a minimum 5-gallon (19 L) fuel spill.

16. Tank vehicles shall be equipped with a "fuel limit" switch such as a count-back switch, to limit the amount of a single fueling operation to not more than 500 gallons (1893 L) before resetting the limit switch. 

   **Exception:** Tank vehicles where the operator carries and can utilize a remote emergency shutoff device which, when activated, immediately causes flow of fuel from the tank vehicle to cease.

17. Persons responsible for dispensing operations shall be trained in the appropriate mitigating actions in the event of a fire, leak or spill. Training records shall be maintained by the dispensing company.

18. Operators of tank vehicles used for mobile fueling operations shall have in their possession at all times an emergency communications device to notify the proper authorities in the event of an emergency.

19. The tank vehicle dispensing equipment shall be constantly attended and operated only by designated personnel who are trained to handle and dispense motor fuels.

20. Fuel dispensing shall be prohibited within 25 feet (7620 mm) of any source of ignition.

21. The engines of vehicles being fueled shall be shut off during dispensing operations.

22. Nighttime fueling operations shall only take place in adequately lighted areas.

23. The tank vehicle shall be positioned with respect to vehicles being fueled to prevent traffic from driving over the delivery hose.

24. During fueling operations, tank vehicle brakes shall be set, chock blocks shall be in place and warning lights shall be in operation.

25. Motor vehicle fuel tanks shall not be topped off.

26. The dispensing hose shall be properly placed on an approved reel or in an approved compartment prior to moving the tank vehicle.

27. The fire code official and other appropriate authorities shall be notified when a reportable spill or unauthorized discharge occurs.

28. Operators shall place a drip pan or an absorbent pillow under each fuel fill opening prior to and during dispensing operations. Drip pans shall be liquid-tight. The pan or absorbent pillow shall have a capacity of not less than 3 gallons (11.36 L). Spills retained in the drip pan or absorbent pillow need not be reported. Operators, when fueling, shall have on their person an absorbent pad capable of capturing diesel fuel overfills. Except during fueling, the nozzle shall face upward and an absorbent pad shall be kept under the nozzle to catch drips. Contaminated absorbent pads or pillows shall be disposed of regularly in accordance with local, state and federal requirements.

29. Operators of tank vehicles used for mobile fueling operations of Class I fuels shall: Be a minimum of 5 feet away from any electrical equipment.
27.1. Tank vehicles will comply with the requirements of NFPA 385.
27.2. Train and certify all delivery vehicle operators according to DOT Hazardous materials Regulations.
27.3. Create policy and procedures manuals to ensure safe operations. Manuals will be available on demand to the fire code official. Each manual will include the following sections:
   1. Employee training log
   2. Cell phone policy
   3. Inclement weather driving instructions
   4. Fatigue prevention
   5. Seatbelt use
   6. Lightning procedures
   7. Railroad crossing procedures
   8. Drug and Alcohol Safety Training Program
   9. Vehicle Maintenance Log
   10. Daily and weekly safety checklist

5706.6.1 Operation of tank vehicles. Tank vehicles shall be utilized and operated in accordance with NFPA 385 and Sections 5706.6.1.1 through 5706.6.1.11. 5706.6.1.12

5706.6.12 Mobile fueling location. Mobile fueling operations shall not be conducted on a public street. Mobile fuel operations shall be limited to private surface parking lots where such operations have been authorized by the owner or the owners authorized agent. Fueling operations will cease where pedestrians encroach closer than 8 feet to a vehicle receiving fuel.

Reference standards type: This is an update to reference standard(s) already in the ICC Code Books
Add new standard(s) as follows:
Chapter 57 Fire code
Reason: There is a current trend emerging in Texas and California and other states involving the concept of mobile fueling based on community oriented demand for services. Some local AHJ's are reluctant to act upon this concept of fuel delivery due to lack of guidance in the fire code, other AHJ's are approving the concept based upon an alternative means of compliance. In other areas, it is being outright prohibited, which is creating an inconsistent pattern.
These amendments are intended to provide Fire Departments with the guidance needed to evaluate planned operations for mobile delivery of Class I fuel. These amendments are designed to place requirements on service companies to demonstrate a sound and safe approach with the intent of obtaining an operational permit to begin delivery.

According to the commentary provided by the committee responsible for IFC Chapter 57 on Flammable Liquids, mobile fueling has no known adverse incident history associated with it. Many corporations have been increasing operations related to mobile fueling since the initial adoption of mobile fueling standards. Bus companies, delivery companies and the US Postal service all rely on mobile refueling to keep their fleets moving. This industry- including Class I fuels is estimated to be growing 30% per year. In addition, service companies are currently providing safe delivery of Class I fuel in Texas under an alternative methods operational permit with strong safety measures in place and a perfect safety record related to spill prevention and fire safety. No incidents have occurred to date. Given the length of time that mobile fueling has been occurring, the data points to an outstanding safety record. There is no safety related reason that mobile fueling operations should not be allowed, provided such operations are carried out in keeping with reasonable safety requirements to protect people, places and the environment.

States such as Texas, Nevada and Oregon have already amended their fire codes to allow for mobile fueling with Class I fuels. No negative consequences have arisen from such activities and with a significant amount of above
average wage jobs being created.

Based upon the requirements set forth in the IFC, NFPA 30A and NFPA 385, the additional items listed in this amendment in conjunction with IFC Chapter 57 provide a jurisdiction with the information needed to authorize the delivery of Class I fuel from tank vehicles to other vehicles in approved locations.

There is no cost impact to a jurisdiction. All costs are recovered through Operational Permit Fees and vehicle inspection/permits fees.

Cost Impact: Will not increase the cost of construction

This proposal relies on fees set by each jurisdiction to recover any costs. Each jurisdiction will set their own fee schedule. In the locations this activity currently takes place, fees average $400.00 for each site plan reviewed and from $0 - 200.00 for each vehicle requiring a permit. The site review averages 1.25 hours and vehicle reviews average .75 hours.

It could be assumed that this proposal is revenue neutral to profit generating but not an unfunded cost to a jurisdiction.
2015 International Fire Code

Revise as follows:

5706.7 Refineries. Plants and portions of plants in which flammable liquids are produced on a scale from crude petroleum, natural gasoline or other hydrocarbon sources shall be in accordance with Sections 5706.7.1 through 5706.7.3. Petroleum-processing plants and facilities or portions of plants or facilities in which flammable or combustible liquids are handled, treated or produced on a commercial scale from crude petroleum, natural gasoline, or other hydrocarbon sources shall also be in accordance with API 500 or API 505; API 620; API 650; API 651, API 653, API 752, API 753; API 1615, API 2000; API 2001, API 2003, API 2009, API 2015, API 2023, API 2028; API 2201; API 2217A; API 2218; API 2219 and API 2350.

Reference standards type: This reference standard is new to the ICC Code Books

Add new standard(s) as follows:

API 500 - 2012 Recommended Practice for Classification of Locations for Electrical Installations at Petroleum Facilities Classified as Class I, Division 1 and Division 2
API 505 - 2013 Recommended Practice for Classification of Locations for Electrical Installations at Petroleum Facilities Classified as Class I, Zone 0, Zone 1, and Zone 2
API 620 - 2013 Design and Construction of Large, Welded, Low-pressure Storage Tanks
API 650 - 2013 (addendum 2014) - Welded Tanks for Oil Storage
API 753 - 2007 Management of Hazards Associated With Location of Process Plant Portable Buildings
API 2217A - 2009 Guideline for safe work in inert confined spaces in the petroleum and petrochemical industry
API 2218 - 2013 Fireproofing Practices in Petroleum and Petrochemical Processing Plants

Reason: This proposed change adds many API Standards that are already included in other sections of this chapter of the IFC. Including these in this section provided for their specific application to refineries. In additional, a number of API standards not presently included in the IFC are proposed for inclusion in this section. These are: API 505 covering zone classifications (SEE PROPOSED CHANGE TO SECTION 5703.1); API 753 covering the location and use of portable buildings (temporary structures, tents, trailers, etc) in refineries; API 620 and API 650 covering welded storage tanks; API 2000 covering low pressure tank venting; API 2028 covering flame arrestors; API 2217A covering entry into inert spaces; API 2218 covering fireproofing in processing plants; and API 2219 covering the safe use of vacuum trucks for handling flammable quids. The addition of these API standards to the code provides for additional safe work practices and fire protection in refineries.

Cost Impact: Will not increase the cost of construction

all of the proposed API standards have already been in use by the refining industry for many years.

A review of the standard(s) proposed for inclusion in the code,

- API 500- 2012 Recommended Practice for Classification of Locations for Electrical Installations at Petroleum Facilities Classified as Class I, Division 1 and Division 2
- API 505 - 2013 Recommended Practice for Classification of Locations for Electrical Installations at Petroleum Facilities Classified as Class I, Zone 0, Zone 1, and Zone 2
- API 620- 2013 Design and Construction of Large, Welded, Low-pressure Storage Tanks
- API 650 - 2013 (addendum 2014) - Welded Tanks for Oil Storage
- API 753 - 2007 Management of Hazards Associated With Location of Process Plant Portable Buildings
- API 2217A - 2009 Guideline for safe work in inert confined spaces in the petroleum and petrochemical industry
- API 2218 - 2013 Fireproofing Practices in Petroleum and Petrochemical Processing Plants

with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1, 2016.
5706.7.2 Cleaning of tanks Confined Space Entry. The safe entry, associated operations and cleaning of confined spaces in the petroleum industry, including, but not limited to, petroleum storage tanks, process units, vessels and piping shall be conducted in accordance with API 2015. Additionally, entry and operations involving the use of inert gas shall comply with the requirements of API 2217A.

Reference standards type: This reference standard is new to the ICC Code Books
Add new standard(s) as follows:
API 2217A - 2009 Guideline for safe work in inert confined spaces in the petroleum and petrochemical industry

Reason: This proposal includes entry, work and cleaning into all types of confined spaces in the petroleum industry, not just storage tanks. In addition, API 2217A covers entry and work in and around spaces where inert gas is being used.

Cost Impact: Will not increase the cost of construction
These procedures have been in place in the industry for many years.

Analysis: A review of the standard(s) proposed for inclusion in the code, API 2217A - 2009 Guideline for safe work in inert confined spaces in the petroleum and petrochemical industry with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1, 2016.
2015 International Fire Code

5906.5.4 Power supply interlock. Power supply to machines shall be interlocked with exhaust airflow, and liquid pressure level or flow. The interlock shall be designed to shut down the machine it serves when the dust removal or separator system is not operating properly.

Add new text as follows:

5906.5.4.1 Testing The interlocks required by Section 5906.5.4 shall be tested annually and a record shall be kept in accordance with Section 107.3.

Reason: In the IFC, some safety interlocks require testing and others don't. The purpose of this code change is to work towards a consistent approach by requiring safety interlocks to be tested.

Cost Impact: Will not increase the cost of construction
No cost increase is expected from this code change proposal. This code change is for the testing of existing equipment only. As a result, it does not require a change in construction and there is no cost increase.
IFC: 6103.2.1.1.

Proponent: Bruce Swiecicki, representing National Propane Gas Association (bswiecicki@npga.org)

2015 International Fire Code

Revise as follows:

6103.2.1.1 Use in basement, pit or similar location. LP-gas containers shall not be used in a basement, pit or similar location where heavier-than-air gas might collect. LP-gas containers shall not be used in an above-grade underfloor space or basement unless such location is provided with an approved means of ventilation.

Exception: Use with self-contained torch assemblies in accordance with Section 6103.2.1.6.

Reason: The requirement to ban the use of LP-Gas in basements and below grade spaces is an obsolete remnant from the old Uniform Fire Code. It was removed from the Uniform Plumbing and Uniform Mechanical Codes in the 2000 editions of each of those codes. The popular misconception is that since propane is 1.5 times heavier than air, that it immediately sinks to the ground and "pools."

This is not the case as the physics of Brownian motion and thermal dispersion are sufficient to allow propane to mix throughout the room, although it is likely that if the release into the room was from liquid vaporizing, the temperature of the propane would be colder than ambient and therefore its density would be greater. It can be dangerous to assume that all the propane pools at the floor level.

LP-gas powered forklifts, man-lifts, floor buffers, and other equipment have been used successfully inside commercial and industrial occupancies for many years. This equipment is powered by a 33 lb. DOT cylinder that is subject to strict maintenance and filling requirements. Often, these buildings will have floor space that is partially or completely below grade, or will have overhead occupied areas. This requirement eliminates the use of LP-gas powered equipment in these occupancies due to the misconception about the behavior of propane. It is worth noting that there is no similar prohibition in NFPA 58.

The requirement as written is confusing. The first sentence prohibits use of LP-gas in all basements. The second sentence allows its use where there is an approved means of ventilation. It is sufficient to rely upon a ventilation system that is designed according to the mechanical code based on the occupancy and use of the space without any additional ventilation due to the presence of a propane cylinder in the below-grade space.

Cost Impact: Will not increase the cost of construction

This proposal will not increase cost of construction as it removes a limitation where mobile equipment that is powered by LP gas can be used.

F390-16 : 6103.2.1.1-
SWIECICKI13351
F391-16
IFC: 6103.2.1.4.

Proponent: Michael O'Brian representing the Fire Code Action Committee (FCAC@iccSafe.org)

2015 International Fire Code

Revise as follows:

6103.2.1.4 Group E and I occupancies. In Group E and I occupancies and laboratories for educational use in Group B and E occupancies, portable LP-gas containers are allowed to be used for research and experimentation. Such containers shall not be used in classrooms. Such containers shall not exceed a 50-pound (23 kg) water capacity in occupancies used for educational purposes and shall not exceed a 12-pound (5 kg) water capacity in occupancies used for institutional purposes. Where more than one such container is present in the same room, each container shall be separated from other containers by a distance of not less than 20 feet (6096 mm).

Reason: IFC 6103.2.1 prohibits the use of portable propane containers in buildings but provides specific exceptions. IFC 6103.2.1.4 allows the use of propane under certain conditions “for research and experimentation”, but only in Groups E and I occupancies. It makes no sense to allow the use of propane in K-12 for research, but then restrict it at the college level for that same research?

When comparing the IFC language with the referenced NFPA 58 there is a very subtle difference. In NFPA Section 6.19.7 you will find the same limitations with reference to research and experimentation in “educational” and “institutional” facilities. It appears that the use of the phrase “Group E and I occupancies” has been inserted with unintended consequences.

Therefore, this code change will eliminate the terms “Group E and I”, and limit the application to “laboratories for educational or institutional use.” This revision will correct two flaws in the code. First, it will correctly permit the use of LPG in laboratories, where right now it is unrestricted in the Group E or I occupancies. Second, it will provide for the use of LPG in colleges and universities for research.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire safety and hazardous materials in new and existing buildings and facilities and the protection of life and property in wildland urban interface areas. In 2014 and 2015 the Fire-CAC has held 5 open meetings. In addition, there were numerous conference calls, Regional Work Group and Task Group meetings for the current code development cycle, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC

Cost Impact: Will not increase the cost of construction

This proposal provides clarification of the code.
2015 International Fire Code

6103.2.1.6 Use with self-contained torch assemblies. Portable LP-gas containers are allowed to be used to supply approved self-contained torch assemblies or similar appliances. Such containers shall not exceed a water capacity of $2\frac{1}{2}$ pounds ($1.2$ kg).

Reason: What is commonly known as a "one-pound cylinder" actually has a volume equal to 2.7 pounds of water capacity. This proposal will make the IFC consistent with NFPA 58.

Cost Impact: Will not increase the cost of construction

This proposal will not increase the cost of construction because it intends to change the required dimension of the LP-gas container to a more precise dimension. It has no bearing at all on the construction of the building itself.
IFC: 6104.3.
Proponent: Bruce Swiecicki, National Propane Gas Association, representing National Propane Gas Association (bswiecicki@npga.org)

2015 International Fire Code
Revise as follows:

6104.3 Container location. LP-gas containers shall be located with respect to buildings, public ways, and lot lines of adjoining property that can be built upon, in accordance with Table 6104.3.

<table>
<thead>
<tr>
<th>LP-GAS CONTAINER CAPACITY (water gallons)</th>
<th>MINIMUM SEPARATION BETWEEN LP-GAS CONTAINERS AND BUILDINGS, PUBLIC WAYS OR LOT LINES OF ADJOINING PROPERTY THAT CAN BE BUILT UPON</th>
<th>MINIMUM SEPARATION BETWEEN LP-GAS CONTAINERS (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mounded or underground LP-gas containers</td>
<td>Above-ground LP-gas containers</td>
<td></td>
</tr>
<tr>
<td>(feet)</td>
<td>(feet)</td>
<td></td>
</tr>
<tr>
<td>Less than 125c, d</td>
<td>10</td>
<td>5e</td>
</tr>
<tr>
<td>125 to 250</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>251 to 500</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>501 to 2,000</td>
<td>10</td>
<td>25e, f</td>
</tr>
<tr>
<td>2,001 to 30,000</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>30,001 to 70,000</td>
<td>50</td>
<td>75</td>
</tr>
<tr>
<td>70,001 to 90,000</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>90,001 to 120,000</td>
<td>50</td>
<td></td>
</tr>
</tbody>
</table>

Strike through "Public Ways" in Table 6104.3.

For SI: 1 foot = 304.8 mm, 1 gallon = 3.785 L.
a. Minimum distance for underground LP-gas containers shall be measured from the pressure relief device and the filling or liquid-level gauge vent connection at the container, except that all parts of an underground LP-gas container shall be not less than 10 feet from a building or lot line of adjoining property that can be built upon.

b. For other than installations in which the overhanging structure is 50 feet or more above the relief-valve discharge outlet. In applying the distance between buildings and ASME LP-gas containers with a water capacity of 125 gallons or more, not less than 50 percent of this horizontal distance shall apply to all portions of the building that project more than 5 feet from the building wall and that are higher than the relief valve discharge outlet. This horizontal distance shall be measured from a point determined by projecting the outside edge of such overhanging structure vertically downward to grade or other level upon which the LP-gas container is installed. Distances to the building wall shall be not less than those prescribed in this table.

c. Where underground multicontainer installations are composed of individual LP-gas containers having a water capacity of 125 gallons or more, such containers shall be installed so as to provide access at their ends or sides to facilitate working with cranes or hoists.

d. At a consumer site, if the aggregate water capacity of a multicontainer installation, comprised of individual LP-gas containers having a water capacity of less than 125 gallons, is 500 gallons or more, the minimum distance shall comply with the appropriate portion of Table 6104.3, applying the aggregate capacity rather than the capacity per LP-gas container. If more than one such installation is made, each installation shall be separated from other installations by not less than 25 feet. Minimum distances between LP-gas containers need not be applied.

e. The following shall apply to above-ground containers installed alongside buildings:

1. LP-gas containers of less than a 125-gallon water capacity are allowed next to the building they serve where in compliance with Items 2, 3 and 4.

2. Department of Transportation (DOTn) specification LP-gas containers shall be located and installed so that the discharge from the container pressure relief device is not less than 3 feet horizontally from building openings below the level of such discharge and shall not be beneath buildings unless the space is well ventilated to the outside and is not enclosed for more than 50 percent of its perimeter. The discharge from LP-gas container pressure relief devices shall be located not less than 5 feet from exterior sources of ignition, openings into direct-vent (sealed combustion system) appliances or mechanical ventilation air intakes.

3. ASME LP-gas containers of less than a 125-gallon water capacity shall be located and installed such that the discharge from pressure relief devices shall not terminate in or beneath buildings and shall be located not less than 5 feet horizontally from building openings below the level of such discharge and not less than 5 feet from exterior sources of ignition, openings into direct vent (sealed combustion system) appliances, or mechanical ventilation air intakes.

4. The filling connection and the vent from liquid-level gauges on either DOTn or ASME LP-gas containers filled at the point of installation shall be not less than 10 feet from exterior sources of ignition, openings into direct vent (sealed combustion system) appliances or mechanical ventilation air intakes.

f. This distance is allowed to be reduced to not less than 10 feet for a single LP-gas container of 1,200-gallon water capacity or less, provided such container is not less than 25 feet from other LP-gas containers of more than 125-gallon water capacity.

Reason: This proposal will achieve uniformity between the requirements of IFC and NFPA 58 "LP-Gas Code," which in turn will lead to uniform enforcement nation-wide. Since 6101.1 already references NFPA 58 as a code to be complied with in addition to the requirements of Chapter 61, accepting this change will fix existing differences between the two documents.

It is worth noting that NFPA 58 (Table 6.5.2.1) already requires a 25 ft. separation distance between the point of transfer (the filling connection to the container) and a public way, for all containers other than those filled at dispenser stations or vehicle fuel dispensers. In addition, Table 6104.3 already addresses the threat to a container from a building fire with the required separation distance from the building, and impact protection from vehicles is already addressed in 6107.4.

During the last cycle, this proposal was rejected (F327-13) with the following Committee Reason:

"The disapproval was based on the committee's judgment that the public way, where owned by a municipality, could be used for any purpose and could even be sold for private development which would place the propane tank too close to the new private property line."

This statement violates a fundamental tenet of the development and application of model construction codes, which is that the codes can only address the conditions that currently exist at the site. It would be impractical and unjust to begin making assumptions about "what if's" that could occur at the site at some future date based purely on conjecture.

The definition of "Public Way" in the IFC is:

"A street, alley or other parcel of land open to the outside air leading to a street, that has been deeded, dedicated or otherwise permanently appropriated to the public for public use and which has a clear width and height of not less than 10 feet."
Therefore, the chief concern is being able to egress the occupants of a building in a manner that allows them to have access to a safe space outside the building. The presumption is that an emergency has occurred inside the building and the occupants must egress the building safely.

The restriction on the placement of a propane container with respect to a public way is not consistent with the purpose for establishing a public way because the threat to the occupants does not come from the propane container. The container is required to be located a specific distance from the building based on its size and therefore, the container will not be threatened by a fire event that occurs within the building. It has been shown that the distances required by Table 6104.3 are sufficient to maintain the safety of the container even if the building is on fire. Therefore, there is no threat to the occupants from the propane container as they egress the building. In addition, the potential concern of vehicular impact to the propane container is already addressed in Section 312 of the IFC.

In summary, elimination of the term "public way" will not compromise the safety of the occupants of the building and will resolve differences between the IFC and NFPA 58.

**Bibliography:** [NFPA 58 Liquefied Petroleum Gas Code] [National Fire Protection Association] [2014 edition.] [Page 34]

**Cost Impact:** Will not increase the cost of construction
This proposal will not increase the cost of construction and in fact may actually DECREASE the cost of construction because it is providing a wider range of options by which to install a LP-gas container. In other words, it opens up more possibilities for locating a LP-gas container on the building site.
### 2015 International Fire Code

**TABLE 6104.3**

**LOCATION OF LP-GAS CONTAINERS**

<table>
<thead>
<tr>
<th>LP-GAS CONTAINER CAPACITY (water gallons)</th>
<th>MINIMUM SEPARATION BETWEEN LP-GAS CONTAINERS AND BUILDINGS, PUBLIC WAYS OR LOT LINES OF ADJOINING PROPERTY THAT CAN BE BUILT UPON</th>
<th>MINIMUM SEPARATION BETWEEN LP-GAS CONTAINERS&lt;sup&gt;b, c&lt;/sup&gt; (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mounded or underground LP-gas containers&lt;sup&gt;a&lt;/sup&gt; (feet)</td>
<td>Above-ground LP-gas containers&lt;sup&gt;b&lt;/sup&gt; (feet)</td>
<td></td>
</tr>
<tr>
<td>Less than 125&lt;sup&gt;c, d&lt;/sup&gt;</td>
<td>10</td>
<td>5&lt;sup&gt;e&lt;/sup&gt;</td>
</tr>
<tr>
<td>125 to 250</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>251 to 500</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>501 to 2,000</td>
<td>10</td>
<td>25&lt;sup&gt;e, f&lt;/sup&gt;</td>
</tr>
<tr>
<td>2,001 to 30,000</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>30,001 to 70,000</td>
<td>50</td>
<td>75</td>
</tr>
<tr>
<td>70,001 to 90,000</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>90,001 to 120,000</td>
<td>50</td>
<td>125</td>
</tr>
</tbody>
</table>

For SI: 1 foot = 304.8 mm, 1 gallon = 3.785 L.

#### Notes:

**a.** Minimum distance for underground LP-gas containers shall be measured from the pressure relief device and the filling or liquid-level gauge vent connection at the container, except that all parts of an underground LP-gas container shall be not less than 10 feet from a building or lot line of adjoining property that can be built upon.

**b.** For other than installations in which the overhanging structure is 50 feet or more above the relief-valve discharge outlet. In applying the distance between buildings and ASME LP-gas containers with a water capacity of 125 gallons or more, not less than 50 percent of this horizontal distance shall also apply to all portions of the building that project more than 5 feet from the building wall and that are higher than the relief valve discharge outlet. This horizontal distance shall be measured from a point determined by projecting the outside edge of such overhanging structure vertically downward to grade or other level upon which the LP-gas
container is installed. Distances to the building wall shall be not less than those prescribed in this table.

c. Where underground multicontainer installations are composed of individual LP-gas containers having a water capacity of 125 gallons or more, such containers shall be installed so as to provide access at their ends or sides to facilitate working with cranes or hoists.

d. At a consumer site, if the aggregate water capacity of a multicontainer installation, comprised of individual LP-gas containers having a water capacity of less than 125 gallons, is 500 gallons or more, the minimum distance shall comply with the appropriate portion of Table 6104.3, applying the aggregate capacity rather than the capacity per LP-gas container. If more than one such installation is made, each installation shall be separated from other installations by not less than 25 feet. Minimum distances between LP-gas containers need not be applied.

e. The following shall apply to above-ground containers installed alongside buildings:

1. LP-gas containers of less than a 125-gallon water capacity are allowed next to the building they serve with no separation distance where in compliance with Items 2, 3 and 4.

2. Department of Transportation (DOTn) specification LP-gas containers shall be located and installed so that the discharge from the container pressure relief device is not less than 3 feet horizontally from building openings below the level of such discharge and shall not be beneath buildings unless the space is well ventilated to the outside and is not enclosed for more than 50 percent of its perimeter. The discharge from LP-gas container pressure relief devices shall be located not less than 5 feet from exterior sources of ignition, openings into direct-vent (sealed combustion system) appliances or mechanical ventilation air intakes.

3. ASME LP-gas containers of less than a 125-gallon water capacity shall be located and installed such that the discharge from pressure relief devices shall not terminate in or beneath buildings and shall be located not less than 5 feet horizontally from building openings below the level of such discharge and not less than 5 feet from exterior sources of ignition, openings into direct vent (sealed combustion system) appliances or mechanical ventilation air intakes.

4. The filling connection and the vent from liquid-level gauges on either DOTn or ASME LP-gas containers filled at the point of installation shall be not less than 10 feet from exterior sources of ignition, openings into direct vent (sealed combustion system) appliances or mechanical ventilation air intakes.

f. This distance is allowed to be reduced to not less than 10 feet for a single LP-gas container of 1,200-gallon water capacity or less, provided such container is not less than 25 feet from other LP-gas containers of more than 125-gallon water capacity.

**Reason:** This proposal which revises item 1 of footnote e will make the requirements for vertical cylinders and small ASME containers the same between the IFC and NFPA 58. There is no valid technical or safety reason why this shouldn't be done and the result will be more uniformity in the enforcement of the provisions between both documents. And since 6101.1 references NFPA 58, the proposed change will resolve this conflict between the two codes.

**Cost Impact:** Will not increase the cost of construction
This proposal will reduce the cost of construction as it will not restrict the placement of such containers to simply the building they serve. Instead there will be no separation distance requirements, thereby providing more flexibility in container placement.
2015 International Fire Code

6109.3 Position. LP-gas containers in storage having individual water capacity greater than $\frac{2\frac{1}{2}}{2.7}$ pounds (± 1.2 kg) [nominal 1-pound (0.454 kg) LP-gas capacity] shall be positioned with the pressure relief valve in direct communication with the vapor space of the container.

Reason: What is commonly known as a "one-pound cylinder" actually has a volume equal to 2.7 pounds of water capacity. This proposal will make the IFC consistent with NFPA 58.

Cost Impact: Will not increase the cost of construction
This proposal will not increase the cost of construction because it intends to change the required dimension of the LP-gas container to a more precise dimension. It has no bearing at all on the construction of the building itself.
F396-16
IFC: 6109.7.
Proponent: Bruce Swiecicki, representing National Propane Gas Association (bswiecicki@npga.org)

2015 International Fire Code

Revise as follows:

6109.7 Storage in basement, pit or similar location. LP-gas containers shall not be stored in a basement, pit or similar location where heavier-than-air gas might collect. LP-gas containers shall not be stored in above-grade underfloor spaces or basements unless such location is provided with an approved means of ventilation.

Exception: Department of Transportation (DOTn) specification cylinders with a maximum water capacity of $2 \frac{1}{2} - 2.7 \text{ pounds (1.2 kg)}$ for use in completely self-contained hand torches and similar applications. The quantity of LP-gas shall not exceed 20 pounds (9 kg).

Reason: The requirement to ban the use of LP-Gas in basements and below grade spaces is an obsolete remnant from the old Uniform Fire Code. It was removed from the Uniform Plumbing and Uniform Mechanical Codes in the 2000 editions of each of those codes. The popular misconception is that since propane is 1.5 times heavier than air, that it immediately sinks to the ground and "pools."

This is not the case as the physics of Brownian motion and thermal dispersion are sufficient to allow propane to mix throughout the room, although it is likely that if the release into the room was from liquid vaporizing, the temperature of the propane would be colder than ambient and therefore its density would be greater. It can be dangerous to assume that all the propane pools at the floor level.

LP-gas powered forklifts, man-lifts, floor buffers, and other equipment have been used successfully inside commercial and industrial occupancies for many years. This equipment is powered by a 33 lb. DOT cylinder that is subject to strict maintenance and filling requirements. Often, these buildings will have floor space that is partially or completely below-grade, or will have overhead occupied areas. This requirement eliminates the use of LP-gas powered equipment in these occupancies due to the misconception about the behavior of propane. It is worth noting that there is no similar prohibition in NFPA 58.

The requirement as written is confusing. The first sentence prohibits use of LP-gas in all basements. The second sentence allows its use here there is an approved means of ventilation. It is sufficient to rely upon a ventilation system that is designed according to the mechanical code based on the occupancy and use of the space without any additional ventilation due to the presence of a propane cylinder in the below-grade space.

Cost: What is commonly known as a "one-pound cylinder" actually has a volume equal to 2.7 pounds of water capacity. This proposal will make the IFC consistent with NFPA 58.

Cost Impact: Will not increase the cost of construction
This proposal will not increase the cost of construction because it is not related whatsoever to the construction of the building. This proposal will make the IFC consistent with NFPA 58.
F397-16

IFC: 6109.8.
Proponent: Bruce Swiecicki, representing National Propane Gas Association (bswiecicki@npga.org)

2015 International Fire Code

Revise as follows:

6109.8 Protection of valves on LP-gas containers in storage. LP-gas container DOT cylinder valves shall be protected by screw-on-type caps or collars that shall be securely in place on all containers stored regardless of whether they are full, partially full or empty. Container and tank outlet valves shall be closed or plugged.

Reason: The proposed revisions will bring the requirements into line with the terminology that is used in the IFC and defined in Chapter 2, while also integrating terminology that is familiar to those in the LP-gas industry.

Cost Impact: Will not increase the cost of construction
This proposal will not increase the cost of construction because it is clarifying the intent of the proposal by using terminology that is consistent with NFPA 58.
2015 International Fire Code

Revise as follows:

6109.9 Storage within buildings accessible to the public. Department of Transportation (DOTn) specification cylinders with maximum water capacity of $2\frac{1}{2}$ pounds (1.2 kg) used in completely self-contained hand torches and similar applications are allowed to be stored or displayed in a building accessible to the public. The quantity of LP-gas shall not exceed 200 pounds (91 kg) except as provided in Section 6109.11.

Reason: What is commonly known as a "one-pound cylinder" actually has a volume equal to 2.7 pounds of water capacity. This proposal will make the IFC consistent with NFPA 58.

Cost Impact: Will not increase the cost of construction

This proposal will not increase the cost of construction because it intends to change the required dimension of the LP-gas container to a more precise dimension. It has no bearing at all on the construction of the building itself.
2015 International Fire Code

SECTION 6110 LP-GAS CONTAINERS NOT IN SERVICE

Revise as follows:

6110.1 Temporarily out of service. LP-gas containers at consumer sites whose use has been temporarily discontinued shall comply with all of the following:

1. Be disconnected from appliance piping.
2. Have LP-gas container outlets, except relief valves, closed or plugged.
3. Be positioned with the relief valve in direct communication with the LP-gas container vapor space.
4. When service is reinstated, a leak check shall be performed in accordance with the fuel gas code.

6110.2 Permanently out of service. LP-gas containers at consumer sites to be placed permanently out of service shall be removed from the site.

Reason: The proposed modifications to 6110.1 are needed for the following reasons:

1. Piping should not be disconnected from the container because that allows water and air to enter the piping system, leading to corrosion and difficulties in starting the system up at a later date. In addition, the LP-gas supplier does not necessarily know when a system has been taken out of service because the homeowner only has to turn the valve to shut off service, so the requirement itself is not enforceable. The party most likely to be turning the system off is the homeowner, and under no circumstances should the code be encouraging a homeowner to perform such work on the fuel gas system.
2. The proposed addition to require a leak check to be performed on the system is necessary whenever there is an interruption in service, such as would occur when the service valve on the container is shut off. The leak check is required by the International Fuel Gas Code.

The change to 6110.2 is proposed because it is necessary to limit this requirement to consumer sites where tanks are installed. This requirement should not be misconstrued to apply to propane bulk plants because those locations are intended to store containers that have been removed from service.

Cost Impact: Will not increase the cost of construction

This proposal will not increase the cost of construction because the action of taking a LP-gas container out of service occurs after the building has been constructed and commissioned. In other words, the requirement contained in 6110.1 is not related to the construction of the building.
### TABLE C102.1
**REQUIRED NUMBER AND SPACING OF FIRE HYDRANTS**

<table>
<thead>
<tr>
<th>FIRE-FLOW REQUIREMENT (gpm)</th>
<th>MINIMUM NUMBER OF HYDRANTS</th>
<th>AVERAGE SPACING BETWEEN HYDRANTS a, b, c, f, g (feet)</th>
<th>MAXIMUM DISTANCE FROM ANY POINT ON STREET OR ROAD FRONTAGE TO A HYDRANT d, f, g</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,750 or less</td>
<td>1</td>
<td>500</td>
<td>250</td>
</tr>
<tr>
<td>2,000-2,250</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1,751 - 2,250</td>
<td>2</td>
<td>450</td>
<td>225</td>
</tr>
<tr>
<td>2,500</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2,251 - 2,750</td>
<td>3</td>
<td>450</td>
<td>225</td>
</tr>
<tr>
<td>3,000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2,751 - 3,250</td>
<td>3</td>
<td>400</td>
<td>225</td>
</tr>
<tr>
<td>3,500-4,000</td>
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</tr>
<tr>
<td>3,251 - 4,000</td>
<td>4</td>
<td>350</td>
<td>210</td>
</tr>
<tr>
<td>4,500-5,000</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>4,001 - 5,000</td>
<td>5</td>
<td>300</td>
<td>180</td>
</tr>
<tr>
<td>5,500</td>
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<td>5,001 - 5,500</td>
<td>6</td>
<td>300</td>
<td>180</td>
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<td>6,000</td>
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<td></td>
<td></td>
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<tr>
<td>5,501 - 6,000</td>
<td>6</td>
<td>250</td>
<td>150</td>
</tr>
<tr>
<td>6,500-7,000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6,001 - 7,000</td>
<td>7</td>
<td>250</td>
<td>150</td>
</tr>
</tbody>
</table>

*ICCC COMMITTEE ACTION HEARINGS :: April, 2016*
For SI: 1 foot = 304.8 mm, 1 gallon per minute = 3.785 L/min.

a. Reduce by 100 feet for dead-end streets or roads.

b. Where streets are provided with median dividers that cannot be crossed by fire fighters pulling hose lines, or where arterial streets are provided with four or more traffic lanes and have a traffic count of more than 30,000 vehicles per day, hydrant spacing shall average 500 feet on each side of the street and be arranged on an alternating basis.

c. Where new water mains are extended along streets where hydrants are not needed for protection of structures or similar fire problems, fire hydrants shall be provided at spacing not to exceed 1,000 feet to provide for transportation hazards.

d. Reduce by 50 feet for dead-end streets or roads.

e. One hydrant for each 1,000 gallons per minute or fraction thereof.

f. A 50-percent spacing increase shall be permitted where the building is equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1 of the International Fire Code.

g. A 25-percent spacing increase shall be permitted where the building is equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.2 or 903.3.1.3 of the International Fire Code or Section P2904 of the International Residential Code.

h. The fire code official is authorized to modify the location, number and distribution of fire hydrants based on site specific constraints and hazards.

Reason: By interpolating the current fire flow requirement column to include all possible GPM results the revised table will provide clear direction for design and enforcement. The current Table C105.1 has large gaps of fire-flow GPM that quite often leaves question to the number and spacing of hydrants for specific projects. The intent of this proposal is to fill in these gaps without changing any of the original table results. In the past these gaps have been used to provide the fire code official some needed discretion based on site specific considerations. Footnote f is now added to maintain this discretionary latitude. By filling in the gaps, however, the designer and the fire official will now have a clear place to start from.

Three simple fire-flow scenarios shows the problem with the gaps in the current table and how the proposed revision will fill these gaps:

1. A 14,000 sq ft building of Type V-B Construction would require a fire flow of 3,250 gpm per table B105.2. Currently Table C105.1 is not clear if 3 or 4 hydrants are required. The revised Table C105.1 would clearly require 3 hydrants.

2. A 240,000 sq ft building of Type IB Construction would require a fire flow of 5,250 gpm per table B105.2. Currently Table C105.1 is not clear if 5 or 6 hydrants are required. The revised Table C105.1 would clearly require 6 hydrants.

3. A 160,000 sq ft building of Type IA Construction would require a fire flow of 7,250 gpm per table B105.2. Currently Table C105.1 is not clear if 7 or 8 hydrants are required. The revised Table C105.1 would clearly require 8 hydrants.

Cost Impact: Will not increase the cost of construction
This revision is for clarification only. There is no actual change to the original requirements and will, therefore, not affect the cost of construction.
2015 International Fire Code

Revise as follows:

D103.5 Fire apparatus access road gates. Gates securing the fire apparatus access roads shall comply with all of the following criteria:

1. Where a single gate is provided, the gate width shall be not less than 20 feet (6096 mm). Where a fire apparatus road consists of a divided roadway, the gate width shall be not less than 12 feet (3658 mm).
2. Gates shall be of the swinging horizontal swing, horizontal slide, vertical lift or sliding vertical pivot type.
3. Construction of gates shall be of materials that allow manual operation by one person.
4. Gate components shall be maintained in an operative condition at all times and replaced or repaired when defective.
5. Electric gates shall be equipped with a means of opening the gate by fire department personnel for emergency access. Emergency opening devices shall be approved by the fire code official.
6. Methods of locking shall be submitted for approval by the fire code official.
7. Electric gate operators, where provided, shall be listed in accordance with UL 325.
8. Gates intended for automatic operation shall be designed, constructed and installed to comply with the requirements of ASTM F 2200.

Reason:

- Vertical lift gates and vertical pivot gates should be included in the criteria provision involving acceptable gate types because such gates can comply with the criteria in D103.5 including being covered in and being able to comply with UL 325 and ASTM F2200.
- Vertical lift gates can be designed to meet required minimum height clearances above roadways.
- The swinging and sliding gate type terminology has been revised to reflect terminology used in ASTM F2200.

Cost Impact: Will not increase the cost of construction
The proposal is intended to clarify gate types and has no bearing on construction cost.
2015 International Fire Code

E102.1.7.1 Examples of liquid and solid oxidizers according to hazard. Class 4: ammonium perchlorate (particle size greater than 15 microns), ammonium permanganate, guanidine nitrate, hydrogen peroxide solutions more than 91 percent by weight, perchloric acid solutions more than 72.5 percent by weight, potassium superoxide, tetranitromethane.

Class 3: ammonium dichromate, calcium hypochlorite (over 50 percent by weight), chloric acid (10 percent maximum concentration), hydrogen peroxide solutions (greater than 52 percent up to 91 percent), mono-(trichloro)-tetra-(monopotassium di-chloro)-penta-s-triazinetrione, nitric acid, (fuming -more than 86 percent concentration), perchloric acid solutions (60 percent to 72 percent by weight), potassium bromate, potassium chlorate, potassium dichloro-s-triazinetrione (potassium dichloro-isocyanurate), potassium perchlorate (99 percent), potassium permanganate (greater than 97.5 percent), sodium bromate, sodium chlorate, sodium chloride (over 40 percent by weight) and sodium dichloro-s-triazinetrione anhydrous (sodium dichloro-isocyanurate anhydrous).

Class 2: barium bromate, barium chlorate, barium hypochlorite, barium perchlorate, barium permanganate, 1-bromo-3-chloro-5, 5-dimethylhydantoin, calcium chlorate, calcium chloride, calcium dichromate, calcium hypochlorite (50 percent or less by weight), calcium perchlorate, calcium permanganate, calcium peroxide (75 percent), chromium trioxide (chromic acid), copper chlorate, halane (1, 3-dichloro-5, 5-dimethylhydantoin), hydrogen peroxide (greater than 27.5 percent up to 52 percent), lead perchlorate, lithium chloride, lithium hypochlorite (more than 39 percent available chlorine), lithium perchlorate, magnesium bromate, magnesium chloride, magnesium perchlorate, mercurous chloride, nitric acid (more than 40 percent but less than 86 percent), perchloric acid solutions (more than 50 percent but less than 60 percent), potassium peroxide, potassium superoxide, silver peroxide, sodium chloride (40 percent or less by weight), sodium dichloro-s-triazinetrione anhydrous (sodium dichloro-isocyanurate anhydrous), sodium perchlorate, sodium perchlorate monohydrate, sodium permanganate, sodium peroxide, sodium persulfate (99 percent), strontium chlorate, strontium perchlorate, thallium chloride, urea hydrogen peroxide, zinc bromate, zinc chloride and zinc permanganate.

Class 1: all inorganic nitrates (unless otherwise classified), all inorganic nitrites (unless otherwise classified), ammonium persulfate, barium peroxide, hydrogen peroxide solutions (greater than 8 percent up to 27.5 percent), lead dioxide, lithium hypochlorite (39 percent or less available chlorine), lithium peroxide, magnesium peroxide, manganese dioxide, nitric acid (40 percent concentration or less), perchloric acid solutions (less than 50 percent by weight), potassium dichromate, potassium monopersulfate (45 percent KHSO₅ or 90 percent triple salt), potassium perchlorate, potassium persulfate, sodium carbonate peroxide, sodium dichloro-s-triazinetrione dihydrate, sodium dichromate, sodium perborate (anhydrous), sodium perborate monohydrate, sodium perborate tetra-hydrate, sodium percarbonate, strontium peroxide, trichloro-s-triazinetrione (trichloroisocyanuric acid) and zinc peroxide.

Reason: Sodium dichloro-s-triazinetrione anhydrous (sodium dichloroisocyanurate anhydrous) is a Class 2 oxidizer (See NFPA 400 - Hazardous Materials Code 2016 Edition - Section G.2.3 Class 2 Oxidizers). This code change proposal is submitted to delete sodium dichloro-s-triazinetrione anhydrous (sodium dichloroisocyanurate anhydrous) as a Class 3 oxidizer and to correct its classification in the IFC to a Class 2 oxidizer.

NFPA reclassified sodium dichloro-s-triazinetrione anhydrous (sodium dichloroisocyanurate anhydrous) as a Class 2 oxidizer based on objective tests and criteria of oxidizers and formulated products containing oxidizers according to NFPA 400 Table G.1.2(a) and Table G.1.2(b).
The referenced objective tests and criteria of oxidizers and formulated products containing oxidizers endeavor and work was initiated and performed pursuant to classifying oxidizers based on detailed measurements of burning rates and heat release measurements. Since the initiation of objective tests and criteria of oxidizers and formulated products containing oxidizers numerous oxidizers have been tested to affirm the oxidizers or formulated products containing oxidizers current classification or amend/revise the oxidizer or formulated product containing oxidizers to the correct classification in accordance with NFPA 400 Table G.1.2(a) and Table G.1.2(b). This proposal seeks to properly align and provide the public, code enforcement officials and engineers with consistent and correct information regarding the proper oxidizer classification of sodium dichloro-s-triazinetrione anhydrous (sodium dichloroisocyanurate anhydrous).

**Bibliography:** NFPA 400 - Hazardous Materials Code 2016 Edition, Section G.2.3 Class 2 Oxidizers
E. Buc, Ph.D., Oxidizer Classification Research Project: Tests and Criteria, Fire and Materials Research Laboratory, LLC, November 2, 2009.

**Cost Impact:** Will not increase the cost of construction
This code change proposal will not increase the cost of construction. This proposal upon incorporation/adoption into the revised International Fire Code may result in reduced cost of construction and protection of the reference oxidizer [sodium dichloro-s-triazinetrione anhydrous (sodium dichloroisocyanurate anhydrous) due to its proper oxidizer classification in IFC Appendix E102.1.7.1
### TABLE F101.2

**FIRE FIGHTER WARNING PLACARD DESIGNATIONS BASED ON HAZARD CLASSIFICATION CATEGORIES**

<table>
<thead>
<tr>
<th>HAZARD CATEGORY</th>
<th>DESIGNATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Combustible liquid II</td>
<td>F2</td>
</tr>
<tr>
<td>Combustible liquid IIIA</td>
<td>F2</td>
</tr>
<tr>
<td>Combustible liquid IIIB</td>
<td>F1</td>
</tr>
<tr>
<td>Combustible dust</td>
<td>F3 or F2(^a)</td>
</tr>
<tr>
<td>Combustible fiber</td>
<td>F3</td>
</tr>
<tr>
<td>Cryogenic flammable</td>
<td>F4, H3</td>
</tr>
<tr>
<td>Cryogenic oxidizing</td>
<td>OX, H3</td>
</tr>
<tr>
<td>Explosive</td>
<td>R4</td>
</tr>
<tr>
<td>Flammable solid</td>
<td>F2</td>
</tr>
<tr>
<td>Flammable gas (gaseous)</td>
<td>F4</td>
</tr>
<tr>
<td>Flammable gas (liquefied)</td>
<td>F4</td>
</tr>
<tr>
<td>Flammable liquid IA</td>
<td>F4</td>
</tr>
<tr>
<td>Flammable liquid IB</td>
<td>F3</td>
</tr>
<tr>
<td>Flammable liquid IC</td>
<td>F3</td>
</tr>
<tr>
<td>Organic peroxide, UD</td>
<td>R4</td>
</tr>
<tr>
<td>Substance</td>
<td>Code</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>Organic peroxide I</td>
<td>F4, R3</td>
</tr>
<tr>
<td>Organic peroxide II</td>
<td>F3, R3</td>
</tr>
<tr>
<td>Organic peroxide III</td>
<td>F2, R2</td>
</tr>
<tr>
<td>Organic peroxide IV</td>
<td>F1, R1</td>
</tr>
<tr>
<td>Organic peroxide V</td>
<td>None</td>
</tr>
<tr>
<td>Oxidizing gas (gaseous)</td>
<td>OX</td>
</tr>
<tr>
<td>Oxidizing gas (liquefied)</td>
<td>OX</td>
</tr>
<tr>
<td>Oxidizer 4</td>
<td>OX4</td>
</tr>
<tr>
<td>Oxidizer 3</td>
<td>OX3</td>
</tr>
<tr>
<td>Oxidizer 2</td>
<td>OX2</td>
</tr>
<tr>
<td>Oxidizer 1</td>
<td>OX1</td>
</tr>
<tr>
<td>Pyrophoric gases</td>
<td>F4</td>
</tr>
<tr>
<td>Pyrophoric solids, liquids</td>
<td>F3</td>
</tr>
<tr>
<td>Unstable reactive 4D</td>
<td>R4</td>
</tr>
<tr>
<td>Unstable reactive 3D</td>
<td>R4</td>
</tr>
<tr>
<td>Unstable reactive 3N</td>
<td>R2</td>
</tr>
<tr>
<td>Unstable reactive 2</td>
<td>R2</td>
</tr>
<tr>
<td>Unstable reactive 1</td>
<td>None</td>
</tr>
<tr>
<td>Water reactive 3</td>
<td>W3</td>
</tr>
<tr>
<td>Water reactive 2</td>
<td>W2</td>
</tr>
<tr>
<td>Corrosive</td>
<td>H3, COR</td>
</tr>
<tr>
<td>Toxic</td>
<td></td>
</tr>
<tr>
<td>---------------</td>
<td>---</td>
</tr>
<tr>
<td>Highly toxic</td>
<td></td>
</tr>
</tbody>
</table>

- F—Flammable category.
- COR—Corrosive.
- R—Reactive category.
- UD—Unclassified detonable material.
- H—Health category.
- 4D—Class 4 detonable material.
- 3D—Class 3 detonable material.
- 3N—Class 3 nondetonable material.
- OX—Special hazard: oxidizing properties.

**a. F3 = Finely divided solids, typically less than 75 micrometers (µm) (200 mesh), that present an elevated risk of forming an ignitable dust cloud, such as finely divided sulfur, National Electric Code Group E dusts (e.g. aluminum, zirconium, and titanium) and bis-phenol A.**

**F2 = Finely divided solids less than 420 (µm) (40 mesh) that present an ordinary risk of forming an ignitable dust cloud.**
**3N—Class 3 nondetonable material.**

**Reason:** The proposed change simply aligns the placarding required in Table F101.2 with the 2012 Edition of NFPA 704.


**Cost Impact:** Will not increase the cost of construction

The proposed change simply changes what is shown on the placard. It will not increase the number of placards, nor will it change the locations of placards. Therefore it will not increase the cost of construction.
2015 International Fire Code

Add new text as follows:

**SECTION H104 GLOBALLY HARMONIZED SYSTEM HAZARD STATEMENT CONVERSION**

**H104.1 Correlation.** Table H104.1 shall be used to correlate the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) codes to the materials and classes found in *International Fire Code* Table 5003.1.1.

<table>
<thead>
<tr>
<th>GHS Codes on Safety Data Sheet</th>
<th>GHS Category (1)</th>
<th>GHS Chapter or Table (T)</th>
<th>MAQ to Use From Table 5003.1.1</th>
<th>GHS Definition</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>H200</td>
<td>Unstable explosive</td>
<td>2.1</td>
<td>Explosive Div 1.1</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>H201</td>
<td>Div 1.1 Mass explosion hazard</td>
<td>2.1</td>
<td>Explosive Div 1.1</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>H202</td>
<td>Div 1.2 Severe projection hazard</td>
<td>2.1</td>
<td>Explosive Div 1.2</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>H203</td>
<td>Div 1.3 Fire, blast or projection hazard</td>
<td>2.1</td>
<td>Explosive Div 1.3</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>H204</td>
<td>Div 1.4 Effects limited to package</td>
<td>2.1</td>
<td>Explosive Div 1.4</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>H205</td>
<td>Div 1.5 Very insensitive</td>
<td>2.1</td>
<td>Explosive Div 1.5</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>None</td>
<td>Div 1.6 Extremely insensitive</td>
<td>2.1</td>
<td>Explosive Div 1.6</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>H220, H221</td>
<td>Flammable gas - gaseous or liquefied</td>
<td>2.2.1</td>
<td>FGG or FLG</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Code</td>
<td>Description</td>
<td>Temperature</td>
<td>Flash Point</td>
<td>Boiling Point</td>
<td>Notes</td>
</tr>
<tr>
<td>-------</td>
<td>------------------------------</td>
<td>-------------</td>
<td>-------------</td>
<td>---------------</td>
<td>---------------------------</td>
</tr>
<tr>
<td>H222</td>
<td>Extremely flammable aerosol</td>
<td>2.3</td>
<td>Use MAQs for specific components</td>
<td>-</td>
<td>Handled by IFC 50 and 51 and NFPA 30B</td>
</tr>
<tr>
<td>H223</td>
<td>Flammable aerosol</td>
<td>2.3</td>
<td>Use MAQs for specific components</td>
<td>-</td>
<td>Handled by IFC 50 and 51 and NFPA 30B</td>
</tr>
<tr>
<td>H229</td>
<td>Aerosol</td>
<td>2.3</td>
<td>Use MAQs for specific components</td>
<td>-</td>
<td>Handled by IFC 50 and 51 and NFPA 30B</td>
</tr>
<tr>
<td>H230, H231</td>
<td>Chemically unstable flammable gas</td>
<td>2.2.2</td>
<td>Unstable (reactive) gas</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>H240</td>
<td>Organic peroxide Type A</td>
<td>2.15</td>
<td>OP UD</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>H241</td>
<td>Organic peroxide Type B</td>
<td>2.15</td>
<td>OP1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>None</td>
<td>-</td>
<td>-</td>
<td>C3B</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

GHS and IFC definitions slightly different.
<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Subdivision</th>
<th>Section</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>H242</td>
<td>Organic peroxide Type C</td>
<td>2.15</td>
<td>OP2</td>
<td>(1)</td>
</tr>
<tr>
<td>H242</td>
<td>Organic peroxide Type D</td>
<td>2.15</td>
<td>OP3</td>
<td>(1)</td>
</tr>
<tr>
<td>H242</td>
<td>Organic peroxide Type E</td>
<td>2.15</td>
<td>OP4</td>
<td>(1)</td>
</tr>
<tr>
<td>H242</td>
<td>Organic peroxide Type F</td>
<td>2.15</td>
<td>OP5</td>
<td>(1)</td>
</tr>
<tr>
<td>H240</td>
<td>Self reactive Type A</td>
<td>2.8</td>
<td>UR4</td>
<td>(2)</td>
</tr>
<tr>
<td>H241</td>
<td>Self reactive Type B</td>
<td>2.8</td>
<td>UR3</td>
<td>(2)</td>
</tr>
<tr>
<td>H242</td>
<td>Self reactive Type C</td>
<td>2.8</td>
<td>UR2</td>
<td>(2)</td>
</tr>
<tr>
<td>None</td>
<td>Self reactive Types D, E, F, G</td>
<td>2.8</td>
<td>UR1</td>
<td>(2)</td>
</tr>
<tr>
<td>H250</td>
<td>Catches fire spontaneously if exposed to air</td>
<td>2.9, 2.10</td>
<td>Pyrophoric</td>
<td></td>
</tr>
<tr>
<td>H251, H252</td>
<td>Self-heating substance</td>
<td>2.11</td>
<td>No MAQ applies</td>
<td></td>
</tr>
<tr>
<td>H260</td>
<td>Reacts vigorously with water</td>
<td>2.12</td>
<td>WR3</td>
<td></td>
</tr>
<tr>
<td>H261</td>
<td>Reacts readily with water</td>
<td>2.12</td>
<td>WR2</td>
<td>(3)</td>
</tr>
<tr>
<td>H261</td>
<td>Reacts slowly with water</td>
<td>2.12</td>
<td>WR1</td>
<td>(3)</td>
</tr>
<tr>
<td>H270</td>
<td>Oxidizer gas or liquefied</td>
<td>2.4</td>
<td>OLG or OGG</td>
<td></td>
</tr>
<tr>
<td>H271</td>
<td>Oxidizer Category 1 (liquid)</td>
<td>2.13</td>
<td>OX4</td>
<td></td>
</tr>
<tr>
<td>H272</td>
<td>Oxidizer Category 2 (liquid)</td>
<td>2.13</td>
<td>OX3</td>
<td>(4)</td>
</tr>
<tr>
<td>H272</td>
<td>Oxidizer Category 3 (liquid)</td>
<td>2.13</td>
<td>OX2</td>
<td>(4)</td>
</tr>
<tr>
<td>None</td>
<td></td>
<td></td>
<td>OX1</td>
<td></td>
</tr>
</tbody>
</table>

**Note:**
- 1: See also 2.17
- 2: See also 2.8
- 3: See also 2.12
- 4: See also 2.13
<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Category</th>
<th>Rating</th>
<th>MAQ Applies</th>
<th>GHS Concentration</th>
<th>IFC Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>H280</td>
<td>Gas under pressure</td>
<td></td>
<td>2.5</td>
<td>No MAQ applies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>H281</td>
<td>Refrigerated liquefied gas</td>
<td></td>
<td>2.5</td>
<td>No MAQ applies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>H314, H318</td>
<td>Corrosive to tissue</td>
<td></td>
<td>3.2</td>
<td>COR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>H290</td>
<td>Corrosive to metal</td>
<td></td>
<td>2.16</td>
<td>No MAQ applies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>H300</td>
<td>Acutely toxic Category 1,2 (oral)</td>
<td></td>
<td>3.1</td>
<td>HTX</td>
<td>GHS: 0-50 mg/kg</td>
<td>IFC: 0-50 mg/kg</td>
</tr>
<tr>
<td>H310</td>
<td>Acutely toxic Category 1,2 (dermal)</td>
<td></td>
<td>3.1</td>
<td>HTX</td>
<td>GHS: 0-200 mg/kg</td>
<td>IFC: 0-200 mg/kg</td>
</tr>
<tr>
<td>H330</td>
<td>Acutely toxic Category 1,2 (inhalation gas &amp; vapor)</td>
<td></td>
<td>3.1</td>
<td>HTX</td>
<td>GHS: 0-500 ppm or 0-2.0 mg/l</td>
<td>IFC: 0-200 ppm or 0-2.0 mg/l</td>
</tr>
<tr>
<td>H330</td>
<td>Acutely toxic Category 1,2 (inhalation dust, mist, fume)</td>
<td></td>
<td>3.1</td>
<td>HTX</td>
<td>GHS: 0-0.5 mg/l</td>
<td>IFC: 0-2.0 mg/l</td>
</tr>
<tr>
<td>H301</td>
<td>Acutely toxic Category 3 (oral)</td>
<td></td>
<td>3.1</td>
<td>TX</td>
<td>GHS: 0-500 ppm or 0-2.0 mg/l</td>
<td>IFC: 0-50-500 mg/kg</td>
</tr>
<tr>
<td>H302</td>
<td>Acutely toxic Category 4 (oral)</td>
<td></td>
<td>3.1</td>
<td>TX</td>
<td>GHS: 0-500 ppm or 0-2.0 mg/l</td>
<td>IFC: 0-50-500 mg/kg</td>
</tr>
<tr>
<td>H311</td>
<td>Acutely toxic Category 3 (dermal)</td>
<td></td>
<td>3.1</td>
<td>TX</td>
<td>GHS: 0-500 ppm or 0-2.0 mg/l</td>
<td>IFC: 0-50-500 mg/kg</td>
</tr>
<tr>
<td>H331</td>
<td>Acutely toxic Category 3 (inhalation gas or vapor)</td>
<td></td>
<td>3.1</td>
<td>TX</td>
<td>GHS: 0-500 ppm or 0-2.0 mg/l</td>
<td>IFC: 0-50-500 mg/kg</td>
</tr>
<tr>
<td>H331</td>
<td>Acutely toxic Category 3 (inhalation dust, mist, fume)</td>
<td></td>
<td>3.1</td>
<td>TX</td>
<td>GHS: 0-500 ppm or 0-2.0 mg/l</td>
<td>IFC: 0-50-500 mg/kg</td>
</tr>
</tbody>
</table>

(1) GHS organic peroxide (OP) C, D, E, and F are code H242. It is likely that D, E, and F would be
classified OP4 or OP5 in the IFC, which are not limited. Further review may be required to determine if an OP with a code of H242 is a Type C.

(2) The GHS codes do not differentiate between materials that are unstable because they are organic peroxides or that are unstable for some other reason. If a material is an organic peroxide, use the MAQ for the correct class of organic peroxide. If not use the MAQ for an unstable (reactive) material.

(3) For H261, additional research is needed to determine if the material is WR2 or WR1.

(4) For GHS code H272, additional research is needed to determine if the material is an OX3 or OX2.

(5) Check MAQ for specific IFC material and class.

(6) Check LD50 or LC50 to determine if HTX or TX.

Reason: The Globally Harmonized System of Classification and Labelling of Chemicals (GHS) has been adopted internationally, including in the US. Chemical manufacturers are required to provide Safety Data Sheets (SDS), formerly known as Material Safety Data Sheets (MSDS). In Section 2, the SDSs include GHS codes that identify the physical and health hazards of a chemical, which are similar to the hazard categories found in IFC Table 503.1.1 and IBC Table 307.1. In some cases the definitions for the GHS codes are the same as or only slightly different than the fire code hazard categories. In other cases the differences are significant. The purpose of this table is to correlate the GHS codes with the IFC hazard categories, and suggest how to handle cases where the underlying definitions are significantly different. If the GHS codes can be related to the IFC hazard categories, they can facilitate the selection of Maximum Allowable Quantities (MAQ) and simplify the evaluation of a chemical inventory for occupancy classification and other I-Code requirements.

Cost Impact: Will not increase the cost of construction
The use of the table may reduce the cost of chemical evaluation.
IFC: K102.2.2 (New), K102.2.3 (New), K102.2.4 (New), K102.2.5 (New), K102.2.6 (New).

Proponent: John Williams, CBO, representing Adhoc Healthcare Committee (AHC@icc.safe.org)

2015 International Fire Code

Add new text as follows:

**K102.2.2 Smoke barriers**. Smoke barriers shall be constructed in accordance with Sections 422 and 709 of the International Building Code.

**Exceptions:**
1. Smoke barriers shall be permitted to terminate at an atrium enclosure in accordance with Section 404.6 of the International Building Code.
2. Smoke barriers shall be continuous from outside wall to an outside wall, floor to a floor, or from a smoke barrier to a smoke barrier or a combination thereof.

**K102.2.3 Opening protectives**. Openings in smoke barriers shall be protected in accordance with Section 716 of the International Building Code. Opening protectives shall have a minimum fire-protection-rating of 1/3 hour.

**Exception**: Existing wired glass vision panels in doors shall be permitted to remain.

**K102.2.4 Penetrations**. Penetrations of smoke barriers shall comply with the International Building Code.

**Exception**: Approved existing materials and methods of construction.

**K102.2.5 Joints**. Joints made in or between smoke barriers shall comply with the International Building Code.

**Exception**: Approved existing materials and methods of construction.

**K102.2.6 Duct and air transfer openings**. Penetrations in a smoke barrier by duct and air transfer openings shall comply with Section 717 of the International Building Code.

**Exception**: Where existing duct and air transfer openings in smoke barriers exist without smoke dampers, they shall be permitted to remain. Any changes to existing smoke dampers shall be submitted for review and approved in accordance with Section 717 of the International Building Code.

**Reason**: Appendix K was added in the 2015 version to provide a tool for jurisdictions who wanted a retroactive set of requirements to manage minimum standards for existing ambulatory care facilities. This is an important option for jurisdictions seeking parity with federal rules. The current appendix K describes where smoke barrier are required, but does little to address historical construction methods that would have been used and compliant at the time of construction. This proposal clarifies that, similar to changes that were approved in Chapter 11 of the fire code during the last cycle.

This proposal is submitted by the ICC Ad Hoc Committee on Healthcare (AHC). The AHC was established by the ICC Board to evaluate and assess contemporary code issues relating to hospitals and ambulatory healthcare facilities. This is a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. In 2014 and 2015 the
ICC Ad Hoc Committee has held 4 open meetings and numerous Work Group meetings and conference calls for the current code development cycle which included members of the committees as well as any interested party to discuss and debate the proposed changes. Information on the AHC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the AHC effort can be downloaded from the AHC website at: AHC.

**Cost Impact:** Will not increase the cost of construction
This section describes a practical way to deal with one of the existing requirements of this appendix. By clarifying that some historical construction methods are acceptable, this proposal lessen the cost impact of this section.
F406-16

IFC: K102.3, K102.3 (New), K102.3.2 (New).

Proponent: John Williams, CBO, representing Adhoc Healthcare Committee (AHC@iccsafe.org)

2015 International Fire Code

Revise as follows:

K102.3 K102.3.1 Automatic sprinkler systems Type IIB, IIIB and VB construction. An automatic sprinkler system shall be provided throughout the entire floor containing an ambulatory care facility in Type IIB, IIIB and VB construction where either of the following conditions exist at any time:

1. Four or more care recipients are rendered incapable of self-preservation, whether rendered incapable by staff or staff has accepted responsibility for care recipients already incapable.
2. One or more care recipients that are rendered incapable of self-preservation are located at other than the level of exit discharge serving such a facility.

In buildings where ambulatory care is provided on levels other than the level of exit discharge, an automatic sprinkler system shall be installed throughout the entire floor where such care is provided and all floors below, and all floors between the level of ambulatory care and the nearest level of exit discharge, including the level of exit discharge.

Add new text as follows:

K102.3 Automatic sprinkler system. An automatic sprinkler system shall be provided in ambulatory care facilities where required by Sections K102.3.1 and K102.3.2.

K102.3.2 High rise buildings. In high rise building containing ambulatory care facilities an automatic sprinkler system shall be provided throughout the entire floor containing an ambulatory care facility where either of the following conditions exist at any time:

1. Four or more care recipients are rendered incapable of self-preservation.
2. One or more care recipients that are rendered incapable of self-preservation are located at other than the level of exit discharge serving such a facility.

In buildings where ambulatory care is provided on levels other than the level of exit discharge, an automatic sprinkler system shall be installed throughout the entire floor where such care is provided and all floors below, and all floors between the level of ambulatory care and the nearest level of exit discharge, including the level of exit discharge.

Reason: Hospitals and ambulatory care centers are committed to keeping occupants as safe as possible. Since the implementation of sprinkler systems in the 1990's, including advantages and operational trade-offs to fully sprinkler a building, fire deaths in hospitals have dramatically been reduced. Similar implementation of non-smoking policies and use of non-combustible materials in finishes and furnishings have contributed, but they are already mandated without trade-off. The time has come fact remains that the presence of sprinklers is a key element of occupant life safety. This proposal seeks to extend sprinklering as a retroactive requirement to ambulatory occupancies in the appendix section. Not all jurisdictions will adopt the appendix – it was created primarily for compliance with those facilities that seek federal reimbursement and those jurisdictions that want to have a minimum standard for existing ambulatory surgery facilities.

This proposal also amends a key provision to include "rendering" incapable of self preservation. This is a very important distinction in a B-occupancy, of which Ambulatory is a subset. "Rendered" means that some level of
anesthesia is administered to a patient in relation to a procedure, which then requires assistance for horizontal movement or evacuation during a fire event. Although in need of assistance for a much shorter duration (measured in hours), assistance is needed just the same. Note that, in a B-occupancy ambulatory center, a patient may be temporarily Defended In Place, but only until assistance arrives for evacuation. This is different from a hospital, where the Defend In Place strategy is the primary fire response. Anesthesia marks the difference between someone that is normally self-ambulatory, than someone that occupies buildings that may have mobility issues that require assistance as a normal part of their life.

This proposal is submitted by the ICC Ad Hoc Committee on Healthcare (AHC). The AHC was established by the ICC Board to evaluate and assess contemporary code issues relating to hospitals and ambulatory healthcare facilities. This is a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. In 2014 and 2015 the ICC Ad Hoc Committee has held 4 open meetings and numerous Work Group meetings and conference calls for the current code development cycle which included members of the committees as well as any interested party to discuss and debate the proposed changes. Information on the AHC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the AHC effort can be downloaded from the AHC website at: AHC.

Cost Impact: Will increase the cost of construction
This code change is consistent with current federal standards, including doctors offices and outpatient treatment facilities. Those facilities that receive reimbursement for medical services from the federal government will not see an increase of construction because they already follow this standard. However, for those facilities that do not receive federal funds for their services in exam rooms (ie: dental offices), this will be an increase in the cost of construction within those jurisdictions that adopt this appendix for pre-2009 IBC construction.

F406-16 : K102.3- WIL L IAMS12009
2015 International Fire Code

Add new text as follows:

K102.5 Waste and linen chutes. In ambulatory care facilities, existing waste and linen chutes shall comply with Sections K102.5.1 through K102.5.5.

K102.5.1 Enclosures. Chutes shall be enclosed with 1-hour fire-resistance-rated construction. Opening protectives shall be in accordance with Section 716 of the International Building Code and have a fire protection rating of not less than 1 hour.

K102.5.2 Chute intakes. Chute intakes shall comply with Section K102.5.2.1 or K102.5.2.2.

K102.5.2.1 Chute intake direct from corridor. Where intake to chutes is direct from a corridor, the intake opening shall be equipped with a chute-intake door in accordance with Section 716 of the International Building Code and having a fire protection rating of not less than 1 hour.

K102.5.2.2 Chute intake via a chute-intake room. Where the intake to chutes is accessed through a chute-intake room, the room shall be enclosed with 1-hour fire-resistance-rated construction. Opening protectives for the intake room shall be in accordance with Section 716 of the International Building Code and have a fire protection rating of not less than 3/4 hour. Opening protective for the chute enclosure shall be in accordance with Section K102.5.1.

K102.5.3 Automatic sprinkler system. Chutes shall be equipped with an approved automatic sprinkler system in accordance with Section 903.2.11.2.

K102.5.4 Chute discharge rooms. Chutes shall terminate in a dedicated chute discharge room. Such rooms shall be separated from the remainder of the building by not less than 1-hour fire-resistance-rated construction. Opening protectives shall be in accordance with Section 716 of the International Building Code and have a fire protection rating of not less than 1 hour.

K102.5.5 Chute discharge protection. Chute discharges shall be equipped with a self-closing or automatic-closing opening protective in accordance with Section 716 of the International Building Code and having a fire protection rating of not less than 1 hour.

Reason: This code change is consistent with current federal standards, and is proposed to be added to the current Appendix information as it relates to Ambulatory Care facilities. If the ACF has enough linen volume where it requires the use of a linen or trash chute, these basic requirements would be needed. This proposal is submitted by the ICC Ad Hoc Committee on Healthcare (AHC). The AHC was established by the ICC Board to evaluate and assess contemporary code issues relating to hospitals and ambulatory healthcare facilities. This is a joint effort between ICC and the American Society for Healthcare Engineering (ASHE), a subsidiary of the American Hospital Association, to eliminate duplication and conflicts in healthcare regulation. In 2014 and 2015 the ICC Ad Hoc Committee has held 4 open meetings and numerous Work Group meetings and conference calls for the current code development cycle which included members of the committees as well as any interested party to discuss and debate the proposed changes. Information on the AHC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the AHC effort can be downloaded from the AHC website at: AHC.
Cost Impact: Will increase the cost of construction
As a retroactive requirement for Ambulatory Care facilities, this would need to be constructed if the facility does not already have this configuration. These include existing lease spaces, and would affect the core and shell of the building, causing an increase in costs.
Proponent: Jeff Hugo, National Fire Sprinkler Association, representing National Fire Sprinkler Association (hugo@nfsa.org)

2015 International Fire Code

Revise as follows:

**M103.1 Compliance schedule.** Building owners shall file a compliance schedule with the fire code official not later than 365 days after the first effective date of this code or first established date of previous editions. The compliance schedule shall not exceed 12 years for an automatic sprinkler system retrofit.

**Reason:** This change is to clarify the clock starts whenever the appendix is adopted, not restart the clock every new edition. If Appendix M was adopted in 2015, the twelve years starts then. If Appendix M is adopted in 2018, the twelve years starts then. For example, if the City of Essexville adopted the 2015 IFC with Appendix M in 2015, the compliance period to retrofit all of its high-rises ends in 2027. When the City of Essexville adopts the 2018 IFC with Appendix M, the compliance date is still 2027, not 2030.

**Cost Impact:** Will not increase the cost of construction

This clarifies the requirement to add fire and life safety equipment into an existing non-sprinklered high-rise building.
APPENDIX N INDOOR TRADE SHOWS AND EXHIBITIONS

SECTION N101 GENERAL

N101.1 Scope Indoor trade shows and exhibitions with temporary vendor displays or booths within any indoor occupancy classification shall be in accordance with this appendix and all other applicable requirements of this code.

Compliance with this appendix is not required where Section N101.1.1 or N101.1.2 are applicable.

N101.1.1 Non sprinklered buildings. In a building that is not equipped throughout with and automatic sprinkler system, where the aggregate exhibit area is less than 1500 ft$^2$ of floor area and where both conditions apply:

1. The exhibit area does not include any covered or multi-level exhibits or booths.
2. At least two remote exits or exit access doors in compliance with Chapter 10 of this code are provided.

N101.1.2 Sprinklered buildings. In a building that is equipped throughout with an automatic sprinkler system with a minimum design density of ordinary hazard Group 1, where the aggregate exhibit area is less than 4500 ft$^2$ of floor area and where both conditions apply:

1. The exhibit area does not include any covered or multi-level exhibits or booths.
2. At least two remote exits or exit access doors in compliance with Chapter 10 of this code are provided.

N101.2 Permit required An operational permit for trade shows and exhibitions shall be required as set forth in Section 105.6.14.

N101.3 Application A permit application for a trade show or exhibition shall be submitted to the fire code official prior to the start of the event in a time frame established by the jurisdiction. The application shall include documentation that identifies all of the following:

1. The means of egress.
2. The locations and width of exits and aisles.
3. The locations of exit signs.
4. The total square footage of spaces.
5. The location and arrangement of all booths and cooking equipment.
6. The location of all fire protection equipment.
7. The type and location of any heating and electrical equipment, where applicable.
8. The location of any covered or multi-level booths.
9. Construction documents for any covered or multi-level booths.
10. The locations and quantities of any storage of highly combustible goods.
11. The location and type of any vehicle displays, where applicable.

SECTION N102 DEFINITIONS

N102.1 Definitions For the purpose of this appendix, certain terms are defined as follows:

COOKING.
Heating food products to a temperature of 145 degrees F (63 degrees C) or higher by baking, braising, boiling, frying or grilling.

COVERED BOOTH.
An exhibit that has an obstruction placed over the exhibit above floor level that resembles a roof, canopy, tent or other obstruction, other than vertical signs or banners.

MULTI-LEVEL BOOTH.
An exhibit that has a second level or tier constructed on top of the exhibit or portion of the exhibit that is accessible to the public, or includes a live load above the exhibit area floor level.

SECTION N103 PUBLIC SAFETY FOR EVENTS

N103.1 Fire safety and evacuation plan A fire safety and evacuation plan shall be provided in accordance with Section 404.2 of this code.

Exception: where the fire code official determines that the nature of the exhibition, display or of the activities therein does not pose an increased hazard to public safety.

N103.2 Fire watch personnel Where, in the opinion of the fire code official, it is essential for public safety in a trade show or exhibition, either because of the number or persons present or because of the nature of the performance, exhibition, display or activity, the owner or owners authorized agent shall provide one or more fire watch personnel in accordance with Section 403.12.1 of this code.

N103.3 Crowd managers Where events involve a gathering of more than 1,000 people, trained crowd managers shall be provided in accordance with Section 403.12.3 of this code.

SECTION N104 INTERIOR FINISH AND DECORATIVE MATERIALS

N104.1 General Interior finish, interior trim, furniture, furnishings and decorative materials, including decorative vegetation, used in exhibition areas shall comply with the requirements of this section and Chapter 8 of this code.

N104.2 Interior wall and ceiling finish The materials used for interior wall and ceiling finish of exhibit booths, and displays in exhibition areas shall comply with one of the following:

1. Where the building is not equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 the wall and ceiling finish materials are required to be Class A in accordance with Section 803 of this code.
2. Where the building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 the wall and ceiling finish materials are required to be a minimum of Class B in accordance with Section 803 of this code.
SECTION N105  MULTI-LEVEL BOOTHS

N105.1  Construction documents  Construction documents for all multi-level booths shall be stamped by a registered design professional and shall be submitted with the permit application to the fire code official or the building code official, as appropriate.

N105.2  Structural design  Multi-level booths shall be designed and constructed in accordance with Chapter 16 of the International Building Code.

N105.3  Means of egress  Upper levels of multi-level booths with an occupant load greater than 10 persons shall have at least two exits or exit access that are separated in accordance with Section 1007.1.1 of this code.

N105.4  Automatic sprinkler systems  An approved automatic sprinkler system in accordance with Section 903.3.1.1 of this code shall be provided in multi-level booths exceeding 400 ft² in floor area per level.

N105.5  Inspection  Inspection to verify that multi-level booths are constructed in accordance with the construction documents and structural design details required by this section shall be approved by the building code official.

N105.6  Fire alarm and detection  Each multi-level booth with a floor area exceeding 120 ft² on any level shall be provided with an approved fire alarm system in accordance with Section 907.2 of the International Fire Code.

SECTION N106  COVERED BOOTHS

N106.1  Automatic sprinkler systems  An approved automatic sprinkler system in accordance with Section 903.3.1.1 of this code shall be provided in covered booths exceeding 100 ft² in floor area per level.

N106.2  Fire alarm and detection  Each covered booth with a floor area exceeding 120 ft² on any level shall be provided with an approved fire alarm system in accordance with Section 907.2 of this code.

SECTION N107  DISPLAY AND STORAGE OF HAZARDOUS AND COMBUSTIBLE MATERIALS

N107.1  Hazardous materials  The display of hazardous materials shall comply with Section 314 and Chapters 50 through 67 of this code. The storage of hazardous materials in indoor trade shows and exhibition areas shall be prohibited.

N107.1.1  Display near exit  The display of hazardous materials within 5 ft of an exit shall be prohibited.
N107.2 Storage of combustible materials  Storage of combustible materials shall comply with Section 315 of this code.

N107.3 Vehicles  The display of liquid- or gas-fueled vehicles, boats or other motor craft in indoor trade shows and exhibition areas shall comply with Section 314.4 of this code and with Sections N107.3.1 through N107.3.3.

N107.3.1 Batteries in Vehicles  Vehicle batteries shall be rendered inoperable. Batteries in liquid- and gas-fueled vehicles shall be disconnected. Batteries in electric vehicles shall be rendered inoperable by the removal of fuses or other approved methods but shall not be required to be disconnected.

N107.3.2 Vehicle fuel  Vehicle fuel shall comply with Sections N107.3.2.1 through N107.3.2.4.

N107.3.2.1 Fueling within the structure  Vehicles shall not be fueled or defueled within the structure.

N107.3.2.2 Vehicle fuel tanks  Vehicle fuel tanks shall contain no more than one quarter of the tank capacity or 5 gallons of fuel, whichever is less.

N107.3.2.3 Vehicle fuel systems  Vehicle fuel systems shall be inspected for leaks prior to the vehicle being brought into the structure.

N107.3.2.4 Vehicle fuel tank openings  Vehicle fuel tank openings shall be locked and sealed to prevent the escape of vapors.

N107.3.3 Obstruction by vehicles  Vehicles shall not be located in such a manner that they obstruct a means of egress.

N107.3.4 Gas powered vehicles  Compressed natural gas (CNG), liquefied petroleum gas (LPG) or hydrogen-powered vehicles present in indoor trade shows and exhibition areas shall comply with sections N107.2.4.1 through N107.2.4.3.

N107.3.4.1 Shut-off valves  Shut-off valves shall be closed and the engine shall be operated until it stops. Valves shall remain closed until the vehicle is removed.

N107.3.4.2 Battery hot lead  The hot lead of the battery shall be disconnected.

N107.3.4.3 Dual-fuel vehicles equipped to operate on gasoline  Dual-fuel vehicles equipped to operate on gasoline as well as on CNG, LPG or hydrogen shall also comply with Sections 3104.18 of the International Fire Code dealing with gasoline-powered vehicles.

N107.3.5 Competitions or demonstrations  Competitions or demonstrations using any type of vehicle shall comply with sections 3104.18.5 of the International Fire Code.
N107.4 **Fueled equipment other than vehicles** Fueled equipment other than vehicles shall comply with Sections 313 of this code.

N107.5 **Liquid propane gas containers** Liquid propane (LP) gas containers shall comply with Sections N107.5.1 through N107.5.5.

N107.5.1 **LP-gas containers exceeding 12 pounds (5 kg) of water capacity** The use of LP-gas containers exceeding 12 pounds (5 kg) of water capacity shall be prohibited.

N107.5.2 **Where more than one LP-gas container is present in the same area** Where more than one LP-gas container is present in the same area, the aggregate weight of all containers in the area shall not exceed 12 pounds (5 kg) of water capacity.

N107.5.3 **Equipment for LP-gas containers** Equipment for LP-gas containers, including tanks, piping, hoses, fittings, valves, tubing and other related components, shall be approved and shall comply with Chapter 61 of this code and with the applicable requirements of the *International Fuel Gas Code*.

N107.5.4 **Securing of LP-gas containers** Portable LP-gas containers shall be securely fastened in place to prevent unauthorized movement.

N107.5.5 **Spare LP-gas containers** Spare LP-gas containers not connected to an approved appliance shall be stored in a location and manner approved by the fire code official.

N108.1 **Means of egress from the indoor trade show or exhibition area** Means of egress from the indoor trade show or exhibition area shall comply with Chapter 10 of this code and with Sections N1018.2 through N108.3.

N108.2 **Design of means of egress** The design of means of egress shall take into consideration the exhibit layout and the anticipated crowd movement during the event.

N108.3 **Aisles and corridors** Aisles and corridors within the exhibit area shall be kept free of obstructions when the public is present. There shall be no storage of any kind in aisles or corridors within the exhibit area.

**Reason:** This proposed appendix is intended to address hazards associated with larger, more complex trade shows and exhibitions. Although many of these requirements are already included in various locations in the IFC, some of the more important items, such as requirements for covered booths and multi-story booths are not in the existing code. In addition, having the requirements covering these events in a single location, with pointers to other locations within the IFC, makes it easier for those organizing exhibitions, and individual exhibitors who are unfamiliar with the entire fire code to locate the requirements that are applicable to them.

N101.1 The minimum square foot thresholds clarify that the appendix does not cover small trade shows, like those
with traditional tabletop displays and small booths. It only covers the larger exhibitions, and those with covered and multi-level booths, which pose additional safety concerns.

N101.3 clearly defines the information needed to obtain a permit for one of these larger exhibitions. Having this information in writing makes it easier for all parties to understand the information needed to gain approval for the exhibition.

N103 includes a convenient pointer to public safety related requirements in Chapter 4 of the IFC.

N104 includes a set of interior finish requirements that are applicable to an event in a Group A occupancy where there is a significant amount of combustible material in the exhibits and booth themselves that was not present in the building when it was initially designed. Due to the potential fuel loading in the exhibition area, interior wall and ceiling finish materials are required hereby to meet Class A in unsprinkled buildings and Class B in sprinklered buildings. Other applicable requirements in Chapter 8 are not provided in this section.

N105 and N106 include specific added requirements designed to provide an acceptable level of safety for the hazards associated with multi-level and covered booths. Both of these booth types have the ability to block sprinkler protection provided in the compartment in which the exhibition is held, and also can include a significant amount of fuel loading, which justifies the requirement for temporary automatic sprinklers for the larger booths. In addition multi-level booths present concerns with structural integrity, which warrants them being designed and constructed in accordance with Chapter 16 of the IBC.

N107 includes basic requirements for display and storage in exhibitions, with emphasis on vehicles also.

N108 includes a pointer to Chapter 10 means of egress requirements, and also restricts storage in aisles and corridors of exhibitions when the general public is present.

This proposal is similar to one submitted last cycle in an attempt to simplify a reasonable set of requirements for ensuring safety at trade shows and exhibitions. Similar sets of requirements have been successfully used in jurisdictions such as Phoenix and Las Vegas. Concerns were raised last cycle about a lack of definitions, a lack of minimum thresholds, a belief that the proposal was not yet ready for inclusion in the code, and might be better suited as an adoptable appendix.

This proposal addresses many concerns raised by the Fire Code Technical Committee in its reason statement, for disapproval as follows. The proposal proposes an adoptable Appendix N, with more realistic thresholds and with a scope limited to exhibition areas over 1500 sq. ft. in unsprinklered buildings, and 3000 sq. ft. in sprinklered buildings. Exhibits including covered and multi-level booth are covered by these requirements regardless of size due to their unique safety concerns.

Cost Impact: Will increase the cost of construction

The proposal will increase the cost of construction by improving safety for the public, but only if the appendix is adopted by the jurisdiction. This proposal recommends a non mandatory appendix.
APPENDIX N Anchorage of Temporary Tents and Membrane Structures

SECTION N101 GENERAL

N101.1 Scope Temporary tents and Membrane Structures must comply with Section 3103.9 for anchorage. This section provides information to be used by manufacturers, professional engineers, owner, agent or installer and reviewed by the code official for anchoring.

SECTION N102 ANCHORAGE USING GROUND ANCHORS

N102.1 Stakes This appendix applies to steel stakes, information on other types of ground anchors shall be provided by the manufacturer, engineer, owner, agent or installer. Steel stakes shall be 1" in diameter. The allowable material include forged steel and smooth or ribbed rebar. No. 8 inch diameter, rebar shall be limited to not greater than 1,600 lbs. per stake of load.

N102.2 Field Soil Test The owner, agent or installer shall perform a field soil test to determine the holding capacity of the soil at the installation site. The field test shall be in accordance with ASTM D6951 and with the following test procedure.

1. Steel stake with smooth side, 1" in diameter and 36" long.
2. Stake to be driven into the ground vertically approximately 20" and a measurement take of the amount of the exposed stake from ground level to the top.
3. Using a 16 lb. sledge hammer, one strike with a normal swing.
4. Re-measure the distance the stake dropped and compare to Table 0103.2.1 for pullout capacity.

TABLE N102.2
Pullout Capacity for Baseline

<table>
<thead>
<tr>
<th>Consistency</th>
<th>Stake Penetration Resistance (inches per blow)</th>
<th>Pullout Capacity for Baseline ($P_b$) lbs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hard (Very Dense)</td>
<td>&gt;0.2&quot;</td>
<td>2,500</td>
</tr>
<tr>
<td>Very Stiff (Dense)</td>
<td>0.2- 0.5&quot;</td>
<td>1,600</td>
</tr>
<tr>
<td>Stiff (Medium-Dense)</td>
<td>0.5-1.5&quot;</td>
<td>800</td>
</tr>
<tr>
<td>Medium</td>
<td>1.5- 3.0&quot;</td>
<td>400</td>
</tr>
<tr>
<td>Soft (Loose)</td>
<td>3.0- 6.0&quot;</td>
<td>200</td>
</tr>
</tbody>
</table>
For baseline stake of 1" diameter x 36" long (\(P_b\)).
Table based on dry soil conditions. If soils become saturated holding power should be reduced to one-half of dry conditions.

**N102.3 Pullout Capacity.** The pullout capacity of a single stake shall use the following formula to estimate pullout capacity:

\[
P = P_b \times C_e \times C_f \times C_i \times C_l \times C_d
\]

Where:

- \(P_b\) = Pullout capacity of a single stake based on Table N102.2
- \(C_e\) = Correction factor for stake embedment shorter than baseline or not embedded to within 2" of ground surface.
- \(C_f\) = Correction factor for fastening height of guy or rope onto stake.
- \(C_i\) = Correction factor for stake inclinations greater than 15° off vertical.
- \(C_l\) = Correction factor for rope or guy load angle.
- \(C_d\) = Correction factor of stake diameter greater than 1".

The pullout capacity of Group Stakes:

\[
P_g = P_b \times E_f
\]

Where:

- \(P_g\) = Pullout capacity of the stake group
- \(P_b\) = Pullout capacity of baseline stake
- \(E_f\) = Effectiveness factor for a group of stakes

Table N102.3 contains the correction factors and effectiveness factors for these calculations.

**TABLE N102.3**

<table>
<thead>
<tr>
<th>Correction Factors</th>
<th>Stake Embedment (in.)</th>
<th>(C_e)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(C_e) Embedment Factor</td>
<td>42</td>
<td>1.14</td>
</tr>
<tr>
<td></td>
<td>36</td>
<td>1.00</td>
</tr>
<tr>
<td></td>
<td>34</td>
<td>0.92</td>
</tr>
<tr>
<td></td>
<td>32</td>
<td>0.84</td>
</tr>
<tr>
<td></td>
<td>30</td>
<td>0.76</td>
</tr>
<tr>
<td>C_f Fastening Height</td>
<td></td>
<td></td>
</tr>
<tr>
<td>----------------------</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>Fastening Height (in.)</td>
<td>C_f</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>0.98</td>
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<td>6</td>
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<td>8</td>
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<td>10</td>
<td>0.92</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>0.90</td>
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</table>

<table>
<thead>
<tr>
<th>C_i Stake Inclination</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Stake Inclination (Deg)</td>
<td>C_i</td>
</tr>
<tr>
<td>0 - 150</td>
<td>1.00</td>
</tr>
<tr>
<td>16 - 300</td>
<td>0.77</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>C_l Load Angle</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Load Angle (Deg)</td>
<td>C_l</td>
</tr>
<tr>
<td>450</td>
<td>1.00</td>
</tr>
<tr>
<td>530</td>
<td>0.85</td>
</tr>
<tr>
<td>Stake Diameter (in.)</td>
<td>( \text{Stake Diameter} )</td>
</tr>
<tr>
<td>---------------------</td>
<td>----------------------------</td>
</tr>
<tr>
<td>1.000</td>
<td>( \text{1.0} )</td>
</tr>
<tr>
<td>1.125</td>
<td>( \text{1.1} )</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Group Configuration</th>
<th>( \text{Group Configuration} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Double</td>
<td>( \text{1.22} )</td>
</tr>
<tr>
<td>Three stakes in a line perpendicular to direction of load</td>
<td>( \text{2.76} )</td>
</tr>
<tr>
<td>Three stakes in a line perpendicular to direction of load with stake inclined 15-30°</td>
<td>( \text{2.46} )</td>
</tr>
<tr>
<td>Six stakes in a line perpendicular to direction of load</td>
<td>( \text{4.68} )</td>
</tr>
<tr>
<td>Four stakes installed in two columns and two rows in a gang plate</td>
<td>( \text{3.48} )</td>
</tr>
<tr>
<td>Six stakes installed in two columns and three rows in a gang plate</td>
<td>( \text{4.56} )</td>
</tr>
</tbody>
</table>

**Reference standards type:** This reference standard is new to the ICC Code Books

**Add new standard(s) as follows:**


**Reason:** Section 3103.9 of the International Fire Code requires tents and membrane structures to be "...adequately roped, braced and anchored to withstand the element of weather and prevent against collapsing". A study, sponsored by the Industrial Fabrics Association International - Tent Rental Division (IFAI-TRD), conducted at the University of Illinois, researched anchoring using stakes. The results of this study has been published in a IFAI-TRD handbook on tent installation and maintenance and pocket guide on stakes.

The information from this study is being presented here for inclusion in the appendix as guidance for proper anchorage which can be to fulfill the 3103.9 requirement for adequate anchoring by staking. The studies’ field soil test was correlated to the "holding power" of the base line stake (1” x 36” smooth steel). Soil testing was based on a modified version of ASTM D6951 Dynamic Cone Penetrometer (DCP) use for measuring the quality of pavements such as asphalts. The DCP is operated five times using a weight dropped (starting) at 22” with a force of 45 joules (33.2 lb.) for a total of 225 joules (166 lb.). Through experimentation at similar result was found using a "normal" swing of a 16 lb. sledge hammer which is the field test outlined in the appendix.

Using Table N102.2 the baseline can be determined for a 1” x 36” steel stake. The study further tested other conditions and determined corrections factors for stake installed in various (common) ways, mostly detracting from the baseline. Further, stakes in various multiple "gang" applications were tested.
The formulas and tables present in the appendix are the result of this study and can be used to predict the "holding power" of single and multiple stakes with various soils, loading and installation types. The result can be correlated to known loads required by the tent or membrane structure. Even if those loads aren't known, for example using a minimum of 10 lbs./sqft a 20' x 40' pole tent (800 sqft) would require 8,000 lb. of anchorage. Equally distributing this load between 16 ropes or guys that would be 500 lbs. per anchor point. In most soil conditions a 1" x 36" stake properly installed is capable of hold 800 lbs. If the stake installation requires "correction" it could result in less than the required "holding power" for this tent.

In some of the code proposals for Chapter 31 an anchorage plan and structural analysis will be require. If stakes are supplying the anchorage/structural support this information can be used by design professionals, installers and code officials to ensure proper and safe installation. By inclusion in the appendix, this information, although not mandatory, is available for jurisdictions to adopt.

**Bibliography:**

Pocket Guide Pullout Capacity of Tent Stakes, Industrial Fabrics Association International - Tent Rental Division, Copyright 2006

**Cost Impact:** Will increase the cost of construction
Will increase the cost of installation because more will be done to properly anchor tents based on the information and calculations.

**Analysis:** A review of the standard(s) proposed for inclusion in the code, **ASTM D 6951-09(2015)**, Standard Test Method for Use of the Dynamic Cone Penetrometer in Shallow Pavement Applications with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 1, 2016.
APPENDIX N MARIJUANA GROWING AND EXTRACTION

SECTION N101 ADMINISTRATION

N101.1 Scope. Marijuana growing and extraction shall be in accordance with this chapter, the International Building Code, and the International Mechanical Code. Cryogenic fluids shall comply with Chapter 55. Compressed gases shall comply with Chapter 53. Flammable and combustible liquids shall comply with Chapter 57. Hazardous materials shall comply with Chapter 50. LP-gas shall comply with Chapter 61 and the International Fuel Gas Code.

N101.2 Application. The requirements set forth in this chapter are specific to marijuana growing and extraction and shall be applied as exceptions or additions to applicable requirements set forth elsewhere in this code.

N101.3 Multiple hazards. Where a material, its use, or the process it’s associated with poses multiple hazards, all hazards shall be addressed in accordance with Section 5001.1 and other material specific chapters.

N101.4 Permit. A permit shall be required as set forth in Section 105.6.21.

SECTION N102 DEFINITIONS

N102.1 Definitions. For the purposes of this appendix, certain terms are defined as follows:

CARBON DIOXIDE ROOM. A room for the storage and use of carbon dioxide that supports marijuana growing.

EXTRACTION. The removal of oils and fats from marijuana plants by the use of a solvent, production of miscella, distillation of the solvent from the miscella, and solvent recovery.

EXTRACTION ROOM. The room in which marijuana oil and fat extraction occurs.

MISCELLA A mixture, in any proportion, of the extracted oil or fat and the extraction solvent.

SOLVENT. A substance that can dissolve marijuana oils and fats.

WINTERIZATION. Separation of cuticle wax from oils and fats in a polar solvent by freezing and filtration.

SECTION N103 CONSTRUCTION

N103.1 Extraction Rooms. Extraction rooms shall comply with this section.

N103.1.1 Location. An extraction room shall not be located in any building containing a Group
N103.1.2 Extraction room. An extraction room shall comply with Sections N103.1.2.1 through N103.1.2.5.

N103.1.2.1 Other Uses. An extraction room shall have no other uses.

N103.1.2.2 Egress. Each extraction room shall be provided with at least one exit discharge or door from an exit access to an exit. The door shall swing in the direction of egress and be provided with panic hardware.

N103.1.2.3 Facility egress. Extraction rooms shall not enter directly into an exit where the exit is the sole egress path from another portion of the building.

N103.1.2.4 Ventilation. Where hazardous materials or carbon dioxide are used for extraction, a ventilation system shall be provided in accordance with Section 5004.3.

N103.1.2.5 Explosion control. Explosion control shall be provided when required by Section 911.

N103.2 Grow rooms. Grow rooms shall comply with this section.

N103.2.1 Ventilation for light fixtures. Ventilation ductwork for light fixtures shall be installed in accordance with the manufacturer's instructions and the International Mechanical Code.

N103.2.2 Odor Control. The use of ozone generators for odor control shall be in accordance with Section 6005.

N103.2.3 Hanging Plastic. The hanging of plastic from ceilings or suspended overhead supports to create wall dividers shall not be permitted.

SECTION N104 EXTRACTION

N104.1 Staff and training. Extraction shall be continuously staffed by personnel trained in the process and emergency procedures. Training records shall be maintained.

N104.1.1 Fire safety and evacuation plan. A fire safety and evacuation plan shall be provided in accordance with Section 404.2.

N104.2 Revised permit. Prior to changing the extraction solvent, application for a revised operation permit shall be submitted to the fire code official for review and approval.

N104.3 Post extraction purification and winterization. Post extraction purification and winterization shall be performed in an appliance listed or approved for that specific purpose.

N104.4 Industrial ovens. Industrial ovens shall comply with Chapter 30.

   Exception: An automatic fire extinguishing system shall not be required for batch-type Class A ovens having less than 3.0 cubic feet of volume.

N104.5 Continuous gas detection. Where hazardous materials gases or carbon dioxide are used for extraction, a continuous gas detection system shall be provided. The gas detection system shall activate at no greater than 25 percent of the lower explosive limit, 25 percent of the threshold limit value, or 5000 ppm for carbon dioxide, whichever is lower.

N104.6 Interlocks. Safety interlocks shall be provided in accordance with Sections N104.6.1 and N104.6.2.
**N104.6.1 Electrical.** All electrical circuits and devices within the extraction room shall be interlocked to shut off if the ventilation system required by Section N103.1.2.4 fails to operate as indicated by a static pressure sensor located at the most remote point in the system.  

*Exception:* Gas detection, emergency alarm, exhaust ventilation, and emergency lights shall not be shut off.

**N104.6.2 Gas supply.** Where hazardous materials gases or carbon dioxide are used in the extraction process, an automatic emergency shutoff valve shall be provided at the gas source. This valve shall be fail-safe and shall automatically close if the gas detection system malfunctions or activates.

**N104.7 Standby or emergency power.** Standby or emergency power shall be provided in accordance with Sections 5004.7 and N104.7.1.

**N104.7.1 Fuel supply.** The standby or emergency power fuel supply shall have sufficient capacity to allow safe shutdown of extraction plus an additional two hours of operation.

**N104.8 Exhausted enclosure.** Equipment containing hazardous materials or carbon dioxide shall be located within an exhausted enclosure designed, constructed, and operated in accordance with Sections 5003.8.5.1 through 5003.8.5.3.

**SECTION N105 OPERATION OF GROW ROOMS**

**N105.1 Fumigation.** Fumigation shall be in accordance with Chapter 26.

**N105.2 Carbon dioxide enrichment.** Carbon dioxide generators with the capacity to raise the carbon dioxide level to greater than 5000 ppm in the grow room, or gas systems with more than 100 pounds of carbon dioxide shall comply with N105.2.1 through N105.2.8.

**N105.2.1 Carbon dioxide room.** Carbon dioxide containers and generators shall be located outside or in a room with no other use.

**N105.2.2 Fuel fired appliances.** The products of combustion from fuel fired appliances shall not be used to provide carbon dioxide for grow rooms.

**N105.2.3 Protection from damage.** Carbon dioxide systems shall be installed so the tanks, cylinders, piping, other appurtenances are protected from damage.

**N105.2.4 Gas detection.** Gas detection shall be provided in carbon dioxide rooms and in grow rooms that use carbon dioxide. The gas detectors shall activate when the carbon dioxide level exceeds 5000 ppm.

**N105.2.5 Gas detection operation.** When the gas detector activates, it shall function as follows:

1. Turn off the carbon dioxide generator or close a fail-safe automatic shutoff valve at the carbon dioxide supply.
2. Activate audible and visual alarms located inside and outside of the grow room.

**N105.2.6 Pressure relief devices.** Carbon dioxide pressure relief devices shall be vented to the building exterior.

**N105.2.7 Signs.** Warning signs shall be posted at the entrance to each area using or storing carbon dioxide. Signs shall not be obscured or removed, shall be in English as a primary language, shall be durable, and the size, color, lettering and warning statement shall be
N105.2.8 Ventilation. Carbon dioxide rooms shall be ventilated in accordance with Section 5004.3

Reason: Growing marijuana and extracting the essential oils has been legalized in some states and the likelihood is that more states will follow suit. In addition, Canada is close to legalizing the marijuana industry. In Washington State, where it is legal, code officials have been writing specific code language to regulate the growing and extraction of marijuana, which requires the storage and use of hazardous materials. This proposal evolved from the work done in Washington. It is different in that it is specific to marijuana, reorganized, relies more on references to existing code sections, and adds some technical requirements.

Cost Impact: Will increase the cost of construction
This proposal will increase the cost of growing and extracting marijuana. Currently there is no national standard specific to this industry. In many cases, basic safety requirements are not being met, such as gas detection and shutoff, exhaust ventilation, proper storage of solvents, and listing or approval of equipment. It is likely that providing these safety systems and approvals will increase the cost of construction.
APPENDIX N  MOBILE FUELING USING CLASS 1 FUELS

SECTION  N101  GENERAL

N101.1  Mobile fueling criteria.  Mobile Fueling using Class 1 fuel shall be in accordance with all of the following:

1. All drivers are trained on how to respond to a fuel spill, carryout appropriate mitigation measures, and how to properly dispose of contaminated materials when necessary.
2. The tank vehicle will comply with the requirements of NFPA 385 and Local, State and Federal requirements. The tank vehicle's specific function shall be that of supplying fuel to motor vehicle fuel tanks. The tank vehicle and its equipment shall be maintained in good repair.
3. Signs prohibiting smoking or open flames with 25 feet (7.62m) of the tank vehicle or the point of fueling shall be prominently posted on 3 sides of the vehicle including the back and both sides.
4. A fire extinguisher with a minimum rating of 40:BC shall be provided on the vehicle with signage clearly indicating its location.
5. The dispensing nozzles and hoses are approved and listed for use with Class 1 fuel.
6. The dispensing hose will not be more than 50 feet (15.24m) in length.
7. Absorbent materials, non-water absorbent pads, a 10-foot (3.048m) long containment boom, an approved container with lid, and a non-metallic shovel will be on every Booster Fuel delivery vehicle to mitigate a 5 gallon fuel spill.
8. Tank dispensing pumps will be equipped with a dead man nozzle or a fuel limiter switch set to 30 gallons.
9. Staff responsible for dispensing operations is trained in the appropriate mitigating actions in the event of a fire, leak, or spill. Training records shall be maintained and available to the Code Official upon request.
10. Operators of vehicles used for mobile fueling operations will have in their possession at all times a cell phone to notify the proper authorities in the event of an emergency.
11. The tank vehicle dispensing equipment shall be constantly attended and operated only by designated personnel who are trained to handle and dispense motor fuels.
12. Prior to beginning dispensing operations, precautions shall be taken to assure ignition sources are not present.
13. The engines of vehicles being fueled and the fuel supply vehicle shall be shut off during dispensing operations.
14. The tank vehicle shall be positioned with respect to vehicles being fueled so as to preclude traffic from driving over the delivery hose and between the tank vehicle and the motor vehicle being fueled.
15. During fueling operations, the tank vehicle break shall be set and warning lights shall be in operation.
16. Motor vehicle fuel tanks shall not be topped off.
17. The dispensing hose will be mounted and stored on an approved reel prior to moving the tank vehicle.
18. Should there be an unauthorized discharge or spill, the Fire Code Official will be notified.
19. Mobile fueling of Class I fuels shall only operate in surface parking lots of locations that contract for this service. Each surface parking lot site will have a site plan submitted to the fire department. The site plan identifies:

1. All buildings, structures, and appurtenances on site and their uses;
2. All uses adjacent to the property lines of the site;
3. The locations of all storm drain openings, adjacent waterways or wetlands;
4. Information regarding slope, natural drainage, curbing, impounding and how a spill will be retained upon the site property.

20. The Code Official is authorized to impose limits upon: the times and/or days during which mobile fueling operations are allowed to take place, and specific locations on a site where fueling is permitted. Mobile fuelers will limit operations to surface parking lots of commercial, industrial, governmental, manufacturing locations and other locations as approved by the local code official. Parking garages will not be eligible for service. Operations will not be conducted inside buildings or in Educational or Institutional Occupancies as defined by the IFC.

21. Mobile fueling operations will not be conducted on public streets.

22. Mobile fueling will not take place within 15 feet (4.572m) of buildings, property lines, or combustible storage.

Reason: This Appendix Proposal for Mobile Fueling with Class I fuels is the result of two companies recognizing the need for regulation because of many other smaller companies not following safe operating procedures. Booster Fuels and WeFuel are working together to ensure this new service moves ahead with specific conditions that will apply to mobile fueling processes as advocated by a "mobile fueling coalition".

Statement of Intent

This amendment is proposed by to establish minimum safety requirements. Periodically, technology progresses faster than the regulatory scheme resulting in a need for the industry to establish minimum safeguards to protect itself. This is not intended to replace the process but rather to close the gap as quickly as possible. The intent of creating this coalition is to aid local, regional and state authorities in assessing minimum safety requirements. The intent of this coalition therefore is limited to the subject of the transfer of Class 1 flammable liquids. Failure to act in an appropriate fashion encourages non-conformance and could result in an incident embarrassing to both the AHJ and industry representatives.

Current Local Fire Service

Local governments are reluctant to take action or grant equivalency in the field of mobile fueling because the code currently provides no guidance as to how to do that. This reluctance to act translates into resistance to an emerging technology. As a result, the business community is moving forward with the adoption of practices that may or may not be appropriate.

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Cost Impact: Will not increase the cost of construction
This proposal does not increase the cost to a jurisdiction. All costs are recovered through permit fees in each jurisdiction.