

IFC



2021 GROUP A PROPOSED CHANGES TO THE I-CODES

April 11 – May 5, 2021
Virtual Committee Action Hearings

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2021 GROUP A – PROPOSED CHANGES TO THE INTERNATIONAL FIRE CODE

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TENTATIVE ORDER OF DISCUSSION 2021 PROPOSED CHANGES TO THE INTERNATIONAL FIRE CODE

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 and PC code change proposals may not be included on this list, as they are being heard by another committee.

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WUIC17-21	F31-21	F4-21	F89-21
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F119-21 Part I	F168-21	F209-21
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F121-21	F170-21	F211-21
F122-21	F82-21	F212-21
F123-21	F171-21	F213-21
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F130-21	F178-21	F221-21
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F2-21	F181-21	F224-21
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F134-21	F183-21	F226-21
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F143-21	F191-21	F235-21

F1-21

IFC: SECTION 202; IBC: SECTION 202

Proponents: Mark Hopkins, representing TERPconsulting (mhopkins@terpconsulting.com)

2021 International Fire Code

Revise as follows:

AUTOMATIC SPRINKLER SYSTEM. ~~An automatic sprinkler system, for fire protection purposes, is an integrated system of underground and overhead piping designed in accordance with fire protection engineering standards. The system includes a suitable water supply. The portion of the system above the ground is a network of specially sized or hydraulically designed piping installed in a structure or area, generally overhead, and to which automatic sprinklers are connected in a systematic pattern. The system is usually activated by heat from a fire and discharges water over the fire area.~~ An automatic sprinkler system is an integrated network of piping designed in accordance with fire protection engineering standards, commonly activated by heat from a fire and discharges water over the fire area, that consists of sprinklers, a water supply source, a water control valve, a waterflow alarm, and a drain. The portion of the sprinkler system above ground is a network of specifically sized or hydraulically designed piping installed in a building, structure, or area, generally overhead, and to which sprinklers are attached in a systematic pattern.

2021 International Building Code

Revise as follows:

[F] AUTOMATIC SPRINKLER SYSTEM. ~~An automatic sprinkler system, for fire protection purposes, is an integrated system of underground and overhead piping designed in accordance with fire protection engineering standards. The system includes a suitable water supply. The portion of the system above the ground is a network of specially sized or hydraulically designed piping installed in a structure or area, generally overhead, and to which automatic sprinklers are connected in a systematic pattern. The system is usually activated by heat from a fire and discharges water over the fire area.~~ An automatic sprinkler system is an integrated network of piping designed in accordance with fire protection engineering standards, commonly activated by heat from a fire and discharges water over the fire area, that consists of sprinklers, a water supply source, a water control valve, a waterflow alarm, and a drain. The portion of the sprinkler system above ground is a network of specifically sized or hydraulically designed piping installed in a building, structure, or area, generally overhead, and to which sprinklers are attached in a systematic pattern.

Reason Statement: The definition of *automatic sprinkler system* is no longer consistent with the definition in the referenced standard. The definition in Section 202 aligns with the definition found in NFPA 13 (2010) which has been modified several times over past several revision cycles, e.g. 2013, 2016 and 2019 editions of NFPA 13. It is recommended to replace the definition for *automatic sprinkler system* with a definition consistent with the current edition of NFPA 13 (2019).

The importance of this change is to clarify that in a multiple story building, or a building having a footprint exceeding the area limitations of NFPA 13 for a single sprinkler system (52,000 sf or 40,000 sf), would be considered to have one system based on the definition included in Section 202; however, the building would be considered to have multiple systems based upon the definition in NFPA 13 (2019). For example, a 32-story high-rise building having a footprint area of 50,000 sf per floor would be considered as having a single sprinkler system based on the current definition included in Section of 202 while it would be considered as having 32 or more systems based on the definition included of NFPA 13 (2019). Similarly, in a single-story building having an area of 80,000 sf would be considered as having a single sprinkler system based on the definition in Section of 202 while it would be considered as having 2 or more systems based on the definition of NFPA 13 (2019).

The definition could also have an impact on the application of inspection, testing and maintenance requirements since NFPA 25 (2020 and prior eds.) provides system related requirements. Using the example above with respect to internal examination of sprinkler piping per system based on the 5 yr. requirement of NFPA 25. A 32-story high-rise building having a single sprinkler system could be interpreted as requiring four (4) internal examination points for the entire building while NFPA 25 would require four (4) internal examination points in sprinkler systems on alternating floors (e.g. 16 systems) resulting in 64 examination points.

It is recommended to replace the definition to allow for consistency between the *International Building Code* and its referenced standards to ensure consistency in application in all jurisdictions.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Changing the definition does not affect the cost of construction.

F1-21

F2-21

IFC: SECTION 202

Proponents: Gregory Benton, NYS DOS Division of Building Standards and Codes, representing NYS DOS Division of Building Standards and Codes (gregory.benton@dos.ny.gov); Emma Gonzalez-Laders, representing NYS DOS Division of Building Standards and Codes (emma.gonzalez-laders@dos.ny.gov)

2021 International Fire Code

Revise as follows:

ENERGY STORAGE SYSTEM CABINET. A *listed* cabinet containing components of the energy storage system that is included in the UL 9540 listing for the system. Personnel are not able to enter the enclosure other than reaching in to access components for maintenance purposes.

Reason Statement: A common convention in the code when discussing a piece of *listed* equipment is to state that it is *listed* before specifying the listing organization and this edit conforms to that convention.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change proposal is solely an editorial change to conform with how other provisions are written so it won't affect cost.

F2-21

F3-21

IFC: SECTION 202; IBC: SECTION 202

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Fire Code

Revise as follows:

FLAMMABLE GAS. A material which is a gas at 68°F (20°C) or less at 14.7 pounds per square inch atmosphere (psia) (101 kPa) of pressure [a material that has a *boiling point* of 68°F (20°C) or less at 14.7 psia (101 kPa)] ~~which is subdivided as follows:~~

1. ~~is~~ Category 1A.

1. A gas which is ignitable at 14.7 psia (101 kPa) when in a mixture of 13 percent or less by volume with air; or ~~has~~
2. A gas with a flammable range at 14.7 psia (101 kPa) with air of not less than 12 percent, regardless of the lower limit. unless data shows compliance with Category 1B.

2. Category 1B.

A gas which meets the flammability criteria for Category 1A, is not pyrophoric or chemically unstable, and meets one of more of the following:

1. A lower flammability limit of more than 6% by volume of air; or
2. A fundamental burning velocity of less than 3.9 in/s (10 cm/s).

The limits specified shall be determined at 14.7 psi (101 kPa) of pressure and a temperature of 68°F (20°C) in accordance with ASTM E681.

Where not otherwise specified, the term "flammable gas" includes both Category 1A and 1B.

2021 International Building Code

Revise as follows:

[F] FLAMMABLE GAS. A material that is a gas at 68°F (20°C) or less at 14.7 pounds per square inch atmosphere (psia) (101 kPa) of pressure [a material that has a *boiling point* of 68°F (20°C) or less at 14.7 psia (101 kPa)], ~~which also meets one of the following subdivided as follows:~~

1. ~~is~~ Category 1A.

1. A gas which is ignitable at 14.7 psia (101 kPa) when in a mixture of 13 percent or less by volume with air. ~~has~~
2. A gas with a flammable range at 14.7 psia (101 kPa) with air of at least 12 percent, regardless of the lower limit unless data shows compliance with Category 1B.

2. Category 1B.

A gas which meets the flammability criteria for Category 1A, is not pyrophoric or chemically unstable, and meets one or more of the following:

1. A lower flammability limit of more than 6% by volume in air; or
2. A fundamental burning velocity of less than 3.9 in/s (10 cm/s).

The limits specified shall be determined at 14.7 psi (101 kPa) of pressure and a temperature of 68°F (20°C) in accordance with ASTM E681.

Where not otherwise specified, the term "flammable gas" includes both Category 1A and 1B.

Reason Statement: In the 7th edition of the Global Harmonization System of Classification and Labelling of Chemicals (GHS) the classification of flammable gas was expanded. Flammable gases have three categories, Category 1A, Category 1B, and Category 2. The definition is revised to be consistent with the GHS. However, some of the subgroups of Category 1A are not identified since all of the subclass still fall within Category 1A. Not included in the definition are pyrophoric (flammable) gas and chemically unstable (flammable) gas. Within these two additional terms is a requirement

that the gas must first meet the Category 1A definition. Hence, including these terms becomes unnecessary in the Fire Code. GHS also defines a Category 2 flammable gas. The definition of a Category 2 flammable gas is: Category 2 - A gas not meeting the criteria of Category 1A or 1B, which, at 68°F (20 °C) and a pressure of 14.7 psia (101 kPa), has a flammable range while mixed in air. It is recommended that ICC consider adding a note in the commentary that Category 2 flammable gases are not regulated as flammable gases in the Fire Code, however, GHS has a classification for such flammable gases.

The GHS table on flammable gases is as follows:

Table 2.2.1: Criteria for categorisation of flammable gases

Category		Criteria
1A	Flammable gas	Gases, which at 20 °C and a standard pressure of 101.3 kPa: (a) are ignitable when in a mixture of 13% or less by volume in air; or (b) have a flammable range with air of at least 12 percentage points regardless of the lower flammability limit unless data show they meet the criteria for Category 1B
	Pyrophoric gas	Flammable gases that ignite spontaneously in air at a temperature of 54 °C or below
	Chemically unstable gas	A Flammable gases which are chemically unstable at 20°C and a standard pressure of 101.3 kPa
		B Flammable gases which are chemically unstable at a temperature greater than 20°C and/or a pressure greater than 101.3 kPa
1B	Flammable gas	Gases which meet the flammability criteria for Category 1A, but which are not pyrophoric, nor chemically unstable, and which have at least either: (a) a lower flammability limit of more than 6% by volume in air; or (b) a fundamental burning velocity of less than 10 cm/s;
2	Flammable gas	Gases, other than those of Category 1A or 1B, which, at 20 °C and a standard pressure of 101.3 kPa, have a flammable range while mixed in air

NOTE 1: Ammonia and methyl bromide may be regarded as special cases for some regulatory purposes.

NOTE 2: Aerosols should not be classified as flammable gases. See Chapter 2.3.

NOTE 3: In the absence of data allowing classification into Category 1B, a flammable gas that meets the criteria for Category 1A is classified per default in Category 1A.

NOTE 4: Spontaneous ignition for pyrophoric gases is not always immediate, and there may be a delay.

NOTE 5: In the absence of data on its pyrophoricity, a flammable gas mixture should be classified as a pyrophoric gas if it contains more than 1% (by volume) of pyrophoric component(s).

Category 1A flammable gases have a higher flammability and become explosive. These are the flammable gases typically understood such as propane, acetylene, and butane. Category 1B flammable gases have a lower flammability and are not inherently explosive, although all flammable gases can have a deflagration under the right conditions. A typical Category 1B flammable gas would be difluoromethane. The gas has a lower flammable limit of 13.8 percent and an upper flammable limit of 29.9 percent. The burning velocity is 6.7 cm/s or 2.6 in/s. Other Category 1B flammable gases would include: 1,1,1-trifluoroethane; and 2,3,3,3-tetrafluoro-1-propene. Trans-1,3,3,3-tetrafluoro-1-propene and ammonia are a Category 2 flammable gas. The last statement in the definition is to clarify that when not indicated, the term flammable gas applies to both Category 1A and Category 1B. When appropriate, the section in the code will state, "Category 1A flammable gas" or "Category 1B flammable gas."

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 and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: <https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/>

Cost Impact: The code change proposal will not increase or decrease the cost of construction

This change neither increases or decreases the cost of construction. The change only impacts the classification of flammable gases, thus there are no other technical changes to the code through this revision of the definition.

F3-21

F4-21

IFC: SECTION 202, (New)

Proponents: Tim Earl, representing The Gypsum Association (tearl@gbhinternational.com)

2021 International Fire Code

Revise as follows:

[BS] GYPSUM BOARD. ~~A type of gypsum panel product consisting of a noncombustible core primarily of gypsum with paper surfacing. Gypsum wallboard, gypsum sheathing, gypsum base for gypsum veneer plaster, exterior gypsum soffit board, predecorated gypsum board or water-resistant gypsum backing board complying with the standards listed in Tables 2506.2 and 2507.2 and Chapter 35 of the International Building Code.~~

Add new definition as follows:

GYPSUM WALLBOARD. A gypsum board used primarily as an interior surfacing for building structures.

Reason Statement: This redefines one and defines another term already used in the IFC, using definitions already in the IBC and proposed for several other I-Codes this cycle that are also harmonized to ASTM and the industry.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Definition update with no cost impact.

F4-21

F5-21

IFC SECTION 202, 203 (NEW)

Proponents: Crystal Sujeski, California Fire Chiefs Association, representing California Fire Chiefs Association (crystal.sujeski@fire.ca.gov); Robert Marshall, San Mateo Consolidated Fire Department, representing San Mateo Consolidated Fire Department (rmarshall@smcfire.org)

2021 International Fire Code

Add new text as follows:

SECTION 203 OCCUPANCY CLASSIFICATION AND USE.

[BG] 203.1 Occupancy classification. Occupancy classification is the formal designation of the primary purpose of the building, structure or portion thereof. Structures shall be classified into one or more of the occupancy groups specified in this section based on the nature of the hazards and risks to building occupants generally associated with the intended purpose of the building or structure. An area, room or space that is intended to be occupied at different times for different purposes shall comply with all applicable requirements associated with such potential multipurpose. Structures containing multiple occupancy groups shall comply with {Section 508} of the International Building Code. Where a structure is proposed for a purpose that is not specified in this section, such structure shall be classified in the occupancy it most nearly resembles based on the fire safety and relative hazard. Occupied roofs shall be classified in the group that the occupancy most nearly resembles, according to the fire safety and relative hazard, and shall comply with {Section 503.1.4} of the International Building Code.

1. Assembly: Groups A-1, A-2, A-3, A-4 and A-5.
2. Business: Group B.
3. Educational: Group E.
4. Factory and Industrial: Groups F-1 and F-2.
5. High Hazard: Groups H-1, H-2, H-3, H-4 and H-5.
6. Institutional: Groups I-1, I-2, I-3 and I-4.
7. Mercantile: Group M.
8. Residential: Groups R-1, R-2, R-3 and R-4.
9. Storage: Groups S-1 and S-2.
10. Utility and Miscellaneous

[BG] 203.1.1 Use designation. Occupancy groups contain subordinate uses having similar hazards and risks to building occupants. Uses include, but are not limited to, those functional designations specified within the occupancy group descriptions in {Section 203.1}. Certain uses require specific limitations and controls in accordance with the provisions of this code and {Chapter 4} of the International Building Code.

[BG] 203.2 Assembly Group A. Assembly Group A occupancy includes, among others, the use of a building or structure, or a portion thereof, for the gathering of persons for purposes such as civic, social or religious functions; recreation, food or drink consumption or awaiting transportation.

[BG] 203.2.1 Small buildings and tenant spaces. A building or tenant space used for assembly purposes with an occupant load of less than 50 persons shall be classified as a Group B occupancy.

[BG] 203.2.2 Small assembly spaces. The following rooms and spaces shall not be classified as Assembly occupancies:

1. A room or space used for assembly purposes with an occupant load of less than 50 persons and accessory to another occupancy shall be classified as a Group B occupancy or as part of that occupancy.
2. A room or space used for assembly purposes that is less than 750 square feet (70 m²) in area and accessory to another occupancy shall be classified as a Group B occupancy or as part of that occupancy.

[BG] 203.2.3 Associated with Group E occupancies. A room or space used for assembly purposes that is associated with a Group E occupancy is not considered a separate occupancy.

[BG] 203.2.4 Accessory to places of religious worship. Accessory religious educational rooms and religious auditoriums with occupant loads of less than 100 per room or space are not considered separate occupancies.

[BG] 203.2.5 Assembly Group A-1. Group A-1 occupancy includes assembly uses, usually with fixed seating, intended for the production and viewing of the performing arts or motion pictures including, but not limited to:

Motion picture theaters
Symphony and concert halls

Television and radio studios admitting an audience

Theaters

[BG] 203.2.6 Assembly Group A-2. Group A-2 occupancy includes assembly uses intended for food and/or drink consumption including, but not limited to:

Banquet halls

Casinos (gaming areas)

Nightclubs

Restaurants, cafeterias and similar dining facilities (including associated commercial kitchens)

Taverns and bars

[BG] 203.2.7 Assembly Group A-3. Group A-3 occupancy includes assembly uses intended for worship, recreation or amusement and other assembly uses not classified elsewhere in Group A including, but not limited to:

Amusement arcades

Art galleries

Bowling alleys

Community halls

Courtrooms

Dance halls (not including food or drink consumption)

Exhibition halls

Funeral parlors

Greenhouses for the conservation and exhibition of plants that provide public access

Gymnasiums (without spectator seating)

Indoor swimming pools (without spectator seating)

Indoor tennis courts (without spectator seating)

Lecture halls

Libraries

Museums

Places of religious worship

Pool and billiard parlors

Waiting areas in transportation terminals

[BG] 203.2.8 Assembly Group A-4. Group A-4 occupancy includes assembly uses intended for viewing of indoor sporting events and activities with spectator seating including, but not limited to:

Arenas

Skating rinks

Swimming pools

Tennis courts

[BG] 203.2.9 Assembly Group A-5. Group A-5 occupancy includes assembly uses intended for participation in or viewing outdoor activities including, but not limited to:

Amusement park structures

Bleachers

Grandstands

Stadiums

[BG] 203.3 Business Group B. Business Group B occupancy includes, among others, the use of a building or structure, or a portion thereof, for office, professional or service-type transactions, including storage of records and accounts. Business occupancies shall include, but not be limited to, the following:

Airport traffic control towers

Ambulatory care facilities

Animal hospitals, kennels and pounds

Banks

Barber and beauty shops

Car wash

Civic administration

Clinic-outpatient

Dry cleaning and laundries: pick-up and delivery stations and self-service

Educational occupancies for students above the 12th grade, including higher education laboratories.

Electronic data processing

Food processing establishments and commercial kitchens not associated with restaurants, cafeterias and similar dining facilities not more than 2,500 square feet (232 m2) in area.

Laboratories: testing and research

Motor vehicle showrooms

Post offices

Print shops

Professional services (architects, attorneys, dentists, physicians, engineers, etc.)

Radio and television stations

Telephone exchanges

Training and skill development not in a school or academic program (This shall include, but not be limited to, tutoring centers, martial arts studios, gymnastics and similar uses regardless of the ages served, and where not classified as a Group A occupancy).

[BG] 203.3.1 Airport traffic control towers. Airport traffic control towers shall comply with {Section 412.2} of the International Building Code.

[BG] 203.3.2 Ambulatory care facilities. Ambulatory care facilities shall comply with Section 422 of the International Building Code.

[BG] 203.3.3 Higher education laboratories. Higher education laboratories shall comply with Section 428 of the International Building Code.

[BG] 203.4 Educational Group E. Educational Group E occupancy includes, among others, the use of a building or structure, or a portion thereof, by six or more persons at any one time for educational purposes through the 12th grade.

[BG] 203.4.1 Accessory to places of religious worship. Religious educational rooms and religious auditoriums, which are accessory to places of religious worship in accordance with Section 303.1.4 of the International Building Code and have occupant loads of less than 100 per room or space shall be classified as Group A-3 occupancies.

[BG] 203.4.2 Group E, day care facilities. This group includes buildings and structures or portions thereof occupied by more than five children older than 2 1/2 years of age who receive educational, supervision or personal care services for fewer than 24 hours per day.

[BG] 203.4.2.1 Within places of religious worship. Rooms and spaces within places of religious worship providing such day care during religious functions shall be classified as part of the primary occupancy.

[BG] 203.4.2.2 Five or fewer children. A facility having five or fewer children receiving such day care shall be classified as part of the primary occupancy.

[BG] 203.4.2.3 Five or fewer children in a dwelling unit. A facility such as the above within a dwelling unit and having five or fewer children receiving such day care shall be classified as a Group R-3 occupancy or shall comply with the International Residential Code.

[BG] 203.4.3 Storm shelters in Group E occupancies. Storm shelters shall be provided for Group E occupancies where required by Section 423.4 of the International Building Code.

[BG] 203.5 Factory Industrial Group F. Factory Industrial Group F occupancy includes, among others, the use of a building or structure, or a portion thereof, for assembling, disassembling, fabricating, finishing, manufacturing, packaging, repair or processing operations that are not classified as a Group H hazardous or Group S storage occupancy.

[BG] 203.5.1 Moderate-hazard factory industrial, Group F-1. Factory industrial uses that are not classified as Factory Industrial F-2 Low Hazard shall be classified as F-1 Moderate Hazard and shall include, but not be limited to, the following:

Aircraft (manufacturing, not to include repair)

Appliances

Athletic equipment

Automobiles and other motor vehicles

Bakeries

Beverages: over 16-percent alcohol content

Bicycles

Boats

Brooms or brushes

Business machines

Cameras and photo equipment

Canvas or similar fabric

Carpets and rugs (includes cleaning)

Clothing

Construction and agricultural machinery

Disinfectants

Dry cleaning and dyeing

Electric generation plants

Electronics

Energy storage systems (ESS) in dedicated use buildings

Engines (including rebuilding)

Food processing establishments and commercial kitchens not associated with restaurants, cafeterias and similar dining facilities more than 2,500 square feet (232 m2) in area

Furniture

Hemp products

Jute products

Laundries

Leather products

Machinery

Metals

Millwork (sash and door)

Motion pictures and television filming (without spectators)

Musical instruments

Optical goods

Paper mills or products

Photographic film

Plastic products

Printing or publishing

Recreational vehicles

Refuse incineration

Shoes

Soaps and detergents

Textiles

Tobacco

Trailers

Upholstering

Water/sewer treatment facilities

Wood; distillation

Woodworking (cabinet)

[BG] 203.5.1.1 Aircraft manufacturing facilities. Aircraft manufacturing facilities shall comply with Section 412.6 of the International Building Code.

[BG] 203.5.2 Low-hazard factory industrial, Group F-2. Factory industrial uses that involve the fabrication or manufacturing of noncombustible materials that during finishing, packing or processing does not involve a significant fire hazard shall be classified as F-2 occupancies and shall include, but not be limited to, the following:

Beverages: up to and including 16-percent alcohol content

Brick and masonry

Ceramic products

Foundries

Glass products

Gypsum

Ice

Metal products (fabrication and assembly)

[BG] 203.6 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 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). Hazardous occupancies are classified in Groups H-1, H-2, H-3, H-4 and H-5 and shall be in accordance with this code and the requirements of Section 415 of 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.

[BG] 203.6.1 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).
6. Liquor stores and distributors without bulk storage.
7. Refrigeration systems.
8. The storage or utilization of materials for agricultural purposes on the premises.
9. Stationary storage battery systems installed in accordance with {Section 1206.15}.
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, aerosol cooking spray products or plastic aerosol 3 products 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 5003.8.3.5.1.
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.
15. Stationary fuel cell power systems installed in accordance with this code.
16. Capacitor energy storage systems in accordance with this code.
17. Group B higher education laboratory occupancies complying with Section 428 of the International Building Code and Chapter 38 of this code.
18. Distilling or brewing of beverages conforming to the requirements of this code.
19. The storage of beer, distilled spirits and wines in barrels and casks conforming to the requirements of this code.

[BG] 203.6.2 Hazardous materials. Hazardous materials in any quantity shall conform to the requirements of this code, and Section 414 of the International Building Code.

[BG] 203.6.3 High-hazard Group H-1. Buildings and structures containing materials that pose a detonation hazard shall be classified as Group H-1. Such materials shall include, but not be limited to, the following:

Detonable pyrophoric materials

Explosives:

Division 1.1

Division 1.2

Division 1.3

Division 1.4

Division 1.5

Division 1.6

Organic peroxides, unclassified detonable

Oxidizers, Class 4

Unstable (reactive) materials, Class 3 detonable and Class 4

[BG] 203.6.3.1 Occupancies containing explosives not classified as H-1. The following occupancies containing explosive materials shall be classified as follows:

1. Division 1.3 explosive materials that are used and maintained in a form where either confinement or configuration will not elevate the hazard from a mass fire to mass explosion hazard shall be allowed in Group H-2 occupancies.
2. Articles, including articles packaged for shipment, that are not regulated as a Division 1.4 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 shall be allowed in H-3 occupancies.

[BG] 203.6.4 High-hazard Group H-2. Buildings and structures containing materials that pose a deflagration hazard or a hazard from accelerated burning shall be classified as Group H-2. Such materials shall include, but not be limited to, the following:

Class I, II or IIIA flammable or combustible liquids that are used or stored in normally open containers or systems, or in closed containers or systems pressurized at more than 15 pounds per square inch gauge (103.4 kPa)

Combustible dusts 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 414.1.3} of the International Building Code

Cryogenic fluids, flammable

Flammable gases

Organic peroxides, Class I

Oxidizers, Class 3, that are used or stored in normally open containers or systems, or in closed containers or systems pressurized at more than 15 pounds per square inch gauge (103.4 kPa)

Pyrophoric liquids, solids and gases, nondetonable

Unstable (reactive) materials, Class 3, nondetonable

Water-reactive materials, Class 3

[BG] 203.6.5 High-hazard Group H-3. Buildings and structures containing materials that readily support combustion or that pose a physical hazard shall be classified as Group H-3. Such materials shall include, but not be limited to, the following:

Class I, II or IIIA flammable or combustible liquids that are used or stored in normally closed containers or systems pressurized at 15 pounds per square inch gauge (103.4 kPa) or less

Combustible fibers, other than densely packed baled cotton, 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 414.1.3} of the International Building Code

Consumer fireworks, 1.4G (Class C, Common)

Cryogenic fluids, oxidizing

Flammable solids

Organic peroxides, Class II and III

Oxidizers, Class 2

Oxidizers, Class 3, that are used or stored in normally closed containers or systems pressurized at 15 pounds per square inch gauge (103 kPa) or less

Oxidizing gases

Unstable (reactive) materials, Class 2

Water-reactive materials, Class 2

[BG] 203.6.6 High-hazard Group H-4. Buildings and structures containing materials that are health hazards shall be classified as Group H-4. Such materials shall include, but not be limited to, the following:

Corrosives

Highly toxic materials

Toxic materials

[BG] 203.6.7 High-hazard Group H-5. Semiconductor fabrication facilities and comparable research and development areas in which hazardous production materials (HPM) are used and the aggregate quantity of materials is in excess of those specified in Tables 5003.1.1(1) and 5003.1.1(2) shall be classified as Group H-5. Such facilities and areas shall be designed and constructed in accordance with Section 415.11 of the International Building Code.

[BG] 203.6.8 Multiple hazards. Buildings and structures containing a material or materials representing hazards that are classified in one or more of Groups H-1, H-2, H-3 and H-4 shall conform to the code requirements for each of the occupancies so classified.

[BG] 203.7 Institutional Group I. Institutional Group I occupancy includes, among others, the use of a building or structure, or a portion thereof, in which care or supervision is provided to persons who are or are incapable of self-preservation without physical assistance or in which persons are detained for penal or correctional purposes or in which the liberty of the occupants is restricted. Institutional occupancies shall be classified as Group I-1, I-2, I-3 or I-4.

[BG] 203.7.1 Institutional Group I-1. Institutional Group I-1 occupancy shall include buildings, structures or portions thereof for more than 16 persons, excluding staff, who reside on a 24-hour basis in a supervised environment and receive custodial care. Buildings of Group I-1 shall be classified as one of the occupancy conditions specified in Section 203.22.1 or 203.22.2 and shall comply with Section 420 of the International Building Code. This group shall include, but not be limited to, the following:

Alcohol and drug centers

Assisted living facilities

Congregate care facilities

Group homes

Halfway houses

Residential board and care facilities

Residential board and custodial care facilities

Social rehabilitation facilities

[BG] 203.7.1.1 Condition 1. This occupancy condition shall include buildings in which all persons receiving custodial care who, without any assistance, are capable of responding to an emergency situation to complete building evacuation.

[BG] 203.7.1.2 Condition 2. This occupancy condition shall include buildings in which there are any persons receiving custodial care who require limited verbal or physical assistance while responding to an emergency situation to complete building evacuation.

[BG] 203.7.1.3 Six to 16 persons receiving custodial care. A facility housing not fewer than six and not more than 16 persons receiving custodial care shall be classified as Group R-4.

[BG] 203.7.1.4 Five or fewer persons receiving custodial care. A facility with five or fewer persons receiving custodial care shall be classified as Group R-3 or shall comply with the International Residential Code provided an automatic sprinkler system is installed in accordance with Section 903.3.1.3 or with Section P2904 of the International Residential Code.

[BG] 203.7.2 Institutional Group I-2. Institutional Group I-2 occupancy shall include buildings and structures used for medical care on a 24-hour basis for more than five persons who are incapable of self-preservation. This group shall include, but not be limited to, the following:

Foster care facilities

Detoxification facilities

Hospitals

Nursing homes

Psychiatric hospitals

[BG] 203.7.2.1 Occupancy Conditions. Buildings of Group I-2 shall be classified as one of the following occupancy conditions and shall comply with Section 407 of the International Building Code.

[BG] 203.7.2.1.1 Condition 1. This occupancy condition shall include facilities that provide nursing and medical care but do not provide emergency care, surgery, obstetrics or in-patient stabilization units for psychiatric or detoxification, including but not limited to nursing homes and foster care facilities.

[BG] 203.7.2.1.2 Condition 2. This occupancy condition shall include facilities that provide nursing and medical care and could provide emergency care, surgery, obstetrics or in-patient stabilization units for psychiatric or detoxification, including but not limited to hospitals.

[BG] 203.7.2.2 Five or fewer persons receiving medical care. A facility with five or fewer persons receiving medical care shall be classified as Group R-3 or shall comply with the {International Residential Code} provided an automatic sprinkler system is installed in accordance with Section 903.3.1.3 or Section P2904 of the International Residential Code.

[BG] 203.7.3 Institutional Group I-3. Institutional Group I-3 occupancy shall include buildings and structures which are inhabited by more than five persons who are under restraint or security. A Group I-3 facility is occupied by persons who are generally incapable of self-preservation due to security measures not under the occupants' control. This group shall include, but not be limited to, the following:

Correctional centers

Detention centers

Jails

Prerelease centers

Prisons

Reformatories

Buildings of Group I-3 shall be classified as one of the following occupancy conditions specified in Sections 203.24.1 through 203.24.5 and shall comply with Section 408 of the International Building Code.

[BG] 203.7.3.1 Condition 1. This occupancy condition shall include buildings in which free movement is allowed from sleeping areas and other spaces where access or occupancy is permitted to the exterior via means of egress without restraint. A Condition 1 facility is permitted to be constructed as Group R.

[BG] 203.7.3.2 Condition 2. This occupancy condition shall include buildings in which free movement is allowed from sleeping areas and any other occupied smoke compartment to one or more other smoke compartments. Egress to the exterior is impeded by locked exits.

[BG] 203.7.3.3 Condition 3. This occupancy condition shall include buildings in which free movement is allowed within individual smoke compartments, such as within a residential unit comprised of individual sleeping units and group activity spaces, where egress is impeded by remote-controlled release of means of egress from such smoke compartment to another smoke compartment.

[BG] 203.7.3.4 Condition 4. This occupancy condition shall include buildings in which free movement is restricted from an occupied space. Remote-controlled release is provided to permit movement from sleeping units, activity spaces and other occupied areas within the smoke

compartment to other smoke compartments.

[BG] 203.7.3.5 Condition 5. This occupancy condition shall include buildings in which free movement is restricted from an occupied space. Staff-controlled manual release is provided to permit movement from sleeping units, activity spaces and other occupied areas within the smoke compartment to other smoke compartments.

[BG] 203.7.4 Institutional Group I-4, day care facilities. Institutional Group I-4 shall include buildings and structures occupied by more than five persons of any age who receive custodial care for less than 24 hours by persons other than parents or guardians, relatives by blood, marriage, or adoption, and in a place, other than the home of the person cared for. This group shall include, but not be limited to, the following:

Adult day care

Child day care

[BG] 203.7.4.1 Classification as Group E. A child day care facility that provides care for more than five but not more than 100 children 21/2 years or less of age, where the rooms in which the children are cared for are located on a level of exit discharge serving such rooms and each of these child care rooms have an exit door directly to the exterior, shall be classified as Group E.

[BG] 203.7.4.2 Within a place of religious worship. Rooms and spaces within places of religious worship providing such care during religious functions shall be classified as part of the primary occupancy.

[BG] 203.7.4.3 Five or fewer persons receiving care. A facility having five or fewer persons receiving custodial care shall be classified as part of the primary occupancy.

[BG] 203.7.4.4 Five or fewer persons receiving care in a dwelling unit. A facility such as the above within a dwelling unit and having five or fewer persons receiving custodial care shall be classified as a Group R-3 occupancy or shall comply with the International Residential Code.

[BG] 203.8 Mercantile Group M. Mercantile Group M occupancy includes, among others, the use of a building or structure or a portion thereof, for the display and sale of merchandise, and involves stocks of goods, wares or merchandise incidental to such purposes and where the public has access. Mercantile occupancies shall include, but not be limited to, the following:

Department stores

Drug stores

Greenhouses with public access that maintain plants for display and sale

Markets

Motor fuel-dispensing facilities

Retail or wholesale stores

Sales rooms

[BG] 203.8.1 Quantity of hazardous materials. The aggregate quantity of nonflammable solid and nonflammable or noncombustible liquid hazardous materials stored or displayed in a single control area of a Group M occupancy shall not exceed the quantities in Table 5704.3.4.1.

[BG] 203.8.2 Motor fuel-dispensing facilities. Motor fuel-dispensing facilities shall comply with Section 406.7 of the International Building Code.

[BG] 203.9 Residential Group R. Residential Group R includes, among others, the use of a building or structure, or a portion thereof, for sleeping purposes when not classified as an Institutional Group I or when not regulated by the International Residential Code in accordance with Section 101.2 of the International Building Code. Group R occupancies not constructed in accordance with the {International Residential Code} as permitted by Sections 301.4.1 and 301.4.2 of the International Building Code shall comply with Section 420 of the International Building Code.

[BG] 203.9.1 Residential Group R-1. Residential Group R-1 occupancies containing sleeping units where the occupants are primarily transient in nature, including:

Boarding houses (transient) with more than 10 occupants

Congregate living facilities (transient) with more than 10 occupants

Hotels (transient)

Motels (transient)

[BG] 203.9.2 Residential Group R-2. Residential Group R-2 occupancies containing sleeping units or more than two dwelling units where the occupants are primarily permanent in nature, including:

Apartment houses

Congregate living facilities (non-transient) with more than 16 occupants

Boarding houses (non-transient)

Convents

Dormitories

Fraternities and sororities

Monasteries

Hotels (non-transient)

Live/work units

Motels (non-transient)

Vacation timeshare properties

[BG] 203.9.3 Residential Group R-3. Residential Group R-3 occupancies where the occupants are primarily permanent in nature and not classified as Group R-1, R-2, R-4 or I, including:

Buildings that do not contain more than two dwelling units

Care facilities that provide accommodations for five or fewer persons receiving care

Congregate living facilities (non-transient) with 16 or fewer occupants

Boarding houses (non-transient)

Convents

Dormitories

Fraternities and sororities

Monasteries

Congregate living facilities (transient) with 10 or fewer occupants

Boarding houses (transient)

Lodging houses (transient) with five or fewer guestrooms and 10 or fewer occupants

[BG] 203.9.3.1 Care facilities within a dwelling. Care facilities for five or fewer persons receiving care that are within a single-family dwelling are permitted to comply with the International Residential Code provided an automatic sprinkler system is installed in accordance with Section 903.3.1.3 or Section P2904 of the International Residential Code.

[BG] 203.9.3.2 Lodging houses. Owner-occupied lodging houses with five or fewer guest rooms and 10 or fewer total occupants shall be permitted to be constructed in accordance with the International Residential Code provided that an automatic sprinkler system is installed in accordance with Section 903.3.1.3 or Section P2904 of the International Residential Code.

[BG] 203.9.4 Residential Group R-4. Residential Group R-4 shall include buildings, structures or portions thereof for more than five but not more than 16 persons, excluding staff, who reside on a 24-hour basis in a supervised residential environment and receive custodial care. Buildings of Group R-4 shall be classified as one of the occupancy conditions specified in Section 203.31.1 or 203.31.2. Group R-4 occupancies shall meet the requirements for construction as defined for Group R-3, except as otherwise provided for in the International Building Code. This group shall include, but not be limited to, the following:

Alcohol and drug centers

Assisted living facilities

Congregate care facilities

Group homes

Halfway houses

Residential board and care facilities

Social rehabilitation facilities

[BG] 203.9.4.1 Condition 1. This occupancy condition shall include buildings in which all persons receiving custodial care, without any assistance, are capable of responding to an emergency situation to complete building evacuation.

[BG] 203.9.4.2 Condition 2. This occupancy condition shall include buildings in which there are any persons receiving custodial care who require limited verbal or physical assistance while responding to an emergency situation to complete building evacuation.

[BG] 203.10 Storage Group S. Storage Group S occupancy includes, among others, the use of a building or structure, or a portion thereof, for

storage that is not classified as a hazardous occupancy.

[BG] 203.10.1 Accessory storage spaces. A room or space used for storage purposes that is less than 100 square feet (9.3 m2) in area and accessory to another occupancy shall be classified as part of that occupancy. The aggregate area of such rooms or spaces shall not exceed the allowable area limits of Section 508.2 of the International Building Code.

[BG] 203.10.2 Combustible storage. High-piled stock or rack storage, or attic, under-floor and concealed spaces used for storage of combustible materials, shall be in accordance with Section 413 of the International Building Code.

[BG] 203.10.3 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, Levels 2 and 3

Aircraft hangar (storage and repair)

Bags: cloth, burlap and paper

Bamboos and rattan

Baskets

Belting: canvas and leather

Beverages over 16-percent alcohol content

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 5003.1.1(1) (see Section 406.8 of the International Building Code)

Photo engravings

Resilient flooring

Self-service storage facility (mini-storage)

Silks

Soaps

Sugar

Tires, bulk storage of Tobacco, cigars, cigarettes and snuff

Upholstery and mattresses

Wax candles

[BG] 203.10.3.1 Aircraft hangars. Aircraft hangars used for storage or repair shall comply with Section 412.3 of the International Building Code.

[BG] 203.10.3.2 Motor vehicle repair garages. Motor vehicle repair garages shall comply with Section 406.8 of the *International Building Code*.

[BG] 203.10.4 Low-hazard storage, Group S-2. Storage Group S-2 occupancies include, among others, buildings used for the storage of noncombustible materials, such as products on wood pallets or in paper cartons with or without single thickness divisions; or in paper wrappings.

Such products are permitted to have a negligible amount of plastic trim, such as knobs, handles or film wrapping. Storage uses shall include, but not be limited to, storage of the following:

Asbestos
Beverages up to and including 16-percent alcohol
Cement in bags
Chalk and crayons
Dairy products in non-waxed coated paper containers
Dry cell batteries
Electrical coils
Electrical motors
Empty cans
Food products
Foods in noncombustible containers
Fresh fruits and vegetables in non-plastic trays or containers
Frozen foods
Glass
Glass bottles, empty or filled with noncombustible liquids
Gypsum board
Inert pigments
Ivory
Meats
Metal cabinets
Metal desks with plastic tops and trim
Metal parts
Metals
Mirrors
Oil-filled and other types of distribution transformers
Public parking garages, open or enclosed
Porcelain and pottery
Stoves
Talc and soap stones
Washers and dryers

[BG] 203.10.4.1 Public parking garages. Public parking garages shall comply with Section 406.4 of the International Building Code and the additional requirements of Section 406.5 of the International Building Code for open parking garages or Section 406.6 of the International Building Code for enclosed parking garages.

[BG] 203.11 Miscellaneous Group U. Buildings and structures of an accessory character and miscellaneous structures not classified in any specific occupancy shall be constructed, equipped and maintained to conform to the requirements of this code commensurate with the fire and life hazard incidental to their occupancy. Group U shall include, but not be limited to, the following:

Agricultural buildings
Aircraft hangar, accessory to a one- or two-family residence (see Section 412.4 of the International Building Code)
Barns
Carports
Communication equipment structures with a gross floor area of less than 1,500 square feet (139 m²)
Fences more than 7 feet (2134 mm) in height
Grain silos, accessory to a residential occupancy

Livestock shelters

Private garages

Retaining walls

Sheds

Stables

Tanks

Towers

[BG] 203.11.1 Greenhouses. Greenhouses not classified as another occupancy shall be classified as Use Group U.

[BG] 203.11.2 Private garages and carports. Private garages and carports shall comply with Section 406.3 of the International Building Code.

[BG] 203.11.3 Residential aircraft hangars. Aircraft hangars accessory to a one- or two-family residence shall comply with Section 412.4 of the International Building Code.

Revise as follows:

OCCUPANCY CLASSIFICATION. See Section 203. ~~For the purposes of this code, certain occupancies are defined as follows:~~

~~**[BG] Group A, Assembly** Assembly Group A occupancy includes, among others, the use of a building or structure, or a portion thereof, for the gathering of persons for purposes such as civic, social or religious functions; recreation, food or drink consumption; or awaiting transportation.~~

~~{BG} Accessory with places of religious worship. Accessory religious educational rooms and religious auditoriums with *occupant loads* of less than 100 per room or space are not considered separate occupancies.~~

~~{BG} Assembly Group A-1. Group A occupancy includes assembly uses, usually with fixed seating, intended for the production and viewing of performing arts or motion pictures including, but not limited to:~~

~~Motion picture theaters
Symphony and concert halls
Television and radio studios admitting an audience
Theaters~~

~~{BG} Assembly Group A-2. Group A-2 occupancy includes assembly uses intended for food and/or drink consumption including, but not limited to:~~

~~Banquet halls
Casinos (gaming areas)
Night clubs
Restaurants, cafeterias and similar dining facilities (including associated commercial kitchens)
Taverns and bars~~

~~{BG} Assembly Group A-3. Group A-3 occupancy includes assembly uses intended for worship, recreation or amusement and other assembly uses not classified elsewhere in Group A, including, but not limited to:~~

~~Amusement arcades
Art galleries
Bowling alleys
Community halls
Courtrooms
Dance halls (not including food or drink consumption)
Exhibition halls
Funeral parlors
Greenhouses with public access for the conservation and exhibition of plants
Gymnasiums (without spectator seating)
Indoor swimming pools (without spectator seating)
Indoor tennis courts (without spectator seating)
Lecture halls
Libraries~~

Museums
Places of religious worship
Pool and billiard parlors
Waiting areas in transportation terminals

~~{BG} Assembly Group A-4. Group A-4 occupancy includes assembly uses intended for viewing of indoor sporting events and activities with spectator seating including, but not limited to:~~

~~Arenas
Skating rinks
Swimming pools
Tennis courts~~

~~{BG} Assembly Group A-5. Group A-5 occupancy includes assembly uses intended for participation in or viewing outdoor activities including, but not limited to:~~

~~Amusement park structures
Bleachers
Grandstands
Stadiums~~

~~{BG} Associated with Group E occupancies. A room or space used for assembly purposes that is associated with a Group E occupancy is not considered a separate occupancy.~~

~~{BG} Small assembly spaces. The following rooms and spaces shall not be classified as assembly occupancies:~~

- ~~1. A room or space used for assembly purposes with an *occupant load* of less than 50 persons and accessory to another occupancy shall be classified as a Group B occupancy or as part of that occupancy.~~
- ~~2. A room or space used for assembly purposes that is less than 750 square feet (70 m²) in area and accessory to another occupancy shall be classified as a Group B occupancy or as part of that occupancy.~~

~~{BG} Small buildings and tenant spaces. A building or tenant space used for assembly purposes with an *occupant load* of less than 50 persons shall be classified as a Group B occupancy.~~

~~{BG} Special amusement areas. Special amusement areas shall comply with Section 411 of the *International Building Code*.~~

~~{BG} Group B, Business~~ Business Group B occupancy includes, among others, the use of a building or structure, or a portion thereof, for office, professional or service-type transactions, including storage of records and accounts. Business occupancies shall include, but not be limited to, the following:

~~Airport traffic control towers
Ambulatory care facilities
Animal hospitals, kennels and pounds
Banks
Barber and beauty shops
Car wash
Civic administration
Clinic-outpatient
Dry cleaning and laundries: pick-up and delivery stations and self-service
Educational occupancies for students above the 12th grade, including higher education laboratories
Electronic data processing
Food processing establishments and commercial kitchens not associated with restaurants, cafeterias and similar dining facilities not more than 2,500 square feet (232 m²) in area.
Laboratories: testing and research
Motor vehicle showrooms
Post offices
Print shops
Professional services (architects, attorneys, dentists, physicians, engineers, etc.)
Radio and television stations
Telephone exchanges
Training and skill development not in a school or academic program (This shall include, but not be limited to, tutoring centers, martial arts studios, gymnastics and similar uses regardless of the ages served, and where not classified as a Group A occupancy).~~

~~{BG} Airport traffic control towers. Airport traffic control towers shall comply with Section 412.2 of the *International Building Code*.~~

~~{BG} Ambulatory care facilities. Ambulatory care facilities shall comply with Section 422 of the *International Building Code*.~~

~~{BG} Higher education laboratories. Higher education laboratories shall comply with Section 428 of the *International Building Code*.~~

{BG} Group E, Educational Educational Group E occupancy includes, among others, the use of a building or structure, or a portion thereof, by six or more persons at any one time for educational purposes through the 12th grade.

~~{BG} Accessory to places of religious worship. Religious educational rooms and religious auditoriums, which are accessory to places of religious worship in accordance with Section 303.1.4 of the *International Building Code* and have *occupant loads* of less than 100 per room or space shall be classified as Group A-3 occupancies.~~

~~{BG} Group E, day care facilities. This group includes buildings and structures or portions thereof occupied by more than five children older than 2½ years of age who receive educational, supervision or *personal care services* for less than 24 hours per day.~~

~~{BG} Five or fewer children. A facility having five or fewer children receiving such care shall be classified as part of the primary occupancy.~~

~~{BG} Five or fewer children in a dwelling unit. A facility such as the above within a *dwelling unit* and having five or fewer children receiving such care shall be classified as a Group R-3 occupancy or shall comply with the *International Residential Code*.~~

~~{BG} Within places of worship. Rooms and spaces within places of worship providing such care during religious functions shall be classified as part of the primary occupancy.~~

~~{BG} Storm shelters in Group E occupancies. Storm shelters shall be provided for Group E occupancies where required by Section 423.4 of the *International Building Code*.~~

{BG} Group F, Factory Industrial Factory Industrial Group F occupancy includes, among others, the use of a building or structure, or a portion thereof, for assembling, disassembling, fabricating, finishing, manufacturing, packaging, repair or processing operations that are not classified as a Group H high-hazard or Group S storage occupancy.

~~{BG} Factory Industrial F-1 Moderate hazard occupancy. Factory industrial uses that are not classified as Factory Industrial F-2 Low Hazard shall be classified as F-1 Moderate Hazard and shall include, but not be limited to, the following:~~

~~Aircraft (manufacturing, not to include repair)
Appliances
Athletic equipment
Automobiles and other motor vehicles
Bakeries
Beverages; over 16 percent alcohol content
Bicycles
Boats
Brooms or brushes
Business machines
Cameras and photo equipment
Canvas or similar fabric
Carpets and rugs (includes cleaning)
Clothing
Construction and agricultural machinery
Disinfectants
Dry cleaning and dyeing
Electric generation plants
Electronics
Energy storage systems (ESS) in dedicated-use buildings
Engines (including rebuilding)
Food processing and commercial kitchens not associated with restaurants, cafeterias and similar dining facilities more than 2,500 square feet (232 m²) in area
Furniture
Hemp products
Jute products
Laundries
Leather products
Machinery~~

- Metals
- Millwork (sash and door)
- Motion pictures and television filming (without spectators)
- Musical instruments
- Optical goods
- Paper mills or products
- Photographic film
- Plastic products
- Printing or publishing
- Refuse incineration
- Shoes
- Soaps and detergents
- Textiles
- Tobacco
- Trailers
- Upholstering
- Water/sewer treatment facilities
- Wood; distillation
- Woodworking (cabinet)

~~{BG} Aircraft manufacturing facilities. Aircraft manufacturing facilities shall comply with Section 412.6 of the *International Building Code*.~~

~~{BG} Factory Industrial F-2 Low-hazard Occupancy. Factory industrial uses involving the fabrication or manufacturing of noncombustible materials that, during finishing, packaging or processing do not involve a significant fire hazard, shall be classified as Group F-2 occupancies and shall include, but not be limited to, the following:~~

- ~~Beverages; up to and including 16 percent alcohol content~~
- ~~Brick and masonry~~
- ~~Ceramic products~~
- ~~Foundries~~
- ~~Glass products~~
- ~~Gypsum~~
- ~~Ice~~
- ~~Metal products (fabrication and assembly)~~

Group H, High-hazard 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 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). Hazardous occupancies are classified in Groups H-1, H-2, H-3, H-4 and H-5 and shall be in accordance with this code and the requirements of Section 415 of 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.

~~High hazard Group H-1. Buildings and structures containing materials that pose a *detonation* hazard shall be classified as Group H-1. Such materials shall include, but not be limited to, the following:~~

- ~~Detonable pyrophoric materials~~
- ~~Explosives:~~
 - ~~Division 1.1~~
 - ~~Division 1.2~~
 - ~~Division 1.3~~
 - ~~Division 1.4~~
 - ~~Division 1.5~~
 - ~~Division 1.6~~
- ~~Organic peroxides, unclassified detonable~~
- ~~Oxidizers, Class 4~~
- ~~Unstable (reactive) materials, Class 3 detonable, and Class 4~~

~~High hazard Group H-2. Buildings and structures containing materials that pose a *deflagration* hazard or a hazard from accelerated burning shall be classified as Group H-2. Such materials shall include, but not be limited to, the following:~~

- ~~Class I, II or IIIA flammable or *combustible liquids* that are used or stored in normally open containers or systems, or in closed containers or systems pressurized at more than 15 pounds per square inch gauge (103.4 kPa)~~
- ~~*Combustible dusts* 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 414.1.3 of the International~~

~~Building Code~~

~~Cryogenic fluids, flammable~~

~~Flammable gases~~

~~Organic peroxides, Class I~~

~~Oxidizers, Class 3, that are used or stored in normally open containers or systems, or in closed containers or systems pressurized at more than 15 pounds per square inch gauge (103.4 kPa)~~

~~Pyrophoric liquids, solids and gases, nondetonable~~

~~Unstable (reactive) materials, Class 3, nondetonable~~

~~Water-reactive materials, Class 3~~

~~High hazard Group H-3. Buildings and structures containing materials that readily support combustion or that pose a *physical hazard* shall be classified as Group H-3. Such materials shall include, but not be limited to, the following:~~

~~Class I, II or IIIA flammable or *combustible liquids* that are used or stored in normally closed containers or systems pressurized at 15 pounds per square inch gauge (103.4 kPa) or less~~

~~Combustible fibers, other than densely packed baled cotton, 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 414.1.3 of the International Building Code~~

~~Consumer fireworks, 1.4G (Class C, Common)~~

~~Cryogenic fluids, oxidizing~~

~~Flammable solids~~

~~Organic peroxides, Class II and III~~

~~Oxidizers, Class 2~~

~~Oxidizers, Class 3, that are used or stored in normally closed containers or systems pressurized at 15 pounds per square inch gauge (103 kPa) or less~~

~~Oxidizing gases~~

~~Unstable (reactive) materials, Class 2~~

~~Water-reactive materials, Class 2~~

~~High hazard Group H-4. Buildings and structures containing materials that are *health hazards* shall be classified as Group H-4. Such materials shall include, but not be limited to, the following:~~

~~Corrosives~~

~~Highly toxic materials~~

~~Toxic materials~~

~~High hazard Group H-5. Semiconductor fabrication facilities and comparable research and development areas in which hazardous production materials (HPM) are used and the aggregate quantity of materials is in excess of those listed in Tables 5003.1.1(1) and 5003.1.1(2) shall be classified as Group H-5. Such facilities and areas shall be designed and constructed in accordance with Section 415.11 of the International Building Code.~~

~~Multiple hazards. Buildings and structures containing a material or materials representing hazards that are classified in one or more of Groups H-1, H-2, H-3 and H-4 shall conform to the code requirements for each of the occupancies so classified.~~

~~Occupancies containing explosives not classified as H-1. The following occupancies containing *explosive materials* shall be classified as follows:~~

~~1.Division 1.3 *explosive materials* that are used and maintained in a form where either confinement or configuration will not elevate the hazard from a mass fire hazard to mass explosion hazard shall be allowed in Group H-2 occupancies.~~

~~2.Articles, including articles packaged for shipment, that are not regulated as a Division 1.4 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 shall be allowed in H-3 occupancies.~~

~~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).
6. Liquor stores and distributors without bulk storage.
7. Refrigeration systems.
8. The storage or utilization of materials for agricultural purposes on the premises.
9. Stationary storage battery systems installed in accordance with Section 1207.
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, aerosol cooking spray products or plastic aerosol products 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 nonecombustible liquid hazardous materials in quantities not exceeding the *maximum allowable quantity per control area* in Group M or S occupancies complying with Section 5003.8.3.5.1.
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 that such storage conforms to the quantity limits and requirements of this code.
15. Stationary fuel cell power systems installed in accordance with this code.
16. *Capacitor energy storage systems* in accordance with this code.
17. Group B higher education laboratory occupancies complying with Section 428 of the International Building Code and Chapter 38 of this code.
18. Distilling or brewing of beverages conforming to the requirements of this code.
19. The storage of beer, distilled spirits and wines in barrels and casks conforming to the requirements of this code.

[BG] Group I, Institutional Institutional Group I occupancy includes, among others, the use of a building or structure, or a portion thereof, in which care or supervision is provided to persons who are or are not capable of self-preservation without physical assistance or in which persons are detained for penal or correctional purposes or in which the liberty of the occupants is restricted. Institutional occupancies shall be classified as Group I-1, I-2, I-3 or I-4.

[BG] Institutional Group I-1. Institutional Group I-1 occupancy shall include buildings, structures or portions thereof for more than 16 persons, excluding staff, who reside on a 24-hour basis in a supervised environment and receive custodial care. Buildings of Group I-1 shall be classified as one of the occupancy conditions indicated below and shall comply with Section 420 of the *International Building Code*. This group shall include, but not be limited to, the following:

- Alcohol and drug centers
- Assisted living facilities
- Congregate care facilities
- Group homes
- Halfway houses
- Residential board and care facilities
- Residential board and custodial care facilities
- Social rehabilitation facilities

[BG] Condition 1. This occupancy condition shall include buildings in which all persons receiving custodial care who, without any assistance, are capable of responding to an emergency situation to complete building evacuation.

[BG] Condition 2. This occupancy condition shall include buildings in which there are any persons receiving custodial care who require limited verbal or physical assistance while responding to an emergency situation to complete building evacuation.

[BG] Five or fewer persons receiving custodial care. A facility with five or fewer persons receiving custodial care shall be classified as Group R-3 or shall comply with the *International Residential Code* provided that an *automatic sprinkler system* is installed in accordance with Section 903.3.1.3 or with Section P2904 of the *International Residential Code*.

[BG] Six to 16 persons receiving custodial care. A facility housing not fewer than six and not more than 16 persons receiving custodial care shall be classified as Group R-4.

[BG] Institutional Group I-2. Institutional Group I-2 occupancy shall include buildings and structures used for medical care on a 24-hour basis for more than five persons who are not capable of self-preservation. This group shall include, but not be limited to, the following:

- Foster care facilities
- Detoxification facilities
- Hospitals
- Nursing homes
- Psychiatric hospitals

[BG] Occupancy Conditions. Buildings of Group I-2 shall be classified as one of the following occupancy conditions and shall comply with Section 407 of the *International Building Code*:

[BG] Condition 1. This occupancy condition shall include facilities that provide nursing and medical care but do not provide emergency care, surgery, obstetrics, or in-patient stabilization units for psychiatric or detoxification, including, but not limited to, nursing homes and foster care facilities.

~~{BG} Condition 2. This occupancy condition shall include facilities that provide nursing and medical care and could provide emergency care, surgery, obstetrics, or inpatient stabilization units for psychiatric or detoxification, including, but not limited to, hospitals.~~
~~{BG} Five or fewer persons receiving medical care. A facility with five or fewer persons receiving medical care shall be classified as Group R-3 or shall comply with the *International Residential Code* provided that an *automatic sprinkler system* is installed in accordance with Section 903.3.1.3 or with Section P2904 of the *International Residential Code*.~~

~~{BG} Institutional Group I-3. Institutional Group I-3 occupancy shall include buildings and structures which are inhabited by more than five persons who are under restraint or security. A Group I-3 facility is occupied by persons who are generally incapable of self-preservation due to security measures not under the occupants' control. This group shall include, but not be limited to, the following:~~

~~Correctional centers
Detention centers
Jails
Prerelease centers
Prisons
Reformatories~~

~~Buildings of Group I-3 shall be classified as one of the following occupancy conditions and shall comply with Section 408 of the *International Building Code*:~~

~~{BG} Condition 1. This occupancy condition shall include buildings in which free movement is allowed from sleeping areas and other spaces where access or occupancy is permitted to the exterior via *means of egress* without restraint. A Condition 1 facility is permitted to be constructed as Group R.~~

~~{BG} Condition 2. This occupancy condition shall include buildings in which free movement is allowed from sleeping areas and any other occupied *smoke compartment* to one or more other *smoke compartments*. Egress to the exterior is impeded by locked *exits*.~~

~~{BG} Condition 3. This occupancy condition shall include buildings in which free movement is allowed within individual *smoke compartments*, such as within a residential unit comprised of individual *sleeping units* and group activity spaces, where egress is impeded by remote-controlled release of *means of egress* from such *smoke compartment* to another *smoke compartment*.~~

~~{BG} Condition 4. This occupancy condition shall include buildings in which free movement is restricted from an occupied space. Remote-controlled release is provided to permit movement from *sleeping units*, activity spaces and other occupied areas within the *smoke compartment* to other *smoke compartments*.~~

~~{BG} Condition 5. This occupancy condition shall include buildings in which free movement is restricted from an occupied space. Staff-controlled manual release is provided to permit movement from *sleeping units*, activity spaces and other occupied areas within the *smoke compartment* to other *smoke compartments*.~~

~~{BG} Institutional Group I-4, day care facilities. Institutional Group I-4 shall include buildings and structures occupied by more than five persons of any age who receive custodial care for less than 24 hours by persons other than parents or guardians; relatives by blood, marriage, or adoption; and in a place other than the home of the person cared for. This group shall include, but not be limited to, the following:~~

~~Adult day care
Child day care~~

~~{BG} Classification as Group E. A child day care facility that provides care for more than five but not more than 100 children 2¹/₂ years or less of age, where the rooms in which the children are cared for are located on a *level of exit discharge* serving such rooms and each of these child care rooms has an *exit door* directly to the exterior, shall be classified as Group E.~~

~~{BG} Five or fewer occupants receiving care in a dwelling unit. A facility such as the above within a *dwelling unit* and having five or fewer persons receiving custodial care shall be classified as a Group R-3 occupancy or shall comply with the *International Residential Code*.~~

~~{BG} Five or fewer occupants receiving care. A facility having five or fewer persons receiving custodial care shall be classified as part of the primary occupancy.~~

~~{BG} Within a place of religious worship. Rooms and spaces within places of religious worship providing such care during religious functions shall be classified as part of the primary occupancy.~~

{BG} Group M, Mercantile Mercantile Group M occupancy includes, among others, the use of a building or structure or a portion thereof, for the display and sale of merchandise, and involves stocks of goods, wares or merchandise incidental to such purposes and accessible to the public. Mercantile occupancies shall include, but not be limited to, the following:

Department stores
Drug stores
Greenhouses with public access that maintain plants for display and sale
Markets
Motor fuel dispensing facilities
Retail or wholesale stores
Sales rooms

~~{BG} Motor fuel dispensing facilities. Motor fuel dispensing facilities shall comply with Section 406.7 of the *International Building Code*.~~

~~{BG} Quantity of hazardous materials. The aggregate quantity of nonflammable solid and nonflammable or noncombustible liquid hazardous materials stored or displayed in a single control area of a Group M occupancy shall not exceed the quantities in Table 5704.3.4.1.~~

{BG} Group R, Residential Residential Group R includes, among others, the use of a building or structure, or a portion thereof, for sleeping purposes when not classified as an Institutional Group I or when not regulated by the *International Residential Code* in accordance with Section 101.2 of the *International Building Code*. Group R occupancies not constructed in accordance with the *International Residential Code* as permitted by Sections 310.4.1 and 310.4.2 of the *International Building Code* shall comply with Section 420 of the *International Building Code*.

~~{BG} Residential Group R-1. Residential Group R-1 occupancies containing *sleeping units* where the occupants are primarily transient in nature, including:~~

~~Boarding houses (transient) with more than 10 occupants
Congregate living facilities (transient) with more than 10 occupants
Hotels (transient)
Motels (transient)~~

~~{BG} Residential Group R-2. Residential Group R-2 occupancies containing *sleeping units* or more than two *dwelling units* where the occupants are primarily permanent in nature, including:~~

~~Apartment houses
Congregate living facilities (nontransient) with more than 16 occupants
Boarding houses (nontransient)
Convents
Dormitories
Fraternities and sororities
Monasteries
Hotels (nontransient)
Live/work units
Motels (nontransient)
Vacation timeshare properties~~

~~{BG} Residential Group R-3. Residential Group R-3 occupancies where the occupants are primarily permanent in nature and not classified as Group R-1, R-2, R-4 or I, including:~~

~~Buildings that do not contain more than two *dwelling units*
Care facilities that provide accommodations for five or fewer persons receiving care
Congregate living facilities (nontransient) with 16 or fewer occupants
Boarding houses (nontransient)
Convents
Dormitories
Fraternities and sororities
Monasteries
Congregate living facilities (transient) with 10 or fewer occupants
Boarding houses (transient)
Lodging houses (transient) with five or fewer guestrooms and 10 or fewer occupants~~

~~{BG} Care facilities within a dwelling. Care facilities for five or fewer persons receiving care that are within a single family dwelling are permitted to comply with the *International Residential Code* provided an *automatic sprinkler system* is installed in accordance with Section 903.3.1.3 or Section P2904 of the *International Residential Code*.~~

~~{BG} Lodging houses. Owner-occupied *lodging houses* with five or fewer guestrooms and 10 or fewer total occupants shall be permitted to be constructed in accordance with the *International Residential Code* provided that an *automatic sprinkler system* is installed in accordance with Section 903.3.1.3 or Section P2904 of the *International Residential Code*.~~

~~{BG} Residential Group R-4. Residential Group R-4 shall include buildings, structures or portions thereof for more than five but not more than 16 persons, excluding staff, who reside on a 24-hour basis in a supervised residential environment and receive custodial care. Buildings of Group R-4 shall be classified as one of the occupancy conditions indicated below. This group shall include, but not be limited to, the following:~~

~~Alcohol and drug centers
Assisted living facilities
Congregate care facilities
Group homes~~

Halfway houses
Residential board and care facilities
Social rehabilitation facilities

Group R-4 occupancies shall meet the requirements for construction as defined for Group R-3, except as otherwise provided for in the *International Building Code*.

~~{BG} Condition 1. This occupancy condition shall include buildings in which all persons receiving custodial care, without any assistance, are capable of responding to an emergency situation to complete building evacuation.~~

~~{BG} Condition 2. This occupancy condition shall include buildings in which there are any persons receiving custodial care who require limited verbal or physical assistance while responding to an emergency situation to complete building evacuation.~~

[BG] Group S, Storage Storage Group S occupancy includes, among others, the use of a building or structure, or a portion thereof, for storage that is not classified as a hazardous occupancy.

~~{BG} Group S-1 moderate-hazard storage. 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, Levels 2 and 3
Aircraft hangar (storage and repair)
Bags: cloth, burlap and paper
Bamboos and rattan
Baskets
Belting: canvas and leather
Beverages over 16 percent alcohol content
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
Gordage
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 5003.1.1(1) (see Section 406.8 of the *International Building Code*)
Photo engravings
Resilient flooring
Self-service storage facility (mini-storage)
Silks
Soaps
Sugar
Tires, bulk storage of Tobacco, cigars, cigarettes and snuff
Upholstery and mattresses
Wax candles~~

~~{BG} Aircraft hangars. Aircraft hangars used for storage or repair shall comply with Section 412.3 of the *International Building Code*.~~

~~{BG} Motor vehicle repair garages. Motor vehicle repair garages shall comply with Section 406.8 of the *International Building Code*.~~

~~{BG} Group S-2 low-hazard storage. Storage Group S-2 occupancies include, among others, buildings used for the storage of noncombustible materials such as products on wood pallets or in paper cartons with or without single thickness divisions; or in paper wrappings. Such products are permitted to have a negligible amount of plastic trim, such as knobs, handles or film wrapping. Storage uses shall include, but not be limited to, storage of the following:~~

~~Asbestos
Beverages up to and including 16 percent alcohol
Cement in bags
Chalk and crayons~~

~~Dairy products in nonwaxed-coated paper containers~~
~~Dry cell batteries~~
~~Electrical coils~~
~~Electrical motors~~
~~Empty cans~~
~~Food products~~
~~Foods in noncombustible containers~~
~~Fresh fruits and vegetables in nonplastic trays or containers~~
~~Frozen foods~~
~~Glass~~
~~Glass bottles, empty or filled with noncombustible liquids~~
~~Gypsum board~~
~~Inert pigments~~
~~Ivory~~
~~Meats~~
~~Metal cabinets~~
~~Metal desks with plastic tops and trim~~
~~Metal parts~~
~~Metals~~
~~Mirrors~~
~~Oil-filled and other types of distribution transformers~~
~~Porcelain and pottery~~
~~Public parking garages, open or enclosed~~
~~Stoves~~
~~Tale and soapstones~~
~~Washers and dryers~~

~~{BG} Public parking garages. Public parking garages shall comply with Section 406.4 of the *International Building Code* and the additional requirements of Section 406.5 of the *International Building Code* for open parking garages or Section 406.6 of the *International Building Code* for enclosed parking garages.~~

~~{BG} Combustible storage. High piled stock or rack storage, or attic, under floor and concealed spaces used for storage of combustible materials, shall be in accordance with Section 413 of the *International Building Code*.~~

~~{BG} Accessory storage spaces. A room or space used for storage purposes that is accessory to another occupancy shall be classified as part of that occupancy.~~

{BG} Group U, Miscellaneous ~~Buildings and structures of an accessory character and miscellaneous structures not classified in any specific occupancy shall be constructed, equipped and maintained to conform to the requirements of this code commensurate with the fire and life hazard incidental to their occupancy. Group U shall include, but not be limited to, the following:~~

~~Agricultural buildings~~
~~Aircraft hangar, accessory to a one- or two-family residence (see Section 412.4 of the *International Building Code*)~~
~~Barns~~
~~Carports~~
~~Communication equipment structures with a gross floor area of less than 1,500 square feet (139 m²)~~
~~Fences more than 7 feet (2134 mm) in height~~
~~Grain silos, accessory to a residential occupancy~~
~~Livestock shelters~~
~~Private garages~~
~~Retaining walls~~
~~Sheds~~
~~Stables~~
~~Tanks~~
~~Towers~~

~~{BG} Private garages and carports. Private garages and carports shall comply with Section 406.3 of the *International Building Code*.~~

~~{BG} Residential aircraft hangars. Aircraft hangars accessory to a one- or two-family residence shall comply with Section 412.4 of the *International Building Code*.~~

~~{BG} Greenhouses. Greenhouses not classified as another occupancy shall be classified as Use Group U.~~

Staff Analysis: Note that the current "Occupancy Classification" definition in the IFC is in a slightly different order due to formatting issues in the IFC. This proposal has arranged the sections to match the IBC order.

Reason Statement: The Occupancy Classification and Use Chapter 3 of the International Building Code (IBC) was incorporated in the International Fire Code (IFC) Chapter 2 General Definitions more than 10 years ago. The IBC Chapter 3 provides the criteria by which buildings and structures are classified into use groups and occupancies. The balance of the code, occupancy classification is fundamental in the setting of features of construction; occupant safety requirements, especially building limitations; means of egress; fire protection systems; and interior finishes. The International Fire Code does use the occupancy groups throughout the code, so it is a valid reason to have them duplicated here for reference within the code itself. The problem with having the occupancies mixed in the definitions is that the alphabetical order gets interrupted at the "O" letter where the occupancy classification list starts. An additional problem is that some occupancy groups have special conditions and fall as subsections in the IBC. This formatting does not easily translate into the traditional alphabetical sequence of definitions. The tracking of code changes between the IBC and the IFC seems to be problematic, and the result is two different definitions for the same term. This leads to confusion when a code pointers send you to provisions in both codes. This proposal separates out the occupancy classifications from the alphabetical order in Section 202 in the IFC and adds a new Section 203 for the correlation of Occupancy Classification and Use with the IBC. The numbering of the sections and subsections gives structure for tracking and allows for subsections when needed.

The following represents the revisions to the language from what is currently in the definition in Section 202.

SECTION 203 OCCUPANCY CLASSIFICATION AND USE

{BG} 203.1 Occupancy classification. Occupancy classification is the formal designation of the primary purpose of the building, structure or portion thereof. Structures shall be classified into one or more of the occupancy groups specified in this section based on the nature of the hazards and risks to building occupants generally associated with the intended purpose of the building or structure. An area, room or space that is intended to be occupied at different times for different purposes shall comply with all applicable requirements associated with such potential multipurpose. Structures containing multiple occupancy groups shall comply with {Section 508} of the International Building Code. Where a structure is proposed for a purpose that is not specified in this section, such structure shall be classified in the occupancy it most nearly resembles based on the fire safety and relative hazard. Occupied roofs shall be classified in the group that the occupancy most nearly resembles, according to the fire safety and relative hazard, and shall comply with {Section 503.1.4} of the International Building Code.

1. Assembly: Groups A-1, A-2, A-3, A-4 and A-5.
2. Business: Group B.
3. Educational: Group E.
4. Factory and Industrial: Groups F-1 and F-2.
5. High Hazard: Groups H-1, H-2, H-3, H-4 and H-5.
6. Institutional: Groups I-1, I-2, I-3 and I-4.
7. Mercantile: Group M.
8. Residential: Groups R-1, R-2, R-3 and R-4.
9. Storage: Groups S-1 and S-2.
10. Utility and Miscellaneous

{BG} 203.1.1 Use designation.

Occupancy groups contain subordinate uses having similar hazards and risks to building occupants. Uses include, but are not limited to, those functional designations specified within the occupancy group descriptions in {Section 203.1}. Certain uses require specific limitations and controls in accordance with the provisions of this code and {Chapter 4} of the International Building Code.

Revise as follows:

{BG} 203.2 Assembly Group A. Assembly Group A occupancy includes, among others, the use of a building or structure, or a portion thereof, for the gathering of persons for purposes such as civic, social or religious functions; recreation, food or drink consumption or awaiting transportation.

[BG] 203.2.1 Small buildings and tenant spaces.

A building or tenant space used for assembly purposes with an occupant load of less than 50 persons shall be classified as a Group B occupancy.

[BG] 203.2.2 Small assembly spaces. The following rooms and spaces shall not be classified as Assembly occupancies:

1. A room or space used for assembly purposes with an occupant load of less than 50 persons and accessory to another occupancy shall be classified as a Group B occupancy or as part of that occupancy.
2. A room or space used for assembly purposes that is less than 750 square feet (70 m²) in area and accessory to another occupancy shall be classified as a Group B occupancy or as part of that occupancy.

[BG] 203.2.3 Associated with Group E occupancies. A room or space used for assembly purposes that is associated with a Group E occupancy is not considered a separate occupancy.

[BG] 203.2.4 Accessory to places of religious worship. Accessory religious educational rooms and religious auditoriums with occupant loads of less than 100 per room or space are not considered separate occupancies.

[BG] 203.2.5 Assembly Group A-1. Group A-1 occupancy includes assembly uses, usually with fixed seating, intended for the production and viewing of the performing arts or motion pictures including, but not limited to:

- Motion picture theater
- Symphony and concert halls
- Television and radio studios admitting an audience
- Theaters

[BG] 203.2.6 Assembly Group A-2. Group A-2 occupancy includes assembly uses intended for food and/or drink consumption including, but not limited to:

- Banquet halls Casinos (gaming areas)
- Nightclubs
- Restaurants, cafeterias and similar dining facilities (including associated commercial kitchens)
- Taverns and bars

[BG] 203.2.7 Assembly Group A-3. Group A-3 occupancy includes assembly uses intended for worship, recreation or amusement and other assembly uses not classified elsewhere in Group A including, but not limited to:

- Amusement arcades
- Art galleries Bowling alleys
- Community halls
- Courtrooms
- Dance halls (not including food or drink consumption)
- Exhibition halls
- Funeral parlors
- Greenhouses for the conservation and exhibition of plants that provide public access
- Gymnasiums (without spectator seating) Indoor swimming pools (without spectator seating) Indoor tennis courts (without spectator seating) Lecture halls Libraries Museums Places of religious worship Pool and billiard parlors Waiting areas in transportation terminals

[BG] 203.2.8 Assembly Group A-4. Group A-4 occupancy includes assembly uses intended for viewing of indoor sporting events and activities with spectator seating including, but not limited to:

- Arenas
- Skating rinks
- Swimming pools
- Tennis courts

[BG] 203.2.9 Assembly Group A-5. Group A-5 occupancy includes assembly uses intended for participation in or viewing outdoor activities including, but not limited to:

- Amusement park structures
- Bleachers
- Grandstands

- Stadiums

[BG] 203.3 Business Group B. Business Group B occupancy includes, among others, the use of a building or structure, or a portion thereof, for office, professional or service-type transactions, including storage of records and accounts. Business occupancies shall include, but not be limited to, the following:

- Airport traffic control towers
- Ambulatory care facilities
- Animal hospitals, kennels and pounds
- Banks
- Barber and beauty shops
- Car wash
- Civic administration
- Clinic-outpatient
- Dry cleaning and laundries: pick-up and delivery stations and self-service
- Educational occupancies for students above the 12th grade, including higher education laboratories.
- Electronic data processing
- Food processing establishments and commercial kitchens not associated with restaurants, cafeterias and similar dining facilities not more than 2,500 square feet (232 m²) in area.
- Laboratories: testing and research Motor vehicle showrooms
- Post offices
- Print shops
- Professional services (architects, attorneys, dentists, physicians, engineers, etc.)
- Radio and television stations
- Telephone exchanges
- Training and skill development not in a school or academic program (This shall include, but not be limited to, tutoring centers, martial arts studios, gymnastics and similar uses regardless of the ages served, and where not classified as a Group A occupancy).

[BG] 203.3.1 Airport traffic control towers. Airport traffic control towers shall comply with {Section 412.2} of the International Building Code.

[BG] 203.3.2 Ambulatory care facilities. Ambulatory care facilities shall comply with Section 422 of the International Building Code.

[BG] 203.3.3 Higher education laboratories. Higher education laboratories shall comply with Section 428 of the International Building Code.

[BG] 203.4 Educational Group E. Educational Group E occupancy includes, among others, the use of a building or structure, or a portion thereof, by six or more persons at any one time for educational purposes through the 12th grade.

[BG] 203.4.1 Accessory to places of religious worship. Religious educational rooms and religious auditoriums, which are accessory to places of religious worship in accordance with Section 303.1.4 of the International Building Code and have occupant loads of less than 100 per room or space shall be classified as Group A-3 occupancies.

[BG] 203.4.2 Group E, day care facilities. This group includes buildings and structures or portions thereof occupied by more than five children older than 21/2 years of age who receive educational, supervision or personal care services for fewer than 24 hours per day.

[BG] 203.4.2.1 Within places of religious worship. Rooms and spaces within places of religious worship providing such day care during religious functions shall be classified as part of the primary occupancy.

[BG] 203.4.2.2 Five or fewer children. A facility having five or fewer children receiving such day care shall be classified as part of the primary occupancy.

[BG] 203.4.2.3 Five or fewer children in a dwelling unit. A facility such as the above within a dwelling unit and having five or fewer children receiving such day care shall be classified as a Group R-3 occupancy or shall comply with the International Residential Code.

[BG] 203.4.3 Storm shelters in Group E occupancies. Storm shelters shall be provided for Group E occupancies where required by Section 423.4 of the International Building Code.

[BG] 203.5 Factory Industrial Group F. Factory Industrial Group F occupancy includes, among others, the use of a building or structure, or a portion thereof, for assembling, disassembling, fabricating, finishing, manufacturing, packaging, repair or processing operations that are not classified as a Group H hazardous or Group S storage occupancy.

[BG] 203.5.1 Moderate-hazard factory industrial, Group F-1. Factory industrial uses that are not classified as Factory Industrial F-2 Low Hazard shall be classified as F-1 Moderate Hazard and shall include, but not be limited to, the following:

- Aircraft (manufacturing, not to include repair)
- Appliances
- Athletic equipment
- Automobiles and other motor vehicles
- Bakeries
- Beverages: over 16-percent alcohol content
- Bicycles
- Boats
- Brooms or brushes
- Business machines
- Cameras and photo equipment
- Canvas or similar fabric
- Carpets and rugs (includes cleaning)
- Clothing Construction and agricultural machinery
- Disinfectants
- Dry cleaning and dyeing
- Electric generation plants
- Electronics
- Energy storage systems (ESS) in dedicated use buildings
- Engines (including rebuilding)
- Food processing establishments and commercial kitchens not associated with restaurants, cafeterias and similar dining facilities more than 2,500 square feet (232 m2) in area
- Furniture
- Hemp products
- Jute products
- Laundries
- Leather products
- Machinery
- Metals
- Millwork (sash and door)
- Motion pictures and television filming (without spectators)
- Musical instruments
- Optical goods
- Paper mills or products
- Photographic film
- Plastic products
- Printing or publishing
- Recreational vehicles
- Refuse incineration
- Shoes Soaps and detergents
- Textiles
- Tobacco
- Trailers
- Upholstering
- Water/sewer treatment facilities
- Wood; distillation
- Woodworking (cabinet)

[BG] 203.5.1.1 Aircraft manufacturing facilities. Aircraft manufacturing facilities shall comply with Section 412.6 of the International Building Code.

[BG] 203.5.2 Low-hazard factory industrial, Group F-2. Factory industrial uses that involve the fabrication or manufacturing of noncombustible materials that during finishing, packing or processing does not involve a significant fire hazard shall be classified as F-2 occupancies and shall include, but not be limited to, the following:

- Beverages: up to and including 16-percent alcohol content
- Brick and masonry
- Ceramic products
- Foundries
- Glass products
- Gypsum
- Ice
- Metal products (fabrication and assembly)

[BG] 203.6 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 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). Hazardous occupancies are classified in Groups H-1, H-2, H-3, H-4 and H-5 and shall be in accordance with this code and the requirements of Section 415 of 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.

[BG] 203.6.1 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).
6. Liquor stores and distributors without bulk storage.
7. Refrigeration systems.
8. The storage or utilization of materials for agricultural purposes on the premises.
9. Stationary storage battery systems installed in accordance with {Section 1206.15}.
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, aerosol cooking spray products or plastic aerosol 3 products 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 5003.8.3.5.1.
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.
15. Stationary fuel cell power systems installed in accordance with this code.
16. Capacitor energy storage systems in accordance with this code.
17. Group B higher education laboratory occupancies complying with Section 428 of the International Building Code and Chapter 38 of this code.
18. Distilling or brewing of beverages conforming to the requirements of this code.
19. The storage of beer, distilled spirits and wines in barrels and casks conforming to the requirements of this code.

[BG] 203.6.2 Hazardous materials. Hazardous materials in any quantity shall conform to the requirements of this code, and Section 414 of the International Building Code.

[BG] 203.6.3 High-hazard Group H-1. Buildings and structures containing materials that pose a detonation hazard shall be classified as Group H-1. Such materials shall include, but not be limited to, the following:

- Detonable pyrophoric materials
- Explosives:
 - Division 1.1
 - Division 1.2
 - Division 1.3
 - Division 1.4
 - Division 1.5
 - Division 1.6
- Organic peroxides, unclassified detonable
- Oxidizers, Class 4
- Unstable (reactive) materials, Class 3 detonable and Class 4

[BG] 203.6.3.1 Occupancies containing explosives not classified as H-1. The following occupancies containing explosive materials shall be classified as follows:

1. Division 1.3 explosive materials that are used and maintained in a form where either confinement or configuration will not elevate the hazard from a mass fire to mass explosion hazard shall be allowed in Group H-2 occupancies.
2. Articles, including articles packaged for shipment, that are not regulated as a Division 1.4 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 shall be allowed in H-3 occupancies.

[BG] 203.6.4 High-hazard Group H-2. Buildings and structures containing materials that pose a deflagration hazard or a hazard from accelerated burning shall be classified as Group H-2. Such materials shall include, but not be limited to, the following:

- Class I, II or IIIA flammable or combustible liquids that are used or stored in normally open containers or systems, or in closed containers or systems pressurized at more than 15 pounds per square inch gauge (103.4 kPa)
- Combustible dusts 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 414.1.3} of the International Building Code
- Cryogenic fluids, flammable
- Flammable gases
- Organic peroxides, Class I
- Oxidizers, Class 3, that are used or stored in normally open containers or systems, or in closed containers or systems pressurized at more than 15 pounds per square inch gauge (103.4 kPa)
- Pyrophoric liquids, solids and gases, nondetonable
- Unstable (reactive) materials, Class 3, nondetonable
- Water-reactive materials, Class 3

[BG] 203.6.5 High-hazard Group H-3.

Buildings and structures containing materials that readily support combustion or that pose a physical hazard shall be classified as Group H-3. Such materials shall include, but not be limited to, the following:

- Class I, II or IIIA flammable or combustible liquids that are used or stored in normally closed containers or systems pressurized at 15 pounds per square inch gauge (103.4 kPa) or less
- Combustible fibers, other than densely packed baled cotton, 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 414.1.3} of the International Building Code
- Consumer fireworks, 1.4G (Class C, Common)
- Cryogenic fluids, oxidizing

- Flammable solids
- Organic peroxides, Class II and III
- Oxidizers, Class 2
- Oxidizers, Class 3, that are used or stored in normally closed containers or systems pressurized at 15 pounds per square inch gauge (103 kPa) or less
- Oxidizing gases
- Unstable (reactive) materials, Class 2
- Water-reactive materials, Class 2

[BG] 203.6.6 High-hazard Group H-4. Buildings and structures containing materials that are health hazards shall be classified as Group H-4. Such materials shall include, but not be limited to, the following:

- Corrosives
- Highly toxic materials
- Toxic materials

[BG] 203.6.7 High-hazard Group H-5. Semiconductor fabrication facilities and comparable research and development areas in which hazardous production materials (HPM) are used and the aggregate quantity of materials is in excess of those specified in Tables 5003.1.1(1) and 5003.1.1(2) shall be classified as Group H-5. Such facilities and areas shall be designed and constructed in accordance with Section 415.11 of the International Building Code.

[BG] 203.6.8 Multiple hazards. Buildings and structures containing a material or materials representing hazards that are classified in one or more of Groups H-1, H-2, H-3 and H-4 shall conform to the code requirements for each of the occupancies so classified.

[BG] 203.7 Institutional Group I. Institutional Group I occupancy includes, among others, the use of a building or structure, or a portion thereof, in which care or supervision is provided to persons who are or are incapable of self-preservation without physical assistance or in which persons are detained for penal or correctional purposes or in which the liberty of the occupants is restricted. Institutional occupancies shall be classified as Group I-1, I-2, I-3 or I-4.

[BG] 203.7.1 Institutional Group I-1. Institutional Group I-1 occupancy shall include buildings, structures or portions thereof for more than 16 persons, excluding staff, who reside on a 24-hour basis in a supervised environment and receive custodial care. Buildings of Group I-1 shall be classified as one of the occupancy conditions specified in Section 203.22.1 or 203.22.2 and shall comply with Section 420 of the International Building Code. This group shall include, but not be limited to, the following:

- Alcohol and drug centers
- Assisted living facilities
- Congregate care facilities
- Group homes
- Halfway houses
- Residential board and care facilities
- Residential board and custodial care facilities
- Social rehabilitation facilities

[BG] 203.7.1.1 Condition 1. This occupancy condition shall include buildings in which all persons receiving custodial care who, without any assistance, are capable of responding to an emergency situation to complete building evacuation.

[BG] 203.7.1.2 Condition 2. This occupancy condition shall include buildings in which there are any persons receiving custodial care who require limited verbal or physical assistance while responding to an emergency situation to complete building evacuation.

[BG] 203.7.1.3 Six to 16 persons receiving custodial care. A facility housing not fewer than six and not more than 16 persons receiving custodial care shall be classified as Group R-4.

[BG] 203.7.1.4 Five or fewer persons receiving custodial care. A facility with five or fewer persons receiving custodial care shall be classified as Group R-3 or shall comply with the International Residential Code provided an automatic sprinkler system is installed in accordance with Section 903.3.1.3 or with Section P2904 of the International Residential Code.

[BG] 203.7.2 Institutional Group I-2. Institutional Group I-2 occupancy shall include buildings and structures used for medical care on a 24-hour basis for more than five persons who are incapable of self-preservation. This group shall include, but not be limited to, the following:

- Foster care facilities
- Detoxification facilities

- Hospitals
- Nursing homes
- Psychiatric hospitals

[BG] 203.7.2.1 Occupancy Conditions.

Buildings of Group I-2 shall be classified as one of the following occupancy conditions and shall comply with Section 407 of the International Building Code.

[BG] 203.7.2.1.1 Condition 1. This occupancy condition shall include facilities that provide nursing and medical care but do not provide emergency care, surgery, obstetrics or in-patient stabilization units for psychiatric or detoxification, including but not limited to nursing homes and foster care facilities.

[BG] 203.7.2.1.2 Condition 2. This occupancy condition shall include facilities that provide nursing and medical care and could provide emergency care, surgery, obstetrics or in-patient stabilization units for psychiatric or detoxification, including but not limited to hospitals.

[BG] 203.7.2.2 Five or fewer persons receiving medical care. A facility with five or fewer persons receiving medical care shall be classified as Group R-3 or shall comply with the {International Residential Code} provided an automatic sprinkler system is installed in accordance with Section 903.3.1.3 or Section P2904 of the International Residential Code.

[BG] 203.7.3 Institutional Group I-3. Institutional Group I-3 occupancy shall include buildings and structures which are inhabited by more than five persons who are under restraint or security. A Group I-3 facility is occupied by persons who are generally incapable of self-preservation due to security measures not under the occupants' control. This group shall include, but not be limited to, the following:

- Correctional centers
- Detention centers
- Jails Pre-release centers
- Prisons
- Reformatories

Buildings of Group I-3 shall be classified as one of the following occupancy conditions specified in Sections 203.24.1 through 203.24.5 and shall comply with Section 408 of the International Building Code.

[BG] 203.7.3.1 Condition 1. This occupancy condition shall include buildings in which free movement is allowed from sleeping areas and other spaces where access or occupancy is permitted to the exterior via means of egress without restraint. A Condition 1 facility is permitted to be constructed as Group R.

[BG] 203.7.3.2 Condition 2. This occupancy condition shall include buildings in which free movement is allowed from sleeping areas and any other occupied smoke compartment to one or more other smoke compartments. Egress to the exterior is impeded by locked exits.

[BG] 203.7.3.3 Condition 3. This occupancy condition shall include buildings in which free movement is allowed within individual smoke compartments, such as within a residential unit comprised of individual sleeping units and group activity spaces, where egress is impeded by remote-controlled release of means of egress from such smoke compartment to another smoke compartment.

[BG] 203.7.3.4 Condition 4. This occupancy condition shall include buildings in which free movement is restricted from an occupied space. Remote-controlled release is provided to permit movement from sleeping units, activity spaces and other occupied areas within the smoke compartment to other smoke compartments.

[BG] 203.7.3.5 Condition 5. This occupancy condition shall include buildings in which free movement is restricted from an occupied space. Staff-controlled manual release is provided to permit movement from sleeping units, activity spaces and other occupied areas within the smoke compartment to other smoke compartments.

[BG] 203.7.4 Institutional Group I-4, day care facilities. Institutional Group I-4 shall include buildings and structures occupied by more than five persons of any age who receive custodial care for less than 24 hours by persons other than parents or guardians, relatives by blood, marriage, or adoption, and in a place, other than the home of the person cared for. This group shall include, but not be limited to, the following:

- Adult day care
- Child day care

[BG] 203.7.4.1 Classification as Group E. A child day care facility that provides care for more than five but not more than 100 children 2 1/2 years

or less of age, where the rooms in which the children are cared for are located on a level of exit discharge serving such rooms and each of these child care rooms have an exit door directly to the exterior, shall be classified as Group E. **[BG] 203.7.4.2 Within a place of religious worship.** Rooms and spaces within places of religious worship providing such care during religious functions shall be classified as part of the primary occupancy.

[BG] 203.7.4.3 Five or fewer persons receiving care. A facility having five or fewer persons receiving custodial care shall be classified as part of the primary occupancy.

[BG] 203.7.4.4 Five or fewer persons receiving care in a dwelling unit. A facility such as the above within a dwelling unit and having five or fewer persons receiving custodial care shall be classified as a Group R-3 occupancy or shall comply with the International Residential Code.

[BG] 203.8 Mercantile Group M. Mercantile Group M occupancy includes, among others, the use of a building or structure or a portion thereof, for the display and sale of merchandise, and involves stocks of goods, wares or merchandise incidental to such purposes and where the public has access. Mercantile occupancies shall include, but not be limited to, the following:

- Department stores
- Drug stores
- Greenhouses with public access that maintain plants for display and sale
- Markets Motor fuel-dispensing facilities
- Retail or wholesale stores
- Sales rooms

[BG] 203.8.1 Quantity of hazardous materials. The aggregate quantity of nonflammable solid and nonflammable or noncombustible liquid hazardous materials stored or displayed in a single control area of a Group M occupancy shall not exceed the quantities in Table 5704.3.4.1.

[BG] 203.8.2 Motor fuel-dispensing facilities. Motor fuel-dispensing facilities shall comply with Section 406.7 of the International Building Code.

[BG] 203.9 Residential Group R. Residential Group R includes, among others, the use of a building or structure, or a portion thereof, for sleeping purposes when not classified as an Institutional Group I or when not regulated by the International Residential Code in accordance with Section 101.2 of the International Building Code. Group R occupancies not constructed in accordance with the {International Residential Code} as permitted by Sections 301.4.1 and 301.4.2 of the International Building Code shall comply with Section 420 of the International Building Code.

[BG] 203.9.1 Residential Group R-1. Residential Group R-1 occupancies containing sleeping units where the occupants are primarily transient in nature, including:

- Boarding houses (transient) with more than 10 occupants
- Congregate living facilities (transient) with more than 10 occupants
- Hotels (transient)
- Motels (transient)

[BG] 203.9.2 Residential Group R-2.

Residential Group R-2 occupancies containing sleeping units or more than two dwelling units where the occupants are primarily permanent in nature, including:

- Apartment houses
- Congregate living facilities (non-transient) with more than 16 occupants
- Boarding houses (non-transient)
- Convents
- Dormitories
- Fraternities and sororities
- Monasteries Hotels (non-transient)
- Live/work units
- Motels (non-transient)
- Vacation timeshare properties

[BG] 203.9.3 Residential Group R-3.

Residential Group R-3 occupancies where the occupants are primarily permanent in nature and not classified as Group R-1, R-2, R-4 or I, including:

- Buildings that do not contain more than two dwelling units
- Care facilities that provide accommodations for five or fewer persons receiving care
- Congregate living facilities (non-transient) with 16 or fewer occupants
- Boarding houses (non-transient)
- Convents
- Dormitories
- Fraternities and sororities
- Monasteries
- Congregate living facilities (transient) with 10 or fewer occupants
- Boarding houses (transient) Lodging houses (transient) with five or fewer guestrooms and 10 or fewer occupants

[BG] 203.9.3.1 Care facilities within a dwelling.

Care facilities for five or fewer persons receiving care that are within a single-family dwelling are permitted to comply with the International Residential Code provided an automatic sprinkler system is installed in accordance with Section 903.3.1.3 or Section P2904 of the International Residential Code.

[BG] 203.9.3.2 Lodging houses. Owner-occupied lodging houses with five or fewer guest rooms and 10 or fewer total occupants shall be permitted to be constructed in accordance with the International Residential Code provided that an automatic sprinkler system is installed in accordance with Section 903.3.1.3 or Section P2904 of the International Residential Code.

[BG] 203.9.4 Residential Group R-4. Residential Group R-4 shall include buildings, structures or portions thereof for more than five but not more than 16 persons, excluding staff, who reside on a 24-hour basis in a supervised residential environment and receive custodial care. Buildings of Group R-4 shall be classified as one of the occupancy conditions specified in Section 203.31.1 or 203.31.2. Group R-4 occupancies shall meet the requirements for construction as defined for Group R-3, except as otherwise provided for in the International Building Code. This group shall include, but not be limited to, the following:

- Alcohol and drug centers
- Assisted living facilities
- Congregate care facilities
- Group homes
- Halfway houses
- Residential board and care facilities
- Social rehabilitation facilities

[BG] 203.9.4.1 Condition 1. This occupancy condition shall include buildings in which all persons receiving custodial care, without any assistance, are capable of responding to an emergency situation to complete building evacuation.

[BG] 203.9.4.2 Condition 2. This occupancy condition shall include buildings in which there are any persons receiving custodial care who require limited verbal or physical assistance while responding to an emergency situation to complete building evacuation.

[BG] 203.10 Storage Group S. Storage Group S occupancy includes, among others, the use of a building or structure, or a portion thereof, for storage that is not classified as a hazardous occupancy.

[BG] 203.10.1 Accessory storage spaces. A room or space used for storage purposes that is less than 100 square feet (9.3 m²) in area and accessory to another occupancy shall be classified as part of that occupancy. The aggregate area of such rooms or spaces shall not exceed the allowable area limits of Section 508.2 of the International Building Code.

[BG] 203.10.2 Combustible storage. High-piled stock or rack storage, or attic, under-floor and concealed spaces used for storage of combustible materials, shall be in accordance with Section 413 of the International Building Code.

[BG] 203.10.3 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, Levels 2 and 3
- Aircraft hangar (storage and repair)
- Bags: cloth, burlap and paper
- Bamboos and rattan

- Baskets
- Belting: canvas and leather
- Beverages over 16-percent alcohol content
- 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 5003.1.1(1) (see Section 406.8 of the International Building Code)
- Photo engravings
- Resilient flooring
- Self-service storage facility (mini-storage)
- Silks
- Soaps
- Sugar
- Tires, bulk storage of
- Tobacco, cigars, cigarettes and snuff
- Upholstery and mattresses
- Wax candles

[BG] 203.10.3.1 Aircraft hangars. Aircraft hangars used for storage or repair shall comply with Section 412.3 of the International Building Code.

[BG] 203.10.3.2 Motor vehicle repair garages. Motor vehicle repair garages shall comply with Section 406.8 of the *International Building Code*.

[BG] 203.10.4 Low-hazard storage, Group S-2. Storage Group S-2 occupancies include, among others, buildings used for the storage of noncombustible materials, such as products on wood pallets or in paper cartons with or without single thickness divisions; or in paper wrappings. Such products are permitted to have a negligible amount of plastic trim, such as knobs, handles or film wrapping. Storage uses shall include, but not be limited to, storage of the following:

- AsbestosBeverages up to and including 16-percent alcohol
- Cement in bags
- Chalk and crayons
- Dairy products in non-waxed coated paper containers
- Dry cell batteries
- Electrical coils
- Electrical motors
- Empty cans
- Food products
- Foods in noncombustible containers
- Fresh fruits and vegetables in non-plastic trays or containers
- Frozen foods
- Glass
- Glass bottles, empty or filled with noncombustible liquids
- Gypsum board
- Inert pigments
- Ivory
- Meats
- Metal cabinets
- Metal desks with plastic tops and trim
- Metal parts
- Metals

- Mirrors
- Oil-filled and other types of distribution transformers
- Public parking garages, open or enclosed
- Porcelain and pottery
- Stoves
- Talc and soap stones
- Washers and dryers

[BG] 203.10.4.1 Public parking garages.

Public parking garages shall comply with Section 406.4 of the International Building Code and the additional requirements of Section 406.5 of the International Building Code for open parking garages or Section 406.6 of the International Building Code for enclosed parking garages.

[BG] 203.11 Miscellaneous Group U. Buildings and structures of an accessory character and miscellaneous structures not classified in any specific occupancy shall be constructed, equipped and maintained to conform to the requirements of this code commensurate with the fire and life hazard incidental to their occupancy. Group U shall include, but not be limited to, the following:

- Agricultural buildings
- Aircraft hangar, accessory to a one- or two-family residence (see Section 412.4 of the International Building Code)
- Barns
- Carports
- Communication equipment structures with a gross floor area of less than 1,500 square feet (139 m²) Fences more than 7 feet (2134 mm) in height
- Grain silos, accessory to a residential occupancy
- Livestock shelters
- Private garages
- Retaining walls
- Sheds
- Stables
- Tanks
- Towers

[BG] 203.11.1 Greenhouses. Greenhouses not classified as another occupancy shall be classified as Use Group U.

[BG] 203.11.2 Private garages and carports. Private garages and carports shall comply with Section 406.3 of the International Building Code.

[BG] 203.11.3 Residential aircraft hangars. Aircraft hangars accessory to a one- or two-family residence shall comply with Section 412.4 of the International Building Code.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal is reformatting organization of provisions, editorial with no regulatory changes.

F6-21

IFC: SECTION 202, 105.5.3, TABLE 903.2.11.6, 907.2.12; IBC: TABLE 903.2.11.6

Proponents: Mike Nugent, Chair, representing ICC Building Code Action Committee (bcac@iccsafe.org); Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Fire Code

Revise as follows:

~~SPECIAL AMUSEMENTBUILDING AREA.~~ ~~A building that is temporary, permanent or mobile that contains a device or system that conveys passengers or provides a walkway along, around or over a course in any direction as a form of amusement arranged so that the egress path is not readily apparent due to visual or audio distractions or an intentionally confounded egress path, or is not readily available because of the mode of conveyance through the building or structure.~~

A special amusement area is any temporary or permanent building or portion thereof that is occupied for amusement, entertainment or educational purposes and is arranged in a manner that:

1. Makes the means of egress path not readily apparent due to visual or audio distractions.
2. Intentionally confounds identification of the means of egress path.
3. Otherwise makes the means of egress path not readily available because of the nature of the attraction or mode of conveyance through the building or structure.

105.5.3 ~~Amusement buildings~~ Special amusement areas. An operational permit is required to operate a special amusement ~~building area~~.

**TABLE 903.2.11.6
ADDITIONAL REQUIRED FIRE PROTECTION SYSTEMS**

SECTION	SUBJECT
903.2.10.2	Mechanical-access enclosed parking garages
914.2.1	Covered and open mall buildings
914.3.1	High-rise buildings
914.4.1	Atriums
914.5.1	Underground structures
914.6.1	Stages
914.7.1	Special amusement buildings and areas
914.8.2	Airport traffic control towers
914.8.3, 914.8.6	Aircraft hangars
914.9	Flammable finishes
914.10	Drying rooms
914.11.1	Ambulatory care facilities
1030.6.2.3	Smoke-protected assembly seating
1103.5.1	Existing Group A occupancies
1103.5.2	Pyroxylin plastic storage in existing buildings
1103.5.3	Existing Group I-2 occupancies
1103.5.5	Existing Group I-2, Condition 2 occupancies
1103.5.5	Pyroxylin plastics
Table 1207.7, Table 1207.8, Table 1206.9, Table 1206.10	Stationary and mobile energy storage systems
2108.2	Dry cleaning plants
2108.3	Dry cleaning machines
2309.3.1.5.2	Hydrogen motor fuel-dispensing area canopies
2404.2	Spray finishing in Group A, E, I or R
2404.4	Spray booths and spray rooms
2405.2	Dip-tank rooms in Group A, I or R
2405.4.1	Dip tanks
2405.9.4	Hardening and tempering tanks
2703.10	HPM facilities
2703.10.1.1	HPM work station exhaust
2703.10.2	HPM gas cabinets and exhausted enclosures
2703.10.3	HPM exit access corridor
2703.10.4	HPM exhaust ducts
2703.10.4.1	HPM noncombustible ducts
2703.10.4.2	HPM combustible ducts
2807.3	Lumber production conveyor enclosures
2808.7	Recycling facility conveyor enclosures
3006.1	Class A and B ovens
3006.2	Class C and D ovens
Table 3206.2	Storage fire protection
3206.4	Storage
3210.1.1	Record storage over 12 feet
3704.5	Storage of more than 1,000 cubic feet of loose combustible fibers
5003.8.4.1	Gas rooms
5003.8.5.3	Exhausted enclosures

5004.5	Indoor storage of hazardous materials
5005.1.8	Indoor dispensing of hazardous materials
5104.4.1	Aerosol product warehouses
5106.3.2	Aerosol display and merchandising areas
5306.2.1	Exterior medical gas storage room
5306.2.2	Interior medical gas storage room
5306.2.3	Medical gas storage cabinet
5606.5.2.1	Storage of smokeless propellant
5606.5.2.3	Storage of small arms primers
5704.3.7.5.1	Flammable and combustible liquid storage rooms
5704.3.8.4	Flammable and combustible liquid storage warehouses
5705.3.7.3	Flammable and combustible liquid Group H-2 or H-3 areas
6004.1.2	Gas cabinets for highly toxic and toxic gas
6004.1.3	Exhausted enclosures for highly toxic and toxic gas
6004.2.2.6	Gas rooms for highly toxic and toxic gas
6004.3.3	Outdoor storage for highly toxic and toxic gas
6504.1.1	Pyroxylin plastic storage cabinets
6504.1.3	Pyroxylin plastic storage vaults
6504.2	Pyroxylin plastic storage and manufacturing

For SI: 1 cubic foot = 0.023 m³.

907.2.12 Special amusement ~~buildings~~ areas. An automatic smoke detection system shall be provided in buildings with special amusement ~~buildings~~ areas in accordance with Sections 907.2.12.1 through 907.2.12.3.

2021 International Building Code

Revise as follows:

**TABLE 903.2.11.6
ADDITIONAL REQUIRED PROTECTION SYSTEMS**

SECTION	SUBJECT
402.5, 402.6.2	Covered and open mall buildings
403.3	High-rise buildings
404.3	Atriums
405.3	Underground structures
407.7	Group I-2
410.6	Stages
411.3	Special amusement buildings <u>areas</u>
412.2.4	Airport traffic control towers
412.3.6, 412.3.6.1, 412.5.6	Aircraft hangars
415.11.11	Group H-5 HPM exhaust ducts
416.5	Flammable finishes
417.4	Drying rooms
424.3	Play structures
428	Buildings containing laboratory suites
507	Unlimited area buildings
508.5.7	Live/work units
509.4	Incidental uses
1030.6.2.3	Smoke-protected assembly seating
IFC	Sprinkler system requirements as set forth in Section 903.2.11.6 of the <i>International Fire Code</i>

Reason Statement: The purpose of the change is primarily for coordination and correction. The IFC definition for the Special Amusement Area in this proposal matches the IBC definition approved in G48-18. The changes in the references in tables and footnotes is editorial to use the defined term. It is important to note the 'special amusement area' is already approved in the IBC definition of puzzle rooms, Section 411, Table 1017.2 footnote and IFC Section 914.7 and 3103.3.1.

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

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents 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 and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC.

Cost Impact: The code change proposal will increase the cost of construction

Many of these rooms may be classified currently as a B occupancy as they are not specifically called out in the code. As such, there are very little requirements for fire alarm or sprinkler systems. Depending on the size and configuration of the room(s), this provision would increase the cost of construction.

F7-21

IFC: (New)

Proponents: Marcelo Hirschler, representing self (mmh@gbhint.com)

2021 International Fire Code

Add new definition as follows:

VEGETATIVE ROOF. An assembly of interacting components designed to waterproof a building's top surface that includes, by design, vegetation and related landscape elements.

Reason Statement: The term vegetative roof is used in Section 317 of the IFC and is defined in the IBC. Therefore, this proposal simply copies the same definition from the IBC into the IFC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction. This proposal simply adds a definition already contained in ICC codes, in the IBC.

F7-21

F8-21

IFC: (New), 304.1, 304.1.1 (New), 304.1.1, 304.1.2, 304.1.3, 304.1.3.1

Proponents: Tracie Dutter, Contra Costa County Fire Protection District, representing California Fire Chiefs Association

2021 International Fire Code

Add new definition as follows:

VALET WASTE. A waste collection service that collects and removes the waste from the doorsteps of tenants.

304.1 Waste accumulation prohibited. Combustible waste material creating a fire hazard shall not be allowed to accumulate in buildings or structures or upon premises.

Add new text as follows:

304.1.1 Valet Waste. Valet waste collection is prohibited.

Exception: Where approved by the fire code official.

Revise as follows:

~~304.1.1~~ **304.1.2 Waste material.** Accumulations of wastepaper, wood, hay, straw, weeds, litter or combustible or flammable waste or rubbish of any type shall not be permitted to remain on a roof or in any *court*, yard, vacant lot, alley, parking lot, open space, or beneath a *grandstand*, *bleacher*, pier, wharf, manufactured home, recreational vehicle or other similar structure.

~~304.1.2~~ **304.1.3 Vegetation.** Weeds, grass, vines or other growth that is capable of being ignited and endangering property, shall be cut down and removed by the *owner* or occupant of the premises. Vegetation clearance requirements in wildland-urban interface areas shall be in accordance with the *International Wildland-Urban Interface Code*.

~~304.1.3~~ **304.1.4 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*.

~~304.1.3.1~~ **304.1.4.1 Spaces underneath grandstands and bleachers.** Spaces underneath *grandstands* and *bleachers* 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 separated with *fire barriers* and *horizontal assemblies* in accordance with Section 1030.1.1.1.

Reason Statement: Valet waste collection services allow tenants, typically in R-2 occupancies, to place their trash and recyclables in the corridor outside their units to be picked up by a collection service, which comes by on a regularly scheduled basis.

This code change proposal would prohibit valet waste collection unless approved by the fire code official. There are currently no provisions in the IFC that specifically allow or prohibit valet waste; however, this code change proposal to prohibit valet waste is consistent with the current requirements of the IFC, including the following sections:

304.1: Combustible waste material creating a fire hazard shall not be allowed to accumulate in buildings or structures or upon premises.

304.2: Storage of combustible rubbish shall not produce conditions that will create a nuisance or a hazard to the public health, safety or welfare.

1031.2: Required exit accesses, exits and exit discharges shall be continuously maintained free from obstructions or impediments to full instant use in the case of fire or other emergency where the building area served by the means of egress is occupied.

1031.3: A means of egress shall be free from obstructions that would prevent its use, including the accumulation of snow and ice.

1031.6: ... Furnishings, decorations or other objects shall not be placed so as to obstruct exits, access thereto, egress therefrom, or visibility thereof....

Valet waste collection will increase the amount of combustibles in corridors, which can lead to increased fires in corridors. Fires in corridors and the accumulation of combustibles impeding the path of egress through corridors can prevent tenants from safely exiting a building during a fire.

Valet waste will also have an impact on firefighters. Waste and collection containers will interfere with hose lines being pulled along corridors. Additionally, in limited visibility firefighters follow the wall to find their way. Waste and collection containers will create obstructions for firefighters attempting to follow the wall.

The fire code has long protected means of egress and provided for fire safety in buildings. We need to continue to protect means of egress, because when all else goes wrong, people must be able to get out of a building.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

There is no cost impact. The proposal is intended to provide clarification of the section requirements.

F9-21

IFC: 304.3, 304.3.2 (New), 304.3.2, 304.3.4, 304.3.3, 304.3.6 (New), 304.3.6.1 (New), 304.3.6.2 (New), 304.3.7 (New), 808.1, 808.1.1, 808.1.2, 808.2

Proponents: Tim Earl, representing GBH International (tearl@gbhinternational.com)

2021 International Fire Code

Revise as follows:

304.3 Containers. ~~Combustible Containers for combustible rubbish and waste material kept located within or near a structure shall be stored in accordance~~ comply with Sections 304.3.1 through 304.3.74.

Add new text as follows:

304.3.2 Low heat release materials. Where required by this section, low heat release materials shall exhibit a peak rate of heat release not exceeding 300 kW/m² where tested in accordance with ASTM E1354 at an incident heat flux of 50 kW/m² in the horizontal orientation.

Revise as follows:

~~**304.3.2 304.3.3 Capacity exceeding 5.33 cubic feet.** Containers with a capacity exceeding 5.33 cubic feet (40 gallons) (0.15 m³) shall be provided with lids. Containers and lids shall be constructed of noncombustible materials or low heat release materials in accordance with Section 304.3.2. of combustible materials with a peak rate of heat release not exceeding 300 kW/m² where tested in accordance with ASTM E1354 at an incident heat flux of 50 kW/m² in the horizontal orientation.~~

~~**Exception:** Wastebaskets complying with Section 808.~~

304.3.4 Capacity of 1 cubic yard or more. Dumpsters with an individual capacity of 1.0 cubic yard [200 gallons (0.76 m³)] or more shall not be stored in buildings or placed within 5 feet (1524 mm) of combustible walls, openings or combustible roof eave lines unless the dumpsters are constructed of noncombustible materials or low heat release materials in accordance with Section 304.3.2. ~~of combustible materials with a peak rate of heat release not exceeding 300 kW/m² where tested in accordance with ASTM E1354 at an incident heat flux of 50 kW/m² in the horizontal orientation.~~

Exceptions:

1. Dumpsters 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.

~~**304.3.3 304.3.5 Capacity exceeding 1.5 cubic yards.** Dumpsters and containers with an individual capacity of 1.5 cubic yards [40.5 cubic feet (1.15 m³)] 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*.

Add new text as follows:

304.3.6 Waste and linen containers in Group I-1, I-2, and I-3 occupancies and Group B ambulatory care facilities. Waste and linen containers located in Group I-1, I-2 and I-3 occupancies and Group B ambulatory care facilities shall be constructed of noncombustible materials or low heat release materials in accordance with Section 304.3.2. 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.

Exception: Recycling containers complying with Section 304.3.6.2 are not required to be stored in waste and linen collection rooms.

304.3.6.1 Capacity Density. The average capacity density of containers located in an individual room or space, other than waste and linen

collection rooms, shall not be greater than 0.5 gal/ft² (20.4 L/m²).

304.3.6.2 Recycling clean waste containers. Recycling clean waste containers, including their lids, shall not exceed an individual capacity of 96 gallons (363 L).

304.3.7 Waste containers with a capacity of 20 gallons or more in Group R-2 college and university dormitories. Waste containers, including their lids, located in Group R-2 college and university dormitories, and with a capacity of 20 gallons (75.7 L) or more, shall be constructed of noncombustible materials or low heat release materials in accordance with Section 304.3.2. 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 constructed in accordance with Table 509 of the International Building Code.

Revise as follows:

808.1 Wastebaskets and Linen containers in Group I-1, I-2 and I-3 occupancies and Group B 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 Group B ambulatory care facilities shall comply with Section 304.3.6 be constructed of noncombustible materials or of materials that meet a peak rate of heat release not exceeding 300 kW/m² when tested in accordance with ASTM E1354 at an incident heat flux of 50 kW/m² 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 509.1 of the International Building Code.

Exception: Recycling containers complying with Section 808.1.2 are not required to be stored in waste and linen collection rooms.

Delete without substitution:

808.1.1 Capacity density. The average capacity density of containers located in an individual room or space, other than waste and linen collection rooms, shall not be greater than 0.5 gal/ft² (20.4 L/m²).

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).

808.2 Waste containers with a capacity of 20 gallons or more in Group R-2 college and university dormitories. Waste containers, including their lids, located in Group R-2 college and university dormitories, and with a capacity of 20 gallons (75.7 L) or more, shall be constructed of noncombustible materials or of materials that meet a peak rate of heat release not exceeding 300 kW/m² when tested in accordance with ASTM E1354 at an incident heat flux of 50 kW/m² 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 constructed in accordance with Table 509.1 of the International Building Code.

Reason Statement: The intent of this proposal is to clean up the requirements for waste containers and make them easier for users to find. Specifically:

- It eliminates some duplication between sections 304 and 808.
- It places all requirements for waste containers in Chapter 3, where they belong. When asked, code officials told me they wouldn't go looking for waste container requirements in the chapter on Interior Finish, Decorative Materials, and Furnishings. (Waste containers are none of those things). One code official stated that they didn't even know there were waste container requirements in Chapter 8.
- The heat release requirements are restated several times in different places, so I created a new label (low heat release materials) and then reference it in where applicable.
- 304 was reordered in size order, since the current language goes from small to large to medium.
- A pointer was left in 808 for linen containers, since they're not really waste containers.

Again, there are no technical changes in this proposal. It is a reorganization to make the code more user friendly. The intent is to bring more visibility to these requirements, which are often overlooked.

Cost Impact: The code change proposal will not increase or decrease the cost of construction. This is a reorganization of information with no impact on cost.

F10-21

IFC: 304.3, 304.3.2, 304.3.3, 304.3.4, 318.1, CHAPTER 8, SECTION 808, 808.1, 808.1.1, 808.1.2, 808.2, 808.1 (New), 808.2 (New), 808.3 (New), 808.3.1 (New), 808.3.2 (New), 808.3.3 (New), 808.4 (New), 808.4.1 (New), 808.5 (New), SECTION 809 (New), 808.3, 808.4, 808.5, 2310.5.3, 3305.2.3, 3603.4

Proponents: Marcelo Hirschler, GBH International, representing self (mmh@gbhint.com)

2021 International Fire Code

Revise as follows:

304.3 Containers. Combustible rubbish and waste material kept ~~within or~~ near a structure shall be stored in accordance with Sections 304.3.1 through ~~304.3.3~~ 304.3.4.

304.3.2 Capacity exceeding 5.33 cubic feet. ~~Containers~~ Waste containers with a capacity exceeding 5.33 cubic feet (40 gallons) (0.15 m³) shall be provided with lids. ~~Containers~~ The waste containers and their lids shall comply with Section 808.5 ~~be constructed of noncombustible materials or of combustible materials with a peak rate of heat release not exceeding 300 kW/m² where tested in accordance with ASTM E1354 at an incident heat flux of 50 kW/m² in the horizontal orientation.~~

Exception: ~~Wastebaskets complying with Section 808.~~

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 m³)] 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.~~

~~304.3.4~~ 304.3.3 Capacity of 1 cubic yard or more. ~~Waste containers and dumpsters~~ Dumpsters with an individual capacity of 1.0 cubic yard [200 gallons (0.76 m³)] or more, but less than 1.5 cubic yards [40.5 cubic feet (1.15 m³)] shall not be ~~stored in buildings or~~ placed within 5 feet (1524 mm) of combustible walls, openings or combustible roof eave lines unless the waste containers or dumpsters comply with Section 808.5 ~~are constructed of noncombustible materials or of combustible materials with a peak rate of heat release not exceeding 300 kW/m² where tested in accordance with ASTM E1354 at an incident heat flux of 50 kW/m² in the horizontal orientation.~~

~~Exceptions~~ Exception: Waste containers with an individual capacity of 1.0 cubic yards [200 gallons (0.76 m³)] or more shall be permitted to be stored adjacent to a building where the exterior area is protected by an approved automatic sprinkler system.

1. ~~Dumpsters 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.~~

318.1 Laundry carts with a capacity of 1 cubic yard or more. Laundry carts with an individual capacity of 1 cubic yard [200 gallons (0.76 m³)] or more, used in laundries within Group B, E, F-1, I, M and R-1 occupancies, shall be constructed of ~~noncombustible materials or materials having a peak rate of heat release not exceeding 300 kW/m² at a flux of 50 kW/m² where tested in a horizontal orientation in accordance with ASTM E1354~~ materials that comply with the requirements of Section 808.5.

Exceptions:

1. Laundry carts in areas protected by an *approved automatic sprinkler system* installed throughout in accordance with Section 903.3.1.1.
2. Laundry carts in coin-operated laundries.

CHAPTER 8 INTERIOR FINISH, DECORATIVE MATERIALS AND FURNISHINGS

Revise as follows:

SECTION 808 FURNISHINGS OTHER THAN UPHOLSTERED FURNITURE AND MATTRESSES OR DECORATIVE MATERIALS WASTE CONTAINERS AND LINEN CONTAINERS IN NEW AND EXISTING BUILDINGS.

Delete without substitution:

~~**808.1 Wastebaskets and linen containers in Group I-1, I-2 and I-3 occupancies and Group B 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 Group B ambulatory care facilities shall be constructed of noncombustible materials or of materials that meet a peak rate of heat release not exceeding 300 kW/m² when tested in accordance with ASTM E1354 at an incident heat flux of 50 kW/m² 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 509.1 of the International Building Code.~~

~~**Exception:** Recycling containers complying with Section 808.1.2 are not required to be stored in waste and linen collection rooms.~~

~~**808.1.1 Capacity density.** The average capacity density of containers located in an individual room or space, other than waste and linen collection rooms, shall not be greater than 0.5 gal/ft² (20.4 L/m²).~~

~~**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).~~

~~**808.2 Waste containers with a capacity of 20 gallons or more in Group R-2 college and university dormitories.** Waste containers, including their lids, located in Group R-2 college and university dormitories, and with a capacity of 20 gallons (75.7 L) or more, shall be constructed of noncombustible materials or of materials that meet a peak rate of heat release not exceeding 300 kW/m² when tested in accordance with ASTM E1354 at an incident heat flux of 50 kW/m² 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 constructed in accordance with Table 509.1 of the International Building Code.~~

Add new text as follows:

808.1 Waste containers with an individual capacity exceeding 5.33 cubic feet (40 gallons) (0.15 m³). Waste containers with an individual capacity exceeding 5.33 cubic feet (40 gallons) (0.15 m³) shall be provided with lids, and shall comply with Section 808.5.

808.2 Waste containers with an individual capacity of 1 cubic yard or more. Waste containers and linen containers with an individual capacity of 1 cubic yard (200 gallons, 0.76 m³) or more shall not be stored in buildings.

Exceptions:

1. Containers with an individual capacity of 1.0 cubic yards (200 gallons, 0.76 m³) or more, but less than 1.5 cubic yards [40.5 cubic feet (1.15 m³)], and complying with Section 808.5, shall be permitted to be stored in a building.
2. Containers with an individual capacity of 1.0 cubic yards [200 gallons (0.76 m³)] or more shall be permitted to be 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.
3. Containers with an individual capacity of 1.0 cubic yards [200 gallons (0.76 m³)] or more shall be permitted to be stored in a structure where the structure is of Type I or IIA construction, located not less than 10 feet (3048 mm) from other structures and used exclusively for storage of waste containers.

808.3 Waste containers and linen containers in Group I-1, I-2 and I-3 occupancies and Group B ambulatory care facilities. Waste containers and linen containers, including their lids, located in Group I-1, I-2 and I-3 occupancies and Group B ambulatory care facilities shall comply with Section 808.5.

808.3.1 Portable Containers. 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.

Exception: Recycling clean waste containers complying with Section 808.3.2 shall not be required to be stored in waste and line collection rooms.

808.3.2 Recycling clean waste containers. Recycling clean waste containers, including their lids, shall not exceed an individual capacity of 96 gallons (363 L).

808.3.3 Capacity Density. The average capacity density of containers located in an individual room or space, other than waste and linen collection rooms, shall not be greater than 0.5 gal/ft² (20.4 L/m²).

808.4 Waste containers with an individual capacity of 20 gallons or more in Group R-2 college and university dormitories. Waste containers, including their lids, in Group R-2 college and university dormitories with an individual capacity of 20 gallons (75.7 L) or more shall comply

with Section 808.5.

808.4.1 Portable Containers. 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.

808.5 Fire Testing. Waste containers, including their lids, shall be constructed of noncombustible materials or of materials that meet a peak rate of heat release not exceeding 300 kW/m² when tested in accordance with ASTM E1354 at an incident heat flux of 50 kW/m² in the horizontal orientation.

Exception. 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.

Revise as follows:

SECTION 809 OTHER FURNISHINGS IN NEW AND EXISTING BUILDINGS.

~~808.3-~~ **809.1 Signs.** Foam plastic signs that are not affixed to interior building surfaces shall have a maximum heat release rate of 150 kW when tested in accordance with UL 1975, or when tested in accordance with NFPA 289 using the 20-kW ignition source.

Exception: Where the aggregate area of foam plastic signs is less than 10 percent of the floor area or wall area of the room or space in which the signs are located, whichever is less, subject to the approval of the *fire code official*.

~~808.4-~~ **809.2 Combustible lockers.** Where lockers constructed of combustible materials are used, the lockers shall be considered to be interior finish and shall comply with Section 803.

Exception: Lockers constructed entirely of wood and noncombustible materials shall be permitted to be used wherever interior finish materials are required to meet a Class C classification in accordance with Section 803.1.2.

~~808.5-~~ **809.3 Play structures added to existing buildings.** Where play structures that exceed 10 feet (3048 mm) in height or 150 square feet (14 m²) in area are added inside an existing building, they shall comply with Section 424 of the *International Building Code*.

2310.5.3 Rubbish containers. Containers with tight-fitting or self-closing lids shall be provided for temporary storage of combustible debris, rubbish and waste material. The rubbish containers shall be constructed entirely of materials that comply with the requirements of Section 808.5. ~~any one of the following:~~

- ~~1. Noncombustible materials.~~
- ~~2. Materials that meet a peak rate of heat release not exceeding 300 kW/m² when tested in accordance with ASTM E1354 at an incident heat flux of 50 kW/m² in the horizontal orientation.~~

3305.2.3 Rubbish containers. Where rubbish containers with a capacity exceeding 5.33 cubic feet (40 gallons) (0.15 m³) are used for temporary storage of combustible debris, rubbish and waste material, they shall have tight-fitting or self-closing lids. Such rubbish containers shall be constructed entirely of materials that comply with the requirements of Section 808.5. ~~either of the following:~~

- ~~1. Noncombustible materials.~~
- ~~2. Materials that meet a peak rate of heat release not exceeding 300 kW/m² when tested in accordance with ASTM E1354 at an incident heat flux of 50 kW/m² in the horizontal orientation.~~

3603.4 Rubbish containers. Containers with tight-fitting or self-closing lids shall be provided for temporary storage of combustible debris, rubbish and waste material. The rubbish containers shall be constructed entirely of materials that comply with the requirements of Section 808.5. ~~any one of the following:~~

- ~~1. Noncombustible materials.~~
- ~~2. Materials that meet a peak rate of heat release not exceeding 300 kW/m² when tested in accordance with ASTM E1354 at an incident heat flux of 50 kW/m² in the horizontal orientation.~~

Reason Statement: Tim Earl noticed that Sections 304 and 808 need rationalization because they contain repeat requirements and there is a circular reference in section 304.3.2 to section 808. This proposal deals with waste containers (and similar products) and laundry carts. The concept in this proposal is that chapter 8 (which is entitled Interior Finish, Decorative Materials, and Furnishings) should deal with waste containers (and the like) if they are indoors, and contain all the detailed information on fire test requirements (just like it contains all the fire test requirements for interior finish and other furnishings). On the other hand, chapter 3 should deal with the products placed outdoors (and refer to chapter 8 for the fire test details). An alternate approach is contained in a proposal by Tim Earl that places all the waste container requirements (both indoor and outdoor) into chapter 3.

This proposal is purely editorial as it does not make any changes in requirements, but the concept in the proposal is to eliminate redundancy and duplication and handling waste containers that are indoors in chapter 8 and those that are outdoors in chapter 3. The actual fire test requirements are recommended to be placed in chapter 8 because it is a chapter that contains fire test requirements for many other products, including interior finish, interior trim, decorations, signs, etc.

Details:

1. Note that sections 304.3.2 through 304.3.4 deal with all waste containers exceeding certain capacities and are not restricted to those that are outdoors. Therefore it is helpful to subdivide the requirements to make it clear which ones are for outdoors and which ones are for indoors.
2. Most of the requirements for capacity exceeding 1.5 cubic yards are included in those exceeding 1 cubic yard.
3. Section 304.3.2: This section requires that all containers above 5.33 cubic feet meet fire test requirements. The section remains because some such containers are used outdoors, but a new section for such waste containers indoors in all buildings is section 808.1. Also, the fire test requirements (and the exception) are directed at chapter 8, new section 808.5. Section 304 is on waste, so the containers referenced here are all waste containers.
4. Section 304.3.3 This section is being deleted as waste containers exceeding a capacity of 1.5 cubic yards also exceed a capacity of 1 cubic yard. Existing Section 304.3.3 The first part of this existing section (stating that they shall not be stored in buildings) is now placed in section 808.2. Note that existing section 304.3.4 also states that containers exceeding 1 cubic yard shall not be stored in buildings and that is also in new section 808.2. The second part of existing section 304.3.3 stating that waste containers shall be placed outdoors within 5 feet is contained within the new 304.3.3.
5. Exception 1 to 304.3.3 is identical to exception 1 to 304.3.4 and is now in exception 2 to section 808.2.
6. Exception 2 to 304.3.3 is identical to exception 2 to 304.3.4 and is now in exception 3 to 808.2.
7. Exception 3 to 304.3.3 is now the exception to the new 304.3.3, and the language has been modified because if it is OK to locate a waste container exceeding 1.5 cubic yards it clearly must be OK to locate one that is smaller.
8. Section 304.3.4 becomes section 304.3.3. The fire test requirements are moved to section 808.5 and the prohibition to store in a building is moved to section 808.2.
9. Exception 1 to 304.3.4 is now in exception 2 to section 808.2.
10. Exception 2 to 304.3.4 is now in exception 3 to section 808.2.
11. New sections 808 address waste containers and linen containers in new and existing buildings and include the requirements from all sections when dealing with products indoors, including the prohibitions present now.
12. Section 808.1 is the new section for all waste containers exceeding 5.33 cubic feet.
13. Section 808.2 is the new section that deals with all waste containers exceeding 1 cubic yard or 1.5 cubic yards, when they are indoors. It contains the exceptions from sections 304.3.3 and 304.3.4.
14. Section 808.3 is the new section with the old 808.1 language except that the fire test requirements have been moved to new section 808.5. This section covers all waste containers and linen containers in those occupancies, exactly as it is in the present code.
15. Section 808.4 is the new section with the old 808.2 language except that the fire test requirements have been moved to new section 808.5. This section covers waste containers of 20 gallons or more in those occupancies, exactly as it is in the present code.
16. Section 808.5 is the new section with the fire test requirements, all placed in one location rather than repeated multiple times.
17. New sections 809 deal with the sections on signs, combustible lockers and play structures, identical to what is in the code now, but in a new separate section dealing with other furnishings.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The change is editorial and just relocates sections.

F11-21

IFC: 308.1.6, 308.1.6.1, 308.1.6.2, 308.1.6.3, 308.1.7, 308.1.7.1, 308.1.8, 308.1.8.1, 308.1.8.2, 308.1.8.3, 308.1.8.4, 308.1.8.5

Proponents: Tim Earl, representing GBH International (tearl@gbhinternational.com)

2021 International Fire Code

Revise as follows:

308.1.6 Open-flame devices in wildfire risk areas. Torches and other devices, machines or processes liable to start or cause fire shall not be operated or used in or on wildfire risk areas, except by a permit in accordance with Section 105.5 secured from the *fire code official*.

Exception: Use within inhabited premises or designated campsites that are not less than 30 feet (9144 mm) from grass-, grain-, brush- or forest-covered areas.

308.1.6.1 Signals and markers. Flame-employing devices, such as lanterns or kerosene road flares, shall not be operated or used as a signal or marker in or on wildfire risk areas.

Exception: The proper use of fusees at the scenes of emergencies or as required by standard railroad operating procedures.

Revise as follows:

308.1.7 ~~308.1.6.2~~ Portable fueled open-flame devices. Portable open-flame devices fueled by flammable or combustible gases or liquids shall be enclosed or installed in such a manner as to prevent the flame from contacting combustible material.

Exceptions:

1. LP-gas-fueled devices used for sweating pipe joints or removing paint in accordance with Chapter 61.
2. Cutting and welding operations in accordance with Chapter 35.
3. Torches or flame-producing devices in accordance with Section 308.4.
4. Candles and open-flame decorative devices in accordance with Section 308.3.

308.1.8 ~~308.1.6.3~~ Sky lanterns. A person shall not release or cause to be released an untethered sky lantern.

308.1.9 ~~308.1.7~~ Religious ceremonies. Where, in the opinion of the *fire code official*, adequate safeguards have been taken, participants in religious ceremonies are allowed to carry hand-held candles. Hand-held candles shall not be passed from one person to another while lighted.

308.1.9 ~~308.1.7.1~~ Aisles and exits. Candles shall be prohibited in areas where occupants stand, or in an *aisle* or *exit*.

308.1.10 ~~308.1.8~~ Flaming food and beverage preparation. The preparation of flaming foods or beverages in places of assembly and drinking or dining establishments shall be in accordance with Sections 308.1.8.1 through 308.1.8.5.

308.1.10.1 ~~308.1.8.1~~ Dispensing. *Flammable or combustible liquids* used in the preparation of flaming foods or beverages shall be dispensed from one of the following:

1. A 1-ounce (29.6 ml) container.
2. A container not exceeding 1-quart (946.5 ml) capacity with a controlled pouring device that will limit the flow to a 1-ounce (29.6 ml) serving.

308.1.10.2 ~~308.1.8.2~~ Containers not in use. Containers shall be secured to prevent spillage when not in use.

308.1.10.3 ~~308.1.8.3~~ Serving of flaming food. The serving of flaming foods or beverages shall be done in a safe manner and shall not create high flames. The pouring, ladling or spooning of liquids is restricted to a maximum height of 8 inches (203 mm) above the receiving receptacle.

308.1.10.4 ~~308.1.8.4~~ Location. Flaming foods or beverages shall be prepared only in the immediate vicinity of the table being serviced. They shall not be transported or carried while burning.

308.1.10.5 ~~308.1.8.5~~ Fire protection. The person preparing the flaming foods or beverages shall have a wet cloth towel immediately available for use in smothering the flames in the event of an emergency.

Reason Statement: This proposal intends to provide some clarity to a currently confusing code section. 308 is entitled Open Flames. 308.1.6 is, for some reason, entitled Open-Flame Devices, although other sections deal with some specific open flame devices. 308.1.6 specifically addresses open flame devices in wildfire risk areas, as does 308.1.6.1. However, the next two items are clearly not meant to apply only to wildfire risk areas. So, renaming 308.1.6 will make it clear that those two items apply to wildfire risk areas. The next two items are being relocated to their own sections since, if they were left as subsections, the requirements would now only apply to wildfire risk areas, which is not the intent.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

This is simply reorganizing this section to clearly distinguish the different requirements.

F11-21

F12-21

IFC: 309.2, UL Chapter 80 (New)

Proponents: Jonathan Roberts, representing UL LLC (jonathan.roberts@ul.com)

2021 International Fire Code

Revise as follows:

309.2 ~~Use in hazardous (classified) locations~~ Listing. Fuel powered industrial trucks shall be *listed* in accordance with UL 558. Electric battery-powered industrial trucks shall be *listed* in accordance with UL 583. 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.

Add new standard(s) as follows:

UL

Underwriters Laboratories LLC
333 Pfingsten Road
Northbrook IL 60062

558-2012: Standard for Industrial Trucks, Internal Combustion Engine-Powered

583-2012: Electric-Battery-Powered Industrial Trucks

Staff Analysis: A review of the following standards proposed for inclusion in the code, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

- UL 558-2012: Standard for Industrial Trucks, Internal Combustion Engine-Powered
- UL 583-2012: Electric-Battery-Powered Industrial Trucks

Reason Statement: This proposal adds a listing requirement for industrial trucks to ensure equipment used and regulated by the IFC is evaluated for safety in accordance with published standards. This would be consistent with OSHA requirements. There are many industrial trucks currently certified (listed) under both proposed new reference standards.

Cost Impact: The code change proposal will increase the cost of construction

The proposal has the potential to increase the cost of powered industrial trucks, although many of these are already listed in accordance with the standards referenced.

F12-21

F13-21

IFC: CHAPTER 3, SECTION 314, 314.4

Proponents: Robert J Davidson, Davidson Code Concepts, LLC, representing Toyota, USA (rjd@davidsoncodeconcepts.com)

2021 International Fire Code

CHAPTER 3 GENERAL REQUIREMENTS

SECTION 314 INDOOR DISPLAYS.

Revise as follows:

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

1. The engine starting system is made inoperable or ignition 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 any of the following:
 - 2.1. Class I, II and III liquid fuel does not exceed one-quarter tank or 5 gallons (19 L) (whichever is least).
 - 2.2. LP gas does not exceed one-quarter gallon or 6.6 gallons (25 L), (whichever is least).
 - 2.3. CNG does not exceed one-quarter tank or 630 cubic feet (17.8 m3), (whichever is least).
 - 2.4. Hydrogen does not exceed one-quarter tank or 2000 cubic feet (0.57 m3), whichever is least)
3. Fuel tanks and fill openings are closed and sealed to prevent tampering.
4. Vehicles, aircraft, boats or other motorcraft equipment are not fueled or defueled within the building.

Reason Statement: New electric and hybrid vehicles have traditional 12V ignition batteries and main batteries for propulsion. The proposal clarifies the ignition batteries should be disconnected. The main batteries of these vehicles are typically disconnected when the vehicle ignition batteries are disconnected.

Because alternative fuels are not broken down in IFC 314.4 Item 2, some officials have required these vehicles to completely purge all fuel out of their tanks when they are located at indoor displays. Doing so, may allow oxygen to enter the tank which, when refueled, may create an explosive atmosphere. In addition, for composite tanks, the liner may be damaged if the internal pressure is reduced to zero. This proposal specifies the quantities allowed for each alternative fuels with the energy equivalent of 5 gallons of Class 1 liquid fuel (gasoline).

Cost Impact: The code change proposal will not increase or decrease the cost of construction
As an operational item there is no impact on construction costs.

F13-21

F14-21

IFC: CHAPTER 1, SECTION 105, [A] 105.1, 105.5.31, CHAPTER 2, SECTION 202, CHAPTER 3, SECTION 315, 315.1, 315.2, 315.3, 315.3.1, 315.3.2, 315.3.3, 315.3.4, 315.6, 315.7.5, 315.5, 315.4, 315.4.1, 315.4.2, 315.7.7, 315.7, 315. 6.1 (New), 315.6.2 (New), 315.6.3 (New), 315.6.4 (New), 315.7.4, 315.7.6, 315.7.6.1, 315.7.6.2, 315.6.7 (New), TABLE 315.7.6(1), TABLE 315.7.6(2), TABLE 315.7.6(3), TABLE 315.7.6(4), 315.7.1, 315.7.2, 315.7.3

Proponents: Robert J Davidson, Davidson Code Concepts, LLC, representing Brambles, USA (rjd@davidsoncodeconcepts.com); Michael O'Brian, Chair, representing FCAC (fcac@iccsafe.org)

2021 International Fire Code

CHAPTER 1 SCOPE AND ADMINISTRATION

SECTION 105 PERMITS.

[A] 105.1 **General.** Permits shall be in accordance with Sections 105.1.1 through 105.6.24.

Revise as follows:

105.5.31 Miscellaneous combustible materials storage. An operational permit is required to store combustible materials in any room or compartment inside a building in excess of 2,500 cubic feet (71 m³) gross volume, or in any single outside area on any premises in excess of 2,500 5,000 cubic feet (71 142 m³) gross volume of combustible empty packing cases, boxes, barrels or similar containers, combustible pallets, rubber tires, rubber, cork or similar combustible material s.

CHAPTER 2 DEFINITIONS

Add new definition as follows:

STORAGE. The activity of keeping, holding or accumulating articles, materials or products for future use, disposal, or to be drawn upon as needed; may be temporary, transient or permanent in nature.

CHAPTER 3 GENERAL REQUIREMENTS

SECTION 315 GENERAL STORAGE.

Revise as follows:

315.1 General. Indoor combustible materials Storage storage shall be in accordance with Sections 315.2 through 315. 4 315.6. Outdoor pallet combustible materials storage shall be in accordance with Sections 315.2 and 315.4 through 315.6 315.7.

Exception: Wood and wood composite pallets stored outdoors at pallet manufacturing and recycling facilities and complying with Section 2810. Outdoor combustible storage facilities complying with Chapter 28

315.2 Permit required. A permit for miscellaneous combustible materials storage shall be required as set forth in Section 105.5.

315.3 Storage in buildings. Storage of materials in buildings shall be orderly and stacks shall be stable. Storage of combustible materials shall be separated from heaters or heating devices by distance or shielding so that ignition cannot occur.

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.

Exceptions:

1. The 2-foot (610 mm) ceiling clearance is not required for storage along walls in nonsprinklered areas of buildings.
2. The 18-inch (457 mm) ceiling clearance is not required for storage along walls in areas of buildings equipped with an *automatic sprinkler system* in accordance with Section 903.3.1.1, 903.3.1.2 or 903.3.1.3.

315.3.2 Means of egress. Combustible materials shall not be stored in *exits* or enclosures for *stairways* and *ramps*. Combustible materials in the *means of egress* during construction, demolition, remodeling or *alterations* shall comply with Section 3312.3.

315.3.3 Equipment rooms. Combustible material shall not be stored in boiler rooms, mechanical rooms, electrical equipment rooms or in *fire command centers* as specified in Section 508.1.5.

315.3.4 Attic, under-floor and concealed spaces. Attic, under-floor and concealed spaces used for storage of combustible materials shall be protected on the storage side as required for 1-hour *fire-resistance-rated* construction. Openings shall be protected by assemblies that are self-closing and are of noncombustible construction or solid wood core not less than 1³/₄ inches (44.5 mm) in thickness. Storage shall not be placed on exposed joists.

Exceptions:

1. Areas protected by *approved automatic sprinkler systems*.
2. Group R-3 and Group U occupancies.

Revise as follows:

315.3.5 ~~315.6~~ Storage in plenums. Storage is prohibited in plenums. Abandoned material in plenums shall be deemed to be storage and shall be removed. Where located in plenums, the portion of abandoned cables that are able to be accessed without causing damage, or requiring demolition to the building shall be identified for future use with a tag or shall be deemed storage and shall be removed.

315.4 ~~315.7.5~~ Pallet types. For the purpose of indoor or outside storage requirements ~~Pallets~~ 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 and be treated as Class I, II and III commodities in Tables 315.6.6(1) and 315.6.6(3). 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 and be treated as IV and High-hazard commodities in Tables 315.6.6(2) and 315.6.6(4).

315.5 ~~General outdoor storage~~ ~~Storage underneath high-voltage transmission lines.~~ ~~Storage located underneath high-voltage transmission lines shall be in accordance with Section 316.6.2.~~

Outside storage of combustible materials shall comply with this section. Outdoor storage of combustible materials in excess of 5,000 cubic feet (142 m³) shall also comply with Sections 315.6 through 315.6.7.

315.5.1 ~~315.4~~ Distance to lot line ~~Outside storage.~~ Outside storage of combustible materials shall not be located within 10 feet (3048 mm) of a *lot line*.

Exceptions:

1. The separation distance is allowed to be reduced to 3 feet (914 mm) for storage not exceeding 6 feet (1829 mm) in height.
2. The separation distance is allowed to be reduced where the *fire code official* determines that hazard to the adjoining property does not exist.

315.5.2 ~~315.4.1~~ Storage beneath overhead projections from buildings. Where buildings are protected by an *automatic sprinkler system*, the outdoor storage, display and handling of combustible materials 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.

315.5.3 ~~315.4.2~~ Height. Storage in the open shall not exceed 20 feet (6096 mm) in height.

315.5.4 ~~315.7.7~~ Prohibited locations. ~~Pallets~~ Combustible materials shall not be stored underneath high-voltage transmission lines, elevated roadways or elevated railways.

Exception: Materials under high-voltage transmission lines in accordance with Section 316.6.2

315.6 ~~315.7~~ Outdoor ~~pallet~~ storage in excess of 5,000 cubic feet (142 m³). ~~Pallets~~ Combustible materials in excess of 5,000 cubic feet (142 m³) stored outdoors shall comply with Sections 315.6 ~~315.7~~ through ~~315.7.7~~ 315.6.6.2 in addition to the applicable general requirements above. ~~Pallets stored within a building shall be protected in accordance with Chapter 32.~~ Combustible materials shall be classified as Class I, II, III, IV or high-hazard commodities in accordance with Chapter 32

Add new text as follows:

315. 6.1 Site plan. Each site shall maintain a current site plan. The site plan shall be submitted to the fire code official for approval, and contain all of the following:

1. Lot Lines.
2. Utilities.
3. Size, location and type of construction of the buildings on the site.
4. Presence of the fire protection systems.
5. Water supply sources for fire-fighting purposes.
6. Location of hazardous material storage areas.

7. Location of combustible storage.
8. Equipment protected with a dust collection system.
9. Fire apparatus access roads.
10. Designated smoking areas.
11. Location of fire alarm control panels.

315.6.2 Fire prevention plan. The owner or owner's authorized representative shall submit a fire prevention plan for review and approval by the fire code official that includes all of the following:

1. Frequency of walk-through inspections to verify compliance with the plan.
2. Hot work permit program 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.

315.6.3 Fire safety and evacuation plan. The owner or owner's authorized representative shall prepare and train employees in an approved fire safety and evacuation plan in accordance with Chapter 4.

315.6.4 Security management plan. The owner or owner's 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.

Revise as follows:

315.6.5 ~~315.7.4~~ Pallet ~~p~~ Pile stability and size. Pallet Combustible material stacks shall be arranged to form stable piles. Individual ~~pallet~~ combustible material piles shall cover an area not greater than 400 square feet (37 m²).

315.6.6 ~~315.7.6~~ Pile separation distances. In addition to the other requirements of this section, ~~pallet~~ combustible material stacks and piles shall be separated in accordance with Sections ~~315.6.6.1~~ ~~315.7.6.1~~ and ~~315.6.6.2~~ ~~315.7.6.2~~.

315.6.6.1 ~~315.7.6.1~~ Building separation. ~~Pallet~~ combustible material stacks and piles shall be separated from buildings in accordance with Table ~~315.6.6(1)~~ ~~315.7.6(1)~~ for ~~wood pallets~~ Class I, II and III commodities and Table ~~315.6.6(2)~~ ~~315.7.6(2)~~ for ~~plastic pallets~~ Class IV and high-hazard commodities.

315.6.6.2 ~~315.7.6.2~~ Separation from other ~~pallets~~ combustible materials and on-site storage. ~~Pallets~~ Combustible materials shall be separated from other ~~pallet~~ combustible material piles and other storage in accordance with Table ~~315.6.6(3)~~ ~~315.7.6(3)~~ for ~~wood pallets~~ Class I, II, and III commodities and Table ~~315.6.6(4)~~ ~~315.7.6(4)~~ for ~~plastic pallets~~ Class IV and high-hazard commodities.

Add new text as follows:

315.6.7 Modification of storage limitations. The fire code official is authorized to permit increased pile sizes and reduced clearances when the site is provided with mitigation measures and fire protection systems suitable for the hazards presented by the stored combustible material. Requests for pile size increases or clearance reductions shall be submitted for review and approval and identify the specific mitigation measures and fire protection system capabilities that address potential fires and their control

Revise as follows:

TABLE 315.6.6(1) 315.7.6(1)
SEPARATION DISTANCE BETWEEN WOOD-PALLET CLASS I, II, AND III COMMODITIES STACKS AND BUILDINGS

WALL CONSTRUCTION	OPENING TYPE	WOOD-PALLET CLASS I, II, III COMMODITIES SEPARATION DISTANCE (feet)		
		≤50 Pallets	51 to 200 Pallets	>200 Pallets
		≤224 cubic feet	>224 cubic feet to 894 cubic feet	>894 cubic feet
Masonry	None	2	2	2
Masonry	Fire-rated glazing with open sprinklers	2	5	20
Masonry	Fire-rated glazing	5	10	20
Masonry	Plain glass with open sprinklers	5	10	20
Noncombustible	None	5	10	20
Wood with open sprinklers	—	5	10	20
Wood	None	15	30	90
Any	Plain glass	15	30	90

For SI: 1 foot = 304.8 mm.

TABLE 315.6.6(2) 315.7.6(2)

SEPARATION DISTANCE BETWEEN PLASTIC-PALLET CLASS IV AND HIGH-HAZARD COMMODITIES STACKS AND BUILDINGS

WALL CONSTRUCTION	OPENING TYPE	PLASTIC-PALLET CLASS IV AND HIGH-HAZARD COMMODITIES SEPARATION DISTANCE (feet)		
		≤50 Pallets ≤224 CUBIC FEET	51 to 200 Pallets >224 CUBIC FEET TO 894 CUBIC FEET	>200 Pallets >894 CUBIC FEET
Masonry	None	2	2	2
Masonry	Fire-rated glazing with open sprinklers	10	20	50
Masonry	Fire-rated glazing	15	40	100
Masonry	Plain glass with open sprinklers	15	40	100
Noncombustible	None	15	40	100
Wood with open sprinklers	—	15	40	100
Wood	None	30	80	150
Any	Plain glass	30	80	150

For SI: 1 foot = 304.8 mm.

TABLE 315.6.6(3) ~~315.7.6(3)~~**SEPARATION OF CLASS I, II, AND III COMMODITIES FROM OTHER PALLET PILES AND ON-SITE STORAGE (WOOD-PALLETS)**

	WOOD-PALLET CLASS I, II, AND III COMMODITIES SEPARATION DISTANCE (feet)		
	≤ 50 Pallets	51 to 200 Pallets	> 200 Pallets
	<u>≤224 CUBIC FEET</u>	<u>>224 CUBIC FEET TO 894 CUBIC FEET</u>	<u>>894 CUBIC FEET</u>
Between pallet piles	7.5	15	45
Other on-site storage	7.5	15	45

For SI: 1 foot = 304.8 mm.

TABLE 315.6.6(4) 315.7.6(4)
SEPARATION OF CLASS IV AND HIGH-HAZARD COMMODITIES FROM OTHER PALLET PILES AND ON-SITE STORAGE (PLASTIC PALLETS)

	PLASTIC PALLET CLASS IV AND HIGH-HAZARD COMMODITIES SEPARATION DISTANCE (feet)		
	≤50 Pallets ≤224 CUBIC FEET	51 to 200 Pallets >224 CUBIC FEET TO 894 CUBIC FEET	>200 Pallets >894 CUBIC FEET
Between pallet piles	15	40	75
Other on-site storage	15	40	75

For SI: 1 foot = 304.8 mm.

Delete without substitution:

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.~~

Reason Statement: For several cycles new language has been added to the fire code to address the occurrence of large fires involving combustible materials stored outside. Language was added to address storage below high-voltage transmission lines, for biomass being utilized a biofuel feed stock and for wooden pallet storage and manufacturing activities. These efforts were undertaken as a result of local jurisdictions beginning to modify local fire codes to fill in the voids for various materials and conditions. With the work that was done with pallets, the largest focus was on wood pallets, (or tested as equivalent to wood), because that segment of the industry stepped up and worked with the Fire Code Action Committee to produce comprehensive requirements for both static storage sites and sites involving manufacturing. There was acknowledgement of the need to address plastic pallets more comprehensively, but that segment of the industry had not stepped up to assist in discussion. In the meantime large fires continued involving large amounts of outdoor combustible storage including stored materials and empty containers and totes as the work group focused on drafting language. Examples:

Auburn Hills, Michigan February 2019 Aerial footage shows massive fire at plastic factory in Michigan - YouTube Massive fire burns at U.S. Farathane facility in Auburn Hills - YouTube

Fairfield, CA July 2011 Plastic Plant Fire Flares Up Again - YouTube

Grand Prairie, TX April 2020 TX Crews Battling Massive Blaze at Plastics Warehouse | Firehouse Industrial fire in Grand Prairie, Texas - YouTube

As the work group struggled with defining various materials to add to the codes requirements it was determined that adding different materials code cycle by code cycle was not fully addressing the problem and simply created an ongoing game of catch up. The work group decided to address combustible materials generally instead of targeting different industries as a more comprehensive solution, one that doesn't create code winners and losers. This was done by utilizing and modifying existing requirements already in the IFC.

105.5.31 was modified to extend permit requirements to outdoor storage in excess of 5,000 cubic feet of combustible materials.

Section 202 was modified by adding a definition for "Storage".

315.1 was restructured to provide for indoor and outdoor combustible materials applicability structure. The exception was modified to point more generically to Chapter 28 for facilities under that chapter.

315.2 minor addition.

315.3.5 is relocated 315.6

315.4 is relocated 315.7.5 and it was modified to address indoor and outdoor application along with recognition of commodity classifications.

315.5 is now general outdoor storage requirements and identifies the applicability of the historic basic requirements versus the addition requirements when the amounts exceed 5,000 cubic feet. The high-voltage language is now covered by 315.5.3.

315.5.1 just renumbered.

315.5.2 is relocated 315.4.1.

315.5.3 is relocated 315.4.1

315.5.4 combines language from old 315.5 and 315.7.7.

315.6 (former 315.7) is modified to capture combustible materials generally, not just pallets and linkage is provided to Chapter 32 for commodity classification. This was the most effective way to address various commodities with a system already in place in the fire code. Whether located indoors or outdoors it is the same material.

315.6.1, 315.6.2 315.6.3 and 315.6.4 Takes the site plan, fire prevention plan and fire safety and evacuation plan language already in Section 2810.2 for pallet manufacturing and duplicates it here for combustible storage over 5,000 cubic feet of material. This concept has already been done in some local ordinances. Controlling large fires is not limited to storage arrangement, it includes a written plan, protection features, security, general operations, response and training. These requirements provide for those features necessary to complement the storage arrangement.

315.6.5 is relocated 315.7.4 with minor modification to apply the language to combustible materials generally.

315.6.6 is relocated 315.7.6 with the word pallet replaced by combustible materials.

315.6.6.1 is former 315.7.6.1 and has been modified by replacing pallets with combustible materials and replacing the types of pallets, (wood versus plastic), with corresponding commodity classifications from Chapter 32.

315.6.6.2 is former 315.7.6.2 and has been modified by replacing pallets with combustible materials and replacing the types of pallets, (wood versus plastic), with corresponding commodity classifications from Chapter 32. Tables 315.6.6 (1) through (4) are former Tables 315.7.6 (1) through (4). They have been modified to incorporate the commodity classifications from Section 315.6.6.1 and 315.6.6.2 and the pallet numbers have been converted to volume of cubic feet. This was done by converting a 42"x42"x4.38" standard hardwood stringer pallet, (a defined entity in industry and test standards), to 4.47 cubic feet of volume, then converting the pallet numbers to equivalent cubic feet.

315.6.7 is a method for a fire code official to allow for increased pile sizes and/or reduced separation distance based upon fire protection capabilities of a site. Many industrial sites have higher fire protection provided than generic storage sites, this allows recognition of that increased protection. 315.7.1, 315.7.2 and 315.7.3 were deleted because these requirements were incorporated above where noted.

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 and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: <https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/>

Cost Impact: The code change proposal will not increase or decrease the cost of construction

These requirements address operational activities outside of buildings and as a result though operation costs will increase, there is no impact on construction costs of buildings and structures.

F15-21 Part I

PART I IFC: SECTION 202 (New), SECTION 317, 317.1, 317.2, 317.4.3, 905.3.8 (IBC [F] 905.3.8), 504.3

PART II IBC: SECTION 202 (New), SECTION 202, [BF] 1505.10, [BF] 1507.15.1

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org); Mike Nugent, Chair, representing ICC Building Code Action Committee (bcac@iccsafe.org)

THIS IS A TWO PART CODE CHANGE. PART 1 WILL BE HEARD BY THE FIRE CODE COMMITTEE AND PART 2 WILL BE HEARD BY THE INTERNATIONAL BUILDING CODE FIRE SAFETY COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES

2021 International Fire Code

Add new definition as follows:

LANDSCAPED ROOF. An area on a roof incorporating planters, vegetation, hardscaping, or other similar decorative appurtenances that are not part of a roof assembly.

VEGETATIVE ROOF. A roof assembly of interacting components designed to waterproof a building's top surface that includes, by design, vegetation and related landscape elements.

Revise as follows:

SECTION 317 VEGETATIVE LANDSCAPED ROOFS.

317.1 General. Vegetative Landscaped roofs shall ~~comply with~~ be installed and maintained in accordance with ~~Sections 317.2 through 317.5 and Sections 1505 and 1507.16 of the International Building Code~~ and be installed and maintained in accordance with Sections 317.2 through 317.5.

317.2 Vegetative Landscaped roof size. Vegetative Landscaped 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 *listed* Class A roof assembly tested in accordance with ASTM E108 or UL 790 shall be provided between adjacent vegetative landscaped roof areas.

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 vegetative landscaped roof, materials used or where a fire hazard exists to the building or exposures due to the lack of maintenance.

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

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 *stairway* shall be marked at street and floor levels with a sign indicating that the *stairway* continues to the roof. Where roofs are used for landscaped roofs, vegetative roofs or for other purposes, stairways shall be provided as required for such occupancy classification.

F15-21 Part I

F15-21 Part II

IBC: (New), SECTION 202, [BF] 1505.10, [BF] 1507.15.1

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org); Mike Nugent, Chair, representing ICC Building Code Action Committee (bcac@iccsafe.org)

2021 International Building Code

Add new definition as follows:

LANDSCAPED ROOF. An area on a roof incorporating planters, vegetation, hardscaping, or other similar decorative appurtenances that are not part of a roof assembly.

Revise as follows:

[BS] VEGETATIVE ROOF. A roof assembly of interacting components designed to waterproof a building's top surface that includes, by design, vegetation and related landscape elements.

[BF] 1505.10 Vegetative Landscaped roofs. Vegetative Landscaped roofs shall comply with Sections 1505.1 and 1507.15 and shall be installed in accordance with ANSI/SPRI VF-1.

[BF] 1507.15.1 Structural fire resistance. The structural frame and roof construction supporting the load imposed on the roof by the *vegetative roof* or landscaped roofs shall comply with the fire resistance rating requirements of Table 601.

Reason Statement: This is an editorial proposal covering both the IFC and the IBC to consistently use the term "vegetative roof".

The term "landscaped roofs" has been used by the public interchangeably with "vegetative roofs". This has created confusion in the building code and conflicts with industry standards that have coalesced around the term "vegetative roof". Moreover, some of the sections presently identified as "landscaped roofs" should refer to "vegetative roofs" as they really addresses roofs that are part of the building envelope and, thus, are associated with the existing definition of "vegetative roofs". In these locations, the code is revised to properly use "vegetative roof". In other places, both terms are retained as the language could apply either to a vegetative roof where the membrane, growth medium and vegetation are incorporated as part of the roof assembly, or a landscaped roof where planters, hardscapes, or other features are provided above the roof assembly and not integrated into it. A definition for "landscaped roof" is proposed to capture such features and better distinguish between a true "vegetative roof" as defined in the IBC and industry standards.

Neither the IFC nor the IBC define the term "landscaped roof", but the IBC does contain a definition for the term "vegetative roofs" that reads as follows.

[BS] VEGETATIVE ROOF. *An assembly of interacting components designed to waterproof a building's top surface that includes, by design, vegetation and related landscape elements.*

This proposal also copies the existing definition from the IBC to the IFC.

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

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents 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 and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

The proposal is editorial and will not impact how vegetative and landscaped roofs are designed and constructed.

F16-21 Part I

PART I IFC: SECTION 317

PART II IBC: [BF] 1505.10

Proponents: Michael O'Brian, Chair, representing FCAC (fcac@iccsafe.org)

THIS IS A TWO PART CHANGE. PART 1 OF THIS PROPOSAL IS HEARD BY THE FIRE CODE COMMITTEE AND PART II OF THIS PROPOSAL WILL BE HEARD BY THE BUILDING CODE FIRE SAFETY CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Fire Code

Revise as follows:

SECTION 317 VEGETATIVE LANDSCAPED ROOFS.

317.1 General. ~~Landscaped~~ Vegetative roofs shall comply with ~~be installed and maintained in accordance with Sections 317.2 through 317.5 and Sections 1505 and 1507.16 of the International Building Code.~~ Vegetative roofs shall be maintained in accordance with Sections 317.2 and 317.3.

317.2 Landscaped roof size. ~~Landscaped 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 ~~listed~~ Class A roof assembly tested in accordance with ASTM E108 or UL 790 shall be provided between adjacent landscaped roof areas.~~

317.3 Rooftop structure and equipment clearance. ~~For all vegetative roofs abutting combustible vertical surfaces, a Class A rated roof system complying with ASTM E108 or 790—2004 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—317.2 Vegetation. ~~Vegetation shall be maintained in accordance with Sections 317.2.1 and 317.2.2.~~ 317.4.1 and 317.4.2.

317.4.1 317.2.1 Irrigation. ~~Supplemental irrigation shall be provided to maintain levels of hydration necessary to keep green roof plants alive and to keep dry foliage to a minimum.~~

317.4.2 317.2.2 Dead foliage. ~~Excess biomass, such as overgrown vegetation, leaves and other dead and decaying material, shall be removed at regular intervals not less than two times per year.~~

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 landscaped roof, materials used or where a fire hazard exists to the building or exposures due to the lack of maintenance.~~

317.5—317.3 Maintenance equipment. ~~Fueled equipment stored on roofs and used for the care and maintenance of vegetation on roofs shall be stored in accordance with Section 313.~~

F16-21 Part I

F16-21 Part II

IBC: [BF] 1505.10

Proponents: Michael O'Brian, Chair, representing FCAC (fcac@iccsafe.org)

2021 International Building Code

Revise as follows:

[BF] 1505.10 Landscaped and Vegetative roofs. Landscaped and vegetative roofs shall comply with Sections 1505.1 and 1507.15. Vegetative roofs ~~and~~ shall be installed in accordance with ANSI/SPRI VF-1.

Reason Statement: The term "landscaped roofs" has been used by the public to mean the same as "vegetative roofs" but it is used with a different meaning in ICC codes. The IBC defines vegetative roofs as follows:

VEGETATIVE ROOF. An assembly of interacting components designed to waterproof a building's top surface that includes, by design, vegetation and related landscape elements.

This means that vegetative roof is a term that refers specifically to roof systems that are part of the building envelope. Moreover, it is clear Section 317 really should refer to "vegetative roofs" because they really address roofs that are part of the building envelope and, thus, are associated with the existing definition of "vegetative roofs". Therefore, the term "landscaped roofs" is unnecessary and should be replaced by the defined term "vegetative roofs" in this section.

Moreover, the language in the IFC in the set of sections 317, which applies to "vegetative roofs", needs to contain requirements that are consistent with those in the present edition of the SPRI VF-1 standard. However, in actual fact, the language in the IFC is that Sections 317.2, 317.3 and 317.4 are based on an old edition of the SPRI VF-1 standard and, thus, most of the requirements are unnecessary.

Note that Section 1505.10 of the IBC requires that vegetative roofs be installed per the SPRI VF-1 standard. Thus, this proposal simply cleans up section 317 of the IFC and replaces the term "landscaped roofs" with "vegetative roofs". It also clarifies that section 1505.10 of the IBC (controlled by the IFC) applies to both vegetative roofs and landscaped roofs and that the SPRI standard contains the requirements for vegetative roofs. The fire classification for all types of such roofs is contained in section 1505.1 of the IBC and is not delegated to the SPRI industry standard.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

The proposal will not impact how vegetative roofs are designed and constructed as both the IBC and IFC will refer to the same edition of the SPRI standard.

F16-21 Part II

F17-21

IFC: SECTION 317, 317.1, 317.2, 317.3, 317.4, 317.4.1, 317.4.2, 317.4.3, 317.5

Proponents: Amanda Hickman, representing SPRI, Inc. (amanda@thehickmangroup.com)

2021 International Fire Code

Revise as follows:

SECTION 317 ~~LANDSCAPED~~ VEGETATIVE ROOFS.

317.1 General. ~~Landscaped~~ Vegetative roofs shall ~~comply with~~ be installed and maintained in accordance with Sections 317.2 through 317.5 and Sections 1505 and 1507.16 of the International Building Code. Vegetative roofs shall be maintained in accordance with Sections 317.2 and 317.4.

317.2 Landscaped roof size. ~~Landscaped 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 ~~listed~~ Class A roof assembly tested in accordance with ASTM E108 or UL 790 shall be provided between adjacent landscaped roof areas.~~

317.3 Rooftop structure and equipment clearance. ~~For all vegetative roofs abutting combustible vertical surfaces, a Class A-rated roof system complying with ASTM E108 or 790—2004 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 ~~317.2~~ Vegetation. ~~Vegetation shall be maintained in accordance with Sections 317.4.1 and 317.4.2~~ 317.2.1 and 317.2.2.

317.4.1 ~~317.2.1~~ Irrigation. Supplemental irrigation shall be provided to maintain levels of hydration necessary to keep green roof plants alive and to keep dry foliage to a minimum.

317.4.2 ~~317.2.2~~ Dead foliage. Excess biomass, such as overgrown vegetation, leaves and other dead and decaying material, shall be removed at regular intervals not less than two times per year.

317.4.3 ~~317.3~~ Maintenance plan. The *fire code official* is authorized to require a maintenance plan for vegetation placed on roofs due to the size of a ~~landscaped~~ vegetated roof, materials used or where a fire hazard exists to the building or exposures due to the lack of maintenance.

317.5- ~~317.4~~ Maintenance equipment. Fueled equipment stored on roofs and used for the care and maintenance of vegetation on roofs shall be stored in accordance with Section 313.

Reason Statement: The current language in Section 317 of the IFC is based on a previous edition of the ANSI/SPRI VF-1 standard and so some of the provisions of 317 are not consistent with the current edition of ANSI-SPRI VF-1 standard which is referenced in IBC Section 1505.10 for installation of vegetative (landscaped) roofs. The FCAC and BCAC discussed the terms “vegetative” and “landscaped” roofs at great lengths. The SPRI standard addresses roofs consistent with the definition that is being proposed by the FCAC/BCAC for vegetative roof, so we have revised “landscaped” to “vegetative” in the text.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

The proposal is editorial and only clarifies the requirements.

F17-21

F18-21

IFC: 105.5.32, 319.1, 319.2, 319.3, 319.4, 319.4.1, 319.4.2, 319.4.3 (New), 319.4.3.1 (New), 319.4.3.2 (New), 319.4.3.3 (New), 319.4.3.4 (New), 319.5, 319.6, 319.7, 319.7.1, 319.7.2, 319.7.3, 319.7.4, 319.7.5, 319.7.5.1, 319.7.5.2, 319.8, 319.8.1, 319.8.2, 319.8.3, 319.8.4, 319.8.5, 319.9, 319.9.1, 319.9.1.1, 319.9.1.2, 319.9.1.3, 319.9.2, 319.9.3, 319.9.4, 319.10, 319.10.1, 319.10.2, 319.10.3, 904.2.2, 904.13.1, 906.1

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Fire Code

Revise as follows:

105.5.32 Mobile food preparation vehicles. A n operational permit is required for mobile food preparation vehicles equipped with appliances that produce smoke or grease-laden vapors.

319.1 General. Mobile food preparation vehicles that are equipped with appliances that produce smoke or grease-laden vapors for the purpose of preparing, cooking, or serving food shall comply with NFPA 96 and this section. Indoor use of mobile food preparation vehicles is prohibited unless approved by the fire code official.

319.2 Permit required. Permits shall be required as set forth in Section 105.5.

319.3 Exhaust hood. Cooking equipment that produces grease-laden vapors shall be provided with a kitchen exhaust hood constructed in accordance with Section 606.

319.4 Fire protection-~~Maintenance.~~ ~~Fire protection shall be provided in accordance with Sections 319.4.1 and 319.4.2-~~

Maintenance of systems on mobile food preparation vehicles shall be in accordance with Sections 319.4.1 through 319.4.3.

319.4.1 Fire protection for cooking equipment Exhaust System. ~~Cooking equipment shall be protected by automatic fire-extinguishing systems in accordance with Section 904.13-~~

The exhaust system, including hood, grease-removal devices, fans, ducts, and other appurtenances, shall be inspected and cleaned in accordance with NFPA 96.

319.4.2 Fire extinguisher ~~Fire protection systems and devices.~~ ~~Portable fire extinguishers shall be provided in accordance with Section 906.4-~~

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

319.4.3 Fuel gas systems. Fuel gas systems shall be maintained in accordance with 319.4.3.1 through 319.4.3.4.

319.4.3.1 LP-gas systems. LP-gas containers installed on the vehicle and fuel gas piping systems shall be inspected annually by an approved inspection agency, person or special expert who is qualified to ensure that system components are free from damage, suitable for the intended service and not subject to leaking.

319.4.3.2 CNG systems. CNG containers and fuel gas piping systems shall be inspected annually by an approved inspection agency, person or special expert who is qualified to ensure that system components are free from damage, suitable for the intended service and not subject to leaking.

319.4.3.3 Annual leakage test. All fuel gas piping systems and appliances shall be checked annually for leakage at the operating pressure of the system using a manometer or pressure gauge. Where leakage is indicated, the gas supply shall be turned off until repairs have been made and the system no longer leaks.

319.4.3.4 Inspection tag. Upon a satisfactory annual inspection, the approved inspection agency, person or special expert shall affix a tag on the fuel gas system or within the vehicle indicating the name of the inspection agency and the date of the satisfactory inspection.

319.5 ~~Appliance connection to fuel supply piping~~ Manual system operation for the automatic fire extinguishing system(s). ~~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 the manufacturer's installation instructions. Movement of appliances shall be limited by restraining devices installed in accordance with the connector and appliance manufacturer's instructions.~~

A manual activation device shall be provided for the automatic fire extinguishing system(s) provided for the cooking appliance(s). The manual activation device shall be unobstructed and in view from the means of egress, located at or near a means of egress from the cooking area, and at a location acceptable to the fire code official. The manual actuation device shall be installed not more than 48 inches (1200 mm) nor less than 42 inches (1067 mm) above the walking surface of the means of egress and shall clearly identify the hazard protected. The manual actuation shall require a maximum force of 40 pounds (178 N) and a maximum movement of 14 inches (356 mm) to actuate the fire suppression system.

319.6 Cooking oil storage containers. ~~Cooking oil storage containers within mobile food preparation vehicles shall have a maximum aggregate volume not more than 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 Sections 319.7.1 through 319.7.5.2.

319.7.1 Metallic storage tanks. Metallic cooking oil storage tanks shall be ~~listed~~ in accordance with UL 80 or UL 142, 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 comply with both 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 (91 kg) 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 the 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 (590 kg) 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 an 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 606.3.

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 US Department of Transportation to requalify LP-gas cylinders, to ensure that system components are free from damage, suitable for the intended service and not subject to leaking. CNG containers shall be inspected every 3 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.

904.2.2 Commercial hood and duct systems. Each required commercial kitchen exhaust hood and duct system required by Sections 606 and 319 to have a Type I hood shall be protected with an *approved* automatic fire-extinguishing system installed in accordance with this code.

904.13.1 Manual system operation. A manual actuation device shall be located at or near a *means of egress* from the cooking area not less than 10 feet (3048 mm) and not more than 20 feet (6096 mm) from the kitchen exhaust system. The manual actuation device shall be installed not more than 48 inches (1200 mm) nor less than 42 inches (1067 mm) above the floor and shall clearly identify the hazard protected. The manual actuation shall require a maximum force of 40 pounds (178 N) and a maximum movement of 14 inches (356 mm) to actuate the fire suppression system.

Exception Exceptions:

1. *Automatic sprinkler systems* shall not be required to be equipped with manual actuation means.
2. *Mobile food preparation vehicles* in accordance with Section 319.

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- and mobile food preparation vehicles in accordance with Section 319.

Exceptions:

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.
3. In storage areas of Group S occupancies where forklift, powered industrial truck or powered cart operators are the primary occupants, fixed extinguishers, as specified in NFPA 10, shall not be required where in accordance with all of the following:
 - 3.1. Use of vehicle-mounted extinguishers shall be *approved* by the *fire code official*.
 - 3.2. Each vehicle shall be equipped with a 10-pound, 40A:80B:C extinguisher affixed to the vehicle using a mounting bracket *approved* by the extinguisher manufacturer or the *fire code official* for vehicular use.
 - 3.3. Not less than two spare extinguishers of equal or greater rating shall be available on-site to replace a discharged extinguisher.
 - 3.4. Vehicle operators shall be trained in the proper operation, use and inspection of extinguishers.
 - 3.5. Inspections of vehicle-mounted extinguishers shall be performed daily.
2. Within 30 feet (9144 mm) distance of travel from commercial cooking equipment and from domestic cooking equipment in Group I-1; I-2, Condition 1; and R-2 college dormitory occupancies.
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 3316.1.
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*.

Exception: Portable fire extinguishers are not required at normally unmanned Group U occupancy buildings or structures where a portable fire extinguisher suitable to the hazard of the location is provided on the vehicle of visiting personnel.

Reason Statement: The overarching application of NFPA 96 to this code section provides for a cohesive and systemic code proposal, clarification and consistency of application. However, specifically with respect to maintenance of the fire protection systems, the 2021 edition of NFPA 96, Sections 12.2.1 and 12.2.1.1 exempts maintenance of the fire protection systems. In order to ensure that maintenance to address the exhaust system is still required, the existing code section for maintenance is retained. Note that the maintenance to address the exhaust system is still referenced from NFPA 96. However, the existing requirement to maintain the fire protection system is retained without change, to ensure that this

maintenance continues. Additionally, details are added to the criteria for maintenance of fuel gas systems, such as the criteria for an annual leakage test. For clarity to the users, the maintenance criteria for fuel gas systems is reformatted into subsections.

The proposal also includes a specific section to address manual system operation of the extinguishing system. The section is modeled after existing IFC Section 904.12. However, in many cases, the expected separation distance from cooking appliances to the manual actuation device will not be in compliance with the 10-20 feet separation criteria found in Section 904.12. As such, the proposal is to eliminate the specific distance criteria and instead provide performance criteria for the device to be unobstructed, in view from the means of egress, and located at or near the means of egress from the cooking area, subject to approval by the fire code official. This type of code language for placement of the manual activation device is similar to how this topic is treated in the 2021 edition of NFPA 96, Section 11.4. The proposal is added to the IFC to clarify how placement of these devices can differ from those of permanent installations within buildings, which are still governed by the overall criteria of IFC Section 904.12. To clarify the intent for the user, an exception is proposed for Section 904.12.1, so that the separation distance of 10-20 feet does not apply to 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 and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: <https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/>

Cost Impact: The code change proposal will not increase or decrease the cost of construction

The code proposal will not have an impact to the cost of construction as the intent of the code change is to provide clarity and consistency of application and enforcement.

F18-21

F19-21

IFC: SECTION 319, APPENDIX O (NEW)

Proponents: Daniel Nichols, representing Metropolitan Transportation Authority, Construction and Development (dnichols@mnr.org)

2021 International Fire Code

Revise as follows:

~~SECTION 319~~ APPENDIX O MOBILE FOOD PREPARATION VEHICLES.

~~319.1~~ O101.1 General. Mobile food preparation vehicles that are equipped with appliances that produce smoke or grease-laden vapors shall comply with this section when one of the following conditions exist:

1. The vehicle remains in operations on the same premises for 30 days
2. The vehicle is connected to on-premises utilities or energy sources
3. The vehicle has access to on-premises storage for food or supplies
4. The premises has construction that requires disassembly prior to moving the vehicle
5. Required by local law or ordinance

~~319.2~~ O101.2 Permit required. Permits shall be required as set forth in Section 105.5.

~~319.3~~ O101.3 Exhaust hood. Cooking equipment that produces grease-laden vapors shall be provided with a kitchen exhaust hood in accordance with Section 606.

~~319.4~~ O101.4 Fire protection. Fire protection shall be provided in accordance with Sections 319.4.1 and 319.4.2.

~~319.4.1~~ O101.4.1 Fire protection for cooking equipment. Cooking equipment shall be protected by automatic fire-extinguishing systems in accordance with Section 904.13.

~~319.4.2~~ O101.4.2 Fire extinguisher. Portable fire extinguishers shall be provided in accordance with Section 906.4.

~~319.5~~ O101.5 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 the 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~~ O101.6 Cooking oil storage containers. Cooking oil storage containers within mobile food preparation vehicles shall have a maximum aggregate volume not more than 120 gallons (454 L), and shall be stored in such a way as to not be toppled or damaged during transport.

~~319.7~~ O101.7 Cooking oil storage tanks. Cooking oil storage tanks within mobile food preparation vehicles shall comply with Sections ~~319.7.1~~ O101.7.1 through ~~319.7.5.2~~ O101.7.5.2.

~~319.7.1~~ O101.7.1 Metallic storage tanks. Metallic cooking oil storage tanks shall be ~~listed~~ in accordance with UL 80 or UL 142, and shall be installed in accordance with the tank manufacturer's instructions.

~~319.7.2~~ O101.7.2 Nonmetallic storage tanks. Nonmetallic cooking oil storage tanks shall be installed in accordance with the tank manufacturer's instructions and shall comply with both 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~~ O101.7.3 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~~ O101.7.4 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~~ O101.7.5 Tank venting. Normal and emergency venting shall be provided for cooking oil storage tanks.

~~319.7.5.1~~ O101.7.5.1 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~~ O101.7.5.2 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-~~ O101.8 LP-gas systems. Where LP-gas systems provide fuel for cooking appliances, such systems shall comply with Chapter 61 and Sections ~~319.8-1~~ O101.8.1 through ~~319.8-5~~ O101.8.5.

~~319.8-1~~ O101.8.1 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 (91 kg) propane capacity.

~~319.8-2~~ O101.8.2 Protection of container. LP-gas containers installed on the vehicle shall be securely mounted and restrained to prevent movement.

~~319.8-3~~ O101.8.3 LP-gas container construction. LP-gas containers shall be manufactured in compliance with the requirements of NFPA 58.

~~319.8-4~~ O101.8.4 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~~ O101.8.5 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 the manufacturer's instructions.

~~319.9-~~ O101.9 CNG systems. Where CNG systems provide fuel for cooking appliances, such systems shall comply with Sections ~~319.9-1~~ O101.9.1 through ~~319.9-4~~ O101.9.4.

~~319.9-1~~ O101.9.1 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~~ O101.9.1.1 through ~~319.9-1-3~~ O101.9.1.3.

~~319.9-1-1~~ O101.9.1.1 Maximum aggregate volume. The maximum aggregate capacity of CNG containers transported on the vehicle shall not exceed 1,300 pounds (590 kg) water capacity.

~~319.9-1-2~~ O101.9.1.2 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~~ O101.9.1.3 CNG container construction. CNG containers shall be an NGV-2 cylinder.

~~319.9-2~~ O101.9.2 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~~ O101.9.3 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~~ O101.9.4 Methane alarms. A *listed* methane gas alarm shall be installed within the vehicle in accordance with manufacturer's instructions.

~~319-10-~~ O101.10 Maintenance. Maintenance of systems on mobile food preparation vehicles shall be in accordance with Sections ~~319-10-1~~ O101.10.1 through ~~319-10-3~~ O101.10.3.

~~319-10-1~~ O101.10.1 Exhaust system. The exhaust system, including hood, grease-removal devices, fans, ducts and other appurtenances, shall be inspected and cleaned in accordance with Section 606.3.

~~319-10-2~~ O101.10.2 Fire protection systems and devices. *Fire protection systems* and devices shall be maintained in accordance with Section 901.6.

~~319-10-3~~ O101.10.3 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 US Department of Transportation to requalify LP-gas cylinders, to ensure that system components are free from damage, suitable for the intended service and not subject to leaking. CNG containers shall be inspected every 3 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 Statement: The enforcement of Mobile Food Preparation Vehicles for fire safety practices is important, but is not easily accomplished without connection to other laws and ordinances. Unlike fixed areas where vehicles assemble and (sometimes) remain, these Vehicles also can traverse several jurisdictions in a day providing "coffee" to job sites, small businesses, and pop-up business events. As fire code officials that regulate many construction sites and industrial-type work locations, these vehicles are hard to keep tabs on. The main purpose of the appendix is to have the IFC requires maintained while allowing the jurisdiction to adopt it as part of a local licensing requirement. That license may come as part of the food service license, hawking and peddling license, land use license, or several other local license programs. However, having the license is the gateway to uniform protection in the jurisdiction.

5 conditions have been proposed. The first 4 are to address those that become "fixed" and address the spirit of the original code change. The 5th one is to permit the local law or ordinance to use the section without further modification.

The move to the appendix, rather than maintaining in Chapter 3, is solely to address the recognition of the need for a local law or ordinance for the

"moving" vehicles. Referencing a local law or ordinance in the main body of the IFC is only otherwise referenced in Chapter 61 for large LP storage.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is an administrative change regarding when this fire safety practice applies.

F19-21

F20-21

IFC: 319.3, 319.4.1, 319.7.3, 319.7.4

Proponents: Daniel Nichols, Metropolitan Transportation Authority, Construction and Development, representing Metropolitan Transportation Authority, Construction and Development (dnichols@mnrt.org)

2021 International Fire Code

Revise as follows:

319.3 Exhaust hood. Cooking equipment that produces grease-laden vapors shall be provided with a kitchen exhaust hood in accordance with ~~Section 606~~ the International Mechanical Code.

319.4.1 Fire protection for cooking equipment. Cooking equipment required to have a Type I hood shall be protected by automatic fire-extinguishing systems in accordance with Section 904.13.

~~319.8~~ ~~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.

~~319.8.1~~ ~~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.

Reason Statement: The purpose of this code change is to better align the requirements within the section with that of a fixed commercial kitchen; including addressing requirements that are more restrictive.

Exhaust Hood- There is a difference of triggering events between the Fire Code and Mechanical Code on what requires a Type I hood. Under IMC 507, certain light-duty appliances and smokers with integrated exhaust are exempted. This makes the requirements for a mobile food truck more restrictive than a commercial kitchen within a new building.

Fire suppression system- The barometer of the hazard caused by grease laden vapors is dependent on the need for a Type I hood in the IMC, specifically recognized in IMC Section 509. The current language does not take into account the coverage of a Type I hood. Therefore, any vehicle that is regulated by this section is required to have all cooking equipment protected by a fire suppression system, regardless of duty level, output type or hazard.

System Components and Design Criteria- These sections are not part of the "tank" and are only being moved to ensure they are considered separately.

Cost Impact: The code change proposal will decrease the cost of construction

By limiting the applicability of ventilation and fire suppression requirements to that of fixed commercial kitchens, the hazard protection remains comparable while decreasing the cost of building a mobile food truck.

F20-21

F21-21

IFC: 105.6.25 (New), 301.2, 321.1 (New), 321.2 (New), 321.3 (New), 321.4 (New), 321.4.1 (New), 321.4.2 (New), 321.4.2.1 (New), 321.4.2.2 (New), 321.4.2.3 (New), 321.4.2.4 (New), 321.4.2.5 (New), 321.4.2.6 (New), 321.4.3 (New), 321.4.3.1 (New), 321.4.3.2 (New), 321.4.3.3 (New), 403.10.6 (New), TABLE 903.2.11.6

Proponents: Andy King, International Association of Fire Chiefs, representing International Association of Fire Chiefs (andyk@franklinfn.gov); Jeffrey Shapiro, representing Self (jeff.shapiro@intlcodeconsultants.com)

2021 International Fire Code

Add new text as follows:

105.6.25 Lithium batteries. An operational permit is required for an accumulation of more than 15 cubic feet (0.42 m³) of lithium-ion and lithium metal batteries, where required by Section 321.1.

Revise as follows:

301.2 Permits. Permits shall be required as set forth in Section 105.5 for the activities or uses regulated by Sections 306, 307, 308, 315, ~~and~~ 320 and 321.

Add new text as follows:

321.1 General. The storage of lithium-ion and lithium metal batteries shall comply with Section 321.

Exceptions:

1. Batteries installed in the equipment, devices, or vehicles they are designed to power.
2. Batteries packed for use with the equipment, devices, or vehicles they are designed to power.
3. Batteries in original retail packaging that are rated at 300 watt-hours or less for lithium-ion batteries or contain 25 grams or less of lithium metal for lithium metal batteries.
4. Temporary storage of batteries or battery components during the battery manufacturing process prior to completion of final quality control checks.

321.2 Permits. Permits shall be required for an accumulation of more than 15 cubic feet (0.42 m³) of lithium-ion and lithium metal batteries, other than batteries listed in the exceptions to Section 321.1, as set forth in Section 105.6.25

321.3 Fire safety plan. A fire safety plan shall be provided in accordance with Section 403.10.6. In addition, the fire safety plan shall include emergency response actions to be taken upon detection of a fire or possible fire involving lithium-ion or lithium metal battery storage.

321.4 Storage requirements. Lithium-ion and lithium metal batteries shall be stored in accordance with Section 321.4.1, 321.4.2, or 321.4.3, as applicable.

321.4.1 Limited indoor storage in containers. Not more than 15 cubic feet (0.42 m³) of lithium-ion or lithium metal batteries shall be permitted to be stored in containers in accordance with all of the following.

1. Containers shall be open-top and constructed of noncombustible materials or shall be approved for battery collection.
2. Individual containers and groups of containers shall not exceed a capacity of 7.5 cubic feet (0.21 m³).
3. A second container or group of containers shall be separated by not less than 3 feet (914 mm) of open space, or 10 feet (3048 mm) of space that contains combustible materials.
4. Containers shall be located not less than 5 feet (1524 mm) from exits or exit access doors.

321.4.2 Indoor storage areas. Indoor storage areas for lithium-ion and lithium metal batteries, other than those complying with Section 321.4.1, shall comply with Sections 321.4.2.1 through 321.4.2.6.

321.4.2.1 Technical opinion and report. A technical opinion and report complying with Section 104.8.2 shall be prepared to evaluate the fire and explosion risks associated with the indoor storage area and to make recommendations for fire and explosion protection. The report shall be submitted to the *fire code official* and shall require the *fire code official's* approval prior to issuance of a permit. In addition to the requirements of Section 104.8.2, the technical opinion and report shall specifically evaluate the following:

1. The potential for deflagration of flammable gases released during a thermal runaway event.
2. The basis of design for an automatic sprinkler system or other approved fire suppression system. Such design basis shall reference relevant full-scale fire testing or another approved method of demonstrating sufficiency of the recommended design.

321.4.2.2 Construction requirements. Where indoor storage areas for lithium-ion and lithium metal batteries are located in a building with other uses, battery storage areas shall be separated from the remainder of the building by 2-hour rated *fire barriers* or *horizontal assemblies*. *Fire barriers* shall be constructed in accordance with Section 707 of the International Building Code, and *horizontal assemblies* shall be constructed in accordance with Section 711 of the International Building Code.

Exceptions:

1. Where battery storage is contained in one or more approved prefabricated portable structures providing a complete 2-hour fire-resistance rated enclosure, *fire barriers* and *horizontal assemblies* are not required.
2. Where battery storage is limited to new batteries in packaging that has been demonstrated to and approved by the fire code official as sufficient to isolate a fire in packaging to the package interior, *fire barriers* and *horizontal assemblies* are not required.

321.4.2.3 Fire protection systems. Indoor storage areas for lithium-ion and lithium metal batteries shall be protected by an *automatic sprinkler system* complying with Section 903.3.1.1 or an approved alternative fire suppression system. The system design shall be based on recommendations in the approved technical opinion and report required by Section 321.4.2.1.

321.4.2.4 Fire alarm systems. Indoor storage areas for lithium-ion and lithium metal batteries shall be provided with an approved automatic fire detection and alarm system complying with Section 907. The fire detection system shall use air-aspirating smoke detection, radiant energy-sensing fire detection, or both.

321.4.2.5 Explosion control. Where the *approved* technical opinion and report required by Section 321.4.2.1 recommends explosion control, explosion control complying with Section 911 shall be provided.

321.4.2.6 Reduced requirements for storage of partially charged batteries. Indoor storage areas for lithium-ion and lithium metal batteries with a demonstrated state of charge not exceeding 30 percent shall not be required to comply with Sections 321.4.2.1, 321.4.2.2, or 321.4.2.5, provided that procedures for limiting and verifying that the state of charge will not exceed 30 percent have been approved.

321.4.3 Outdoor Storage. Outdoor storage of lithium-ion or lithium metal batteries shall comply with Sections 321.4.3.1 through 321.4.3.3.

321.4.3.1 Distance from storage to exposures. Outdoor storage of lithium-ion or lithium metal batteries, including storage beneath weather-protection in accordance with Section 414.6.1 of the International Building Code, shall comply with one of the following.

1. Battery storage shall be located not less than 20 feet (6096 mm) from any building, lot line, public street, public alley, public way or means of egress.
2. Battery storage shall be located not less than 3 feet (914mm) from any building, lot line, public street, public alley, public way or means of egress, where the battery storage is separated by a 2-hour fire-resistance rated assembly without openings or penetrations and extending 5 feet (1524 mm) above and to the sides of the battery storage area.
3. Battery storage shall be located not less than 3 feet (914 mm) from any building, lot line, public street, public alley, public way or means of egress, where batteries are contained in approved prefabricated portable structures providing a complete 2-hour fire-resistance rated enclosure.

321.4.3.2 Storage area size limits and separation. Outdoor storage areas for lithium-ion or lithium metal batteries, including storage beneath weather-protection in accordance with Section 414.6.1 of the International Building Code, shall not exceed 900 sq. ft (83.6 m²). The height of battery storage in such areas shall not exceed 10 feet (3048 mm). Multiple battery storage areas shall be separated from each other by not less than 10 feet (3048 mm) of open space.

321.4.3.3 Fire detection. Outdoor storage areas for lithium-ion or lithium metal batteries, regardless of whether such areas are open, under weather protection or in a prefabricated portable structure, shall be provided with an approved automatic fire detection and alarm system complying with Section 907. The fire detection system shall use radiant energy-sensing fire detection.

403.10.6 Buildings with lithium-ion or lithium metal battery storage. An approved fire safety plan in accordance with Section 404 shall be prepared and maintained for buildings with lithium-ion or lithium metal battery storage.

Revise as follows:

**TABLE 903.2.11.6
ADDITIONAL REQUIRED FIRE PROTECTION SYSTEMS**

SECTION	SUBJECT
<u>321.2</u>	<u>Lithium-ion and lithium metal battery storage</u>
903.2.10.2	Mechanical-access enclosed parking garages
914.2.1	Covered and open mall buildings
914.3.1	High-rise buildings
914.4.1	Atriums
914.5.1	Underground structures
914.6.1	Stages
914.7.1	Special amusement buildings
914.8.2	Airport traffic control towers
914.8.3, 914.8.6	Aircraft hangars
914.9	Flammable finishes
914.10	Drying rooms
914.11.1	Ambulatory care facilities
1030.6.2.3	Smoke-protected assembly seating
1103.5.1	Existing Group A occupancies
1103.5.2	Pyroxylin plastic storage in existing buildings
1103.5.3	Existing Group I-2 occupancies
1103.5.5	Existing Group I-2, Condition 2 occupancies
1103.5.5	Pyroxylin plastics
Table 1207.7, Table 1207.8, Table 1206.9, Table 1206.10	Stationary and mobile energy storage systems
2108.2	Dry cleaning plants
2108.3	Dry cleaning machines
2309.3.1.5.2	Hydrogen motor fuel-dispensing area canopies
2404.2	Spray finishing in Group A, E, I or R
2404.4	Spray booths and spray rooms
2405.2	Dip-tank rooms in Group A, I or R
2405.4.1	Dip tanks
2405.9.4	Hardening and tempering tanks
2703.10	HPM facilities
2703.10.1.1	HPM work station exhaust
2703.10.2	HPM gas cabinets and exhausted enclosures
2703.10.3	HPM exit access corridor
2703.10.4	HPM exhaust ducts
2703.10.4.1	HPM noncombustible ducts
2703.10.4.2	HPM combustible ducts
2807.3	Lumber production conveyor enclosures
2808.7	Recycling facility conveyor enclosures
3006.1	Class A and B ovens
3006.2	Class C and D ovens
Table 3206.2	Storage fire protection
3206.4	Storage
3210.1.1	Record storage over 12 feet
3704.5	Storage of more than 1,000 cubic feet of loose combustible fibers
5003.8.4.1	Gas rooms

5003.8.5.3	Exhausted enclosures
5004.5	Indoor storage of hazardous materials
5005.1.8	Indoor dispensing of hazardous materials
5104.4.1	Aerosol product warehouses
5106.3.2	Aerosol display and merchandising areas
5306.2.1	Exterior medical gas storage room
5306.2.2	Interior medical gas storage room
5306.2.3	Medical gas storage cabinet
5606.5.2.1	Storage of smokeless propellant
5606.5.2.3	Storage of small arms primers
5704.3.7.5.1	Flammable and combustible liquid storage rooms
5704.3.8.4	Flammable and combustible liquid storage warehouses
5705.3.7.3	Flammable and combustible liquid Group H-2 or H-3 areas
6004.1.2	Gas cabinets for highly toxic and toxic gas
6004.1.3	Exhausted enclosures for highly toxic and toxic gas
6004.2.2.6	Gas rooms for highly toxic and toxic gas
6004.3.3	Outdoor storage for highly toxic and toxic gas
6504.1.1	Pyroxylin plastic storage cabinets
6504.1.3	Pyroxylin plastic storage vaults
6504.2	Pyroxylin plastic storage and manufacturing

For SI: 1 cubic foot = 0.023 m³.

Reason Statement: Lithium-ion and lithium metal batteries can create challenging fire hazards. This proposal includes requirements that regulate the collection and storage of these batteries so as to reduce the probability of an event and mitigate any adverse impact on the affected facility and public safety.

The requirements are intended to cover all types of lithium-ion and lithium metal batteries (e.g., new, used, waste, refurbished), used batteries being collected for recycling or disposal, and batteries at recycling and disposal facilities. Details on the proposal are as follows:

Section 321.1 identifies the threshold quantities of batteries that are regulated by Section 321. As noted in the exceptions, it is not the intent to cover lithium-ion and lithium metal batteries in products, devices or vehicles, in small retail packaging, or the temporary storage of batteries at manufacturing facilities or in transit.

Section 321.3 requires a fire safety and evacuation plan to be provided in accordance with a new section 403.10.6

Section 321.4.1 includes requirements for limited indoor battery storage in containers. This is primarily intended to cover the containers used to collect used batteries for recycling or disposal. These types of containers can be found in many establishments, including mercantile and other occupancies. There is a limitation for an individual container to not exceed 7.5 cubic feet, which is approximately the size of a 55 gallon barrel. A maximum 15 cubic feet of storage (two 55 gallon barrels) are allowed in this code application. Indoor storage in excess of these values will be regulated in accordance with Section 321.4.2, and will require, among other things, an operational permit.

Indoor storage areas other than the limited storage applications covered by 321.4.1 are required to comply with all applicable requirements in 321.4.2.1 through 321.4.2.6.

Section 321.4.2.6 recognizes that lithium-ion batteries not exceeding 30% state of charge (SOC) have been shown to be less likely to undergo thermal runaway or propagate than fully charged batteries, and the 30% SOC level is recognized by the U.S. Department of Transportation (DOT) and other transport agencies (e.g., Transport Canada, International Civil Aviation Organization) as providing an additional level of safety for shipping by air. This section allows the fire code official to waive specific protection requirements based on approval of the procedures used for limiting and verifying that the state of charge will not exceed 30 percent. It is assumed that the procedures used to verify the SOC can be periodically checked as part of the operational permit on the operation.

Section 321.4.3 includes requirements covering the outdoor storage of lithium-ion or lithium metal batteries. It includes criteria for:

1. Location of storage in proximity to exposures
2. Storage area size limits and separation

3. Fire detection requirements.

A new Section 403.10.6 is provided which includes requirements for providing a fire safety plan for battery storage.

Cost Impact: The code change proposal will increase the cost of construction

There currently are no specific requirements in the IFC that regulate the storage of lithium-ion and lithium-metal batteries. The proposal has the potential to increase the costs associated with the collection and storage of these batteries.

F21-21

F22-21

IFC: SECTION 321, 321.1, 321.2 (New), 321.3 (New), 321.4 (New), 321.5 (New), 321.6 (New), 321.7 (New)

Proponents: Marcelo Hirschler, representing self (mmh@gbhint.com)

2021 International Fire Code

Revise as follows:

SECTION 321 ~~ARTIFICIAL COMBUSTIBLE VEGETATION~~ COMBUSTIBLES ON ROOFS AND NEAR BUILDINGS.

321.1 Artificial combustible vegetation on roofs and near buildings. Artificial combustible vegetation exceeding 6 feet (1829 mm) in height and permanently installed outdoors within 5 feet (1524 mm) of a building or on the roof of a building shall comply with Section 807.4.1. The placement of artificial combustible vegetation shall also comply with Sections 806.3 and 807.4.2.

Exception: Artificial decorative vegetation located more than 30 feet (9144 mm) from the exterior wall of a building.

Add new text as follows:

321.2 Combustible furniture near buildings. Combustible furniture permanently installed outdoors, both within 5 feet (1524 mm) of any building and under a combustible exterior projection, shall comply either with Section 321.4 or with Section 321.5, unless exempted by either Section 321.6 or Section 321.7.

321.3 Other Combustible Products Near Buildings. The requirements of Section 321.2 shall apply also to combustible products permanently installed outdoors, both within 5 feet (1524 mm) of any building and under a combustible exterior projection, if the product has either comparable mass or comparable fuel content to that of permanently installed furniture.

321.4 Sprinkler protection. The combustible product shall be located in an area protected by an approved automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2.

321.5 Materials. The combustible product shall comply with any one of the following:

1. The combustible product shall be constructed entirely of materials that exhibit a flame spread index not exceeding 200, in accordance with Section 803.1, and/or of noncombustible materials.
2. The combustible product shall be constructed entirely of materials that exhibit a peak rate of heat release not exceeding 300 kW/m² when tested in accordance with ASTM E1354, at an incident heat flux of 50 kW/m² in the horizontal orientation, and/or of noncombustible materials.
3. The entire combustible product shall exhibit a maximum rate of heat release not exceeding 100 kW when tested in accordance with NFPA 289 using the 20 kW ignition source.

321.6 Fire resistance rating exception. The requirements of Section 321.2 shall not apply when either the exterior projection or the exterior wall have a fire resistance rating of not less than 1 hour.

321.7 Distant exterior projection exception. The requirements of Section 321.2 shall not apply when the exterior projection is located at least 20 feet (6096 mm) above the top of the combustible product.

Reason Statement: Section 315 of the IFC addresses storage, including, particularly, storage beneath overhead projections from buildings. However, the code does not make it clear whether items placed permanently (for example by being secured or screwed in place) near a building (or against a building) for their immediate use are necessarily considered to be "stored" and whether the storage section applies. It has been found that when plastic benches are attached to buildings and placed underneath overhead projections, they can result in severe fires that can destroy the overhang and then continue to destroy the building itself. This can apply to other large combustible items, such as furniture or other combustible products.

ATF conducted tests on several plastic lumber benches simulating an actual incident. In the incident, a plastic lumber bench attached to a brick wall, from the outside, at a school and under a wood overhang, was ignited with a small ignition source (child's coat) and the entire school was destroyed soon after ignition. Tests conducted by GBH International showed that a Southern Yellow Pine (standard park bench lumber) would have performed much better and that even some plastic lumber materials could have done much better. The maximum heat release rate of plastic lumber bench ignited in this type of scenario is very high and can be above 4 MW, while the wood bench did not ignite the overhang. It has been explained that the practice of placing park benches under an overhang is a common feature in areas where rain is frequent, for protection.



This photo shows the effect of a plastic bench just a few minutes after ignition of a small coat on the bench. The next photo shows the same bench just before it had to be manually extinguished.





This photo shows the effect of a wood bench ignited the same way, with the flames causing minimal damage. The next photo shows the wood bench after the fire stopped (no manual extinguishment needed).



This code proposal deals with large/heavy furniture permanently installed near buildings and that cannot be carried away by one person on his/her own. Lightweight furniture would not be permanently installed. The same requirements would also apply to other large combustibles with comparable mass or fuel content.

The proposal parallels an existing section dealing with combustible artificial vegetation.

The code proposal would allow benches, or other large outdoor combustibles, if they are under a sprinklered overhang or if the materials comply with one of three options:

1. The products are constructed entirely of materials meeting a Class C on flame spread index (i.e. not more than 200, which includes standard wood) and/or non-combustible materials without further requirements.
2. The materials of construction meet the same heat release requirements from ASTM E1354 that materials used for garbage cans or laundry carts are required to meet.
3. The large combustible item meets the same full scale heat release results as decorative materials (i.e. section 807.3) or foam plastic exhibit

booths (i.e. section 807.5.1) are required to meet.

Combustible items, including furniture, above occupiable roofs are dealt with separately. Exceptions are included if the overhang, or the wall, complies with at least a 1 hour fire resistance rating.

Cost Impact: The code change proposal will increase the cost of construction
Combustible furniture and other large combustible products will have to be fire tested.

F22-21

F23-21

IFC: SECTION 321, 321.1, 321.2 (New), 321.3 (New), 321.4 (New)

Proponents: Marcelo Hirschler, representing self (mmh@gbhint.com)

2021 International Fire Code

Revise as follows:

SECTION 321 ~~ARTIFICIAL COMBUSTIBLE VEGETATION~~ COMBUSTIBLES ON ROOFS AND NEAR BUILDINGS.

321.1 Artificial combustible vegetation on roofs and near buildings. Artificial combustible vegetation exceeding 6 feet (1829 mm) in height and permanently installed outdoors within 5 feet (1524 mm) of a building or on the roof of a building shall comply with Section 807.4.1. The placement of artificial combustible vegetation shall also comply with Sections 806.3 and 807.4.2.

Exception: Artificial decorative vegetation located more than 30 feet (9144 mm) from the exterior wall of a building.

Add new text as follows:

321.2 Combustible Furniture on Roofs. Combustible furniture permanently installed on roofs shall comply with any one of the following, unless exempted by Section 321.4:

1. The combustible product shall be constructed entirely of materials that exhibit a flame spread index not exceeding 200, in accordance with Section 803.1, and/or of noncombustible materials.
2. The combustible product shall be constructed entirely of materials that exhibit a peak rate of heat release not exceeding 300 kW/m² when tested in accordance with ASTM E1354, at an incident heat flux of 50 kW/m² in the horizontal orientation, and/or of noncombustible materials.
3. The entire combustible product item shall exhibit a maximum rate of heat release not exceeding 100 kW when tested in accordance with NFPA 289 using the 20 kW ignition source.

321.3 Other Combustibles on Roofs. The requirements of Section 321.2 shall apply also to combustible products permanently installed on roofs if they have either comparable mass or comparable fuel content to that of permanently installed furniture.

321.4 Distance exception. The requirements of Section 321.2 shall not apply if the combustible product is installed at a distance of not less than 10 feet (3048 mm) from another combustible product or from an opening.

Reason Statement: This is a companion proposal to one that addresses heavy combustible furniture, and other combustible products of similar mass or fuel content, permanently installed near buildings. This proposal extends the concept contained in the existing section dealing with combustible vegetation.

The fire safety requirements for the furniture on roofs is the same as for the proposal for furniture and other combustibles near buildings. The background for this particular proposal is the fire on a roof of the Cosmopolitan Hotel in Las Vegas on July 2015.

Research has shown that plastic benches can generate very high heat releases. ATF conducted tests on several plastic lumber benches simulating an actual incident. In the incident, a plastic lumber bench attached to a brick wall, from the outside, at a school and under an overhang, was ignited with a small ignition source (child's coat) and the entire school was destroyed soon after ignition. Tests conducted by GBH International showed that a Southern Yellow Pine (standard park bench lumber) would have performed much better and that even some plastic lumber materials could have done much better. The maximum heat release rate of plastic lumber bench ignited in this type of scenario is very high and can be above 4 MW, while the wood bench performed adequately.

The requirements do not apply if the combustible product is far away from any other combustible product or from an opening.

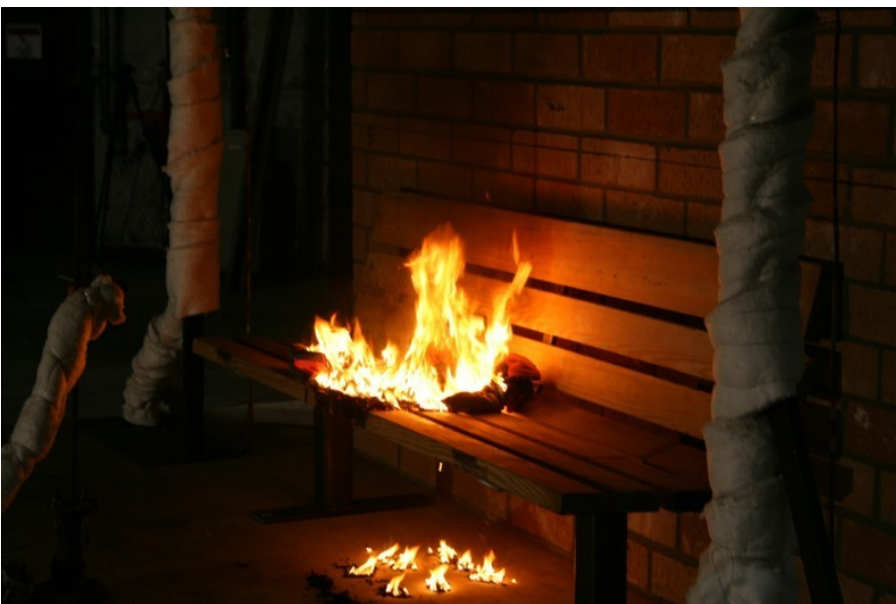
Four photographs are shown below, and the same ones have been added to the proposal on furniture near buildings:

First photograph shows the effect of a plastic bench just a few minutes after ignition of a small coat on the bench.

The second photograph shows the same bench just before it had to be manually extinguished.

The third photograph shows the effect of a wood bench ignited the same way, with the flames causing minimal damage.

The fourth photograph shows the wood bench after the fire stopped (no manual extinguishment needed).





Cost Impact: The code change proposal will increase the cost of construction
Combustible furniture will have to be fire tested.

F23-21

F24-21

IFC: 202 (New), SECTION 322 (New), 322.1 (New), 322.1.1 (New), 322.2 (New), 322.3 (New), 322.4 (New), UL Chapter 80 (New)

Proponents: Jonathan Roberts, representing UL LLC (jonathan.roberts@ul.com)

2021 International Fire Code

Add new definition as follows:

POWERED MICROMOBILITY DEVICES. Motorized bicycles, motorized scooters and other personal transportation devices powered by lithium-ion or lithium metal batteries. This does not include motor vehicles that are required to be registered with the Department of Motor Vehicles for the state or jurisdiction.

Add new text as follows:

SECTION 322 POWERED MICROMOBILITY DEVICES.

322.1 General. Where more than 5 *powered micromobility devices* will be charged inside or within 10 feet (3048 mm) of a building or structure, the charging operation shall be in accordance with this section.

322.1.1 Group R occupancies. The charging of commercially owned *powered micromobility devices* shall not be permitted at Group R occupancies.

322.2 Charging equipment. *Powered micromobility devices* shall be charged in accordance with their listing and the manufacturer's instructions using either the original equipment manufacturer-supplied charging equipment or *listed* charging equipment specified in the manufacturer's instructions.

322.3 Listing. *Powered micromobility devices* shall be *listed* and *labeled* in accordance with UL 2272 or UL 2849, as applicable.

322.4 Battery charging. Battery charging for *powered micromobility devices* shall be performed in *approved* locations in accordance with all of the following:

1. The charging equipment for each device shall be plugged directly into an *approved* receptacle. Extension cords and relocatable power taps shall not be utilized for connecting charging devices.
2. Storage of combustible materials, combustible waste or hazardous materials shall not be permitted within the charging area.
3. The charging operation shall not be located in or obstruct any required means of egress.

Add new standard(s) as follows:

UL

Underwriters Laboratories LLC
333 Pfingsten Road
Northbrook IL 60062

UL 2272 -2016 : Electrical Systems for Personal E-Mobility Devices - with revisions through February 25, 2019

UL 2849-2020: Electrical Systems for eBikes

Staff Analysis: A review of the following standards proposed for inclusion in the code, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

- UL 2272-2016: Electrical Systems for Personal E-Mobility Devices
- UL 2849-2020: Electrical Systems for eBikes

Reason Statement: There has been a significant increase in the use of lithium battery powered micromobility devices in the past few years and the improper charging of these devices has resulted in fire incidents from thermal runaway. This proposal sets reasonable safety requirements to mitigate the hazards associated with the charging of these lithium battery powered devices.

The threshold for this section is the charging of more than five powered micromobility device. This section does not regulate the charging of a few individually owned devices for personal use. It does cover facilities where a much larger number of powered micromobility devices are charged. It also covers charging in and within 10 ft. of buildings or structures.

Increased use of these devices commercially has created a cottage industry of individuals being compensated for charging large numbers of these devices overnight at Group R-3 Occupancies. This practice presents a significant hazard for the occupants which supports the prohibition in any Group R-3 Occupancy.

The proper use of listed powered micromobility devices and compatible chargers will reduce the fire incidents that have occurred with nonlisted or incompatible charging arrangements.

Cost Impact: The code change proposal will increase the cost of construction
This proposal may require the installation of additional approved receptacles.

F24-21

F25-21

IFC: CHAPTER 2, SECTION 202, (New), CHAPTER 3, SECTION 322 (New), 322.1 (New), 322.1.1 (New), 322.2 (New), 322.3 (New), 322.4 (New), 322.5 (New), CHAPTER 80, UL Chapter 80 (New)

Proponents: Robert J Davidson, Davidson Code Concepts, LLC, representing Self (rjd@davidsoncodeconcepts.com)

2021 International Fire Code

CHAPTER 2 DEFINITIONS

SECTION 202 GENERAL DEFINITIONS.

Add new definition as follows:

POWERED MICROMOBILITY DEVICES. Motorized bicycles, motorized scooters and other personal mobility devices powered by a lithium-ion or lithium metal battery. The term does not include motor vehicles that are required to be registered with the Department of Motor Vehicles for the state or jurisdiction

CHAPTER 3 GENERAL REQUIREMENTS

Add new text as follows:

SECTION 322 POWERED MICROMOBILITY DEVICES.

322.1 General. Lithium-ion and lithium metal battery *powered micromobility devices* shall be operated and maintained in accordance with this section.

Exceptions:

1. Storage, repair and charging in residential occupancies of not more than 5 battery *powered mobility devices* , provided that such devices are for personal use by its owner.
2. Charging of a single *powered mobility device* in any occupancy by its owner.

322.1.1 Prohibited locations. The use of a residential occupancy as a business for the charging of commercially owned *powered mobility devices* as part of a rental or sales service shall not be permitted.

322.2 Battery chargers and equipment. *Powered micromobility devices* shall be charged in accordance with their listing and the manufacturer's instructions using only the original equipment manufacturer-supplied charging equipment or charging equipment in accordance with the listing and manufacturer's instructions.

322.3 Listing. *Powered micromobility devices* shall be listed and labeled in accordance with UL 2272 or UL 2849, as applicable.

322.4 Battery charging areas. Where approved, *powered micromobility devices* shall permitted to be charged in a room or area that complies with all of the following:

1. Only listed devices utilizing listed charging equipment shall be permitted to be charged.
2. Is provided with sufficient electrical receptacles to allow the charging equipment for each device to be directly connected to a receptacle. Extension cords and relocatable power taps shall not be used.
3. Storage of combustible materials, combustible waste or hazardous materials shall not be permitted.
4. The charging operation shall not be conducted in or obstruct any required means of egress.
5. Removable storage batteries shall not be stacked or charged in an enclosed cabinet unless the cabinet is specially designed and approved for such purpose.
6. A minimum distance of 18 inches (457.2 mm) shall be maintained between each removable storage battery during charging operations unless each battery is isolated from neighboring batteries by an approved fire-resistant material.
7. A minimum of 18 inches (457.2 mm) shall be maintained between each *powered micromobility devices* during charging operations.
8. The indoor room or area shall be protected by a fire alarm system utilizing air-aspirating smoke detectors or radiant energy-sensing fire detection.

322.5 Fire safety plan. A fire safety plan shall be provided in accordance with Section 403.10.6. In addition, the fire safety plan shall include emergency response actions to be taken upon detection of a fire or possible fire involving lithium-ion or lithium metal battery storage.

CHAPTER 80 REFERENCED STANDARDS

Add new standard(s) as follows:

UL

Underwriters Laboratories LLC
333 Pfingsten Road
Northbrook IL 60062

UL 2272-2016: Electrical Systems for Personal E-Mobility Devices

UL 2849-2020: Electrical Systems for eBikes

Staff Analysis: A review of the following standards proposed for inclusion in the code, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

- UL 2272-2016: Electrical Systems for Personal E-Mobility Devices
- UL 2849-2020: Electrical Systems for eBikes

Note that proposed Section 322.5 refers to proposed Section 403.10.6 within proposal F28-21.

Reason Statement: There has been a significant increase in the use of micromobility devices in the past few years and the improper charging of these devices can lead to a thermal runaway incident. There have been significant fires due to these devices including a recent 4 alarm fire in NYC. This proposal sets reasonable safety requirements for the indoor charging of these devices with lithium-ion and lithium metal type batteries. Requirement for the listing of the device and the associated charging equipment that is compatible with the device and its battery is also a critical safety requirement. There is a clear prohibition of utilizing a residential occupancy for operating a rental, sales and service business for these devices, an occurrence fire departments have reported.

Cost Impact: The code change proposal will increase the cost of construction

This will increase the cost of construction because of the requirements for the proper number of electrical receptacles and the requirement for a fire detection system.

F25-21

F26-21

IFC: 403.9.1.1

Proponents: Chad Sievers, NYS DOS, representing NYS Dept. of State (chad.sievers@dos.ny.gov); Kevin Duerr-Clark, representing New York State Department of State (kevin.duerr-clark@dos.ny.gov)

2021 International Fire Code

Revise as follows:

403.9.1.1 Evacuation diagrams. A diagram depicting two evacuation routes shall be posted on or immediately adjacent to every required egress door from each hotel or motel *sleeping unit*.

The diagram shall contain the location of the nearest fire alarm fire alarm boxes. This section shall apply to diagrams posted or replaced after the adoption of this code.

Reason Statement: Providing group R - 1 occupants directions to the nearest fire alarm pull station has the potential to save many lives. In any fire emergency situation, the quicker an evacuation and an emergency response can be initiated the more likely it is to preserve life and property. If a smoke/ heat detection system is malfunctioning (potentially by an occupant tampering with it or a lack of maintenance) or a patron becomes aware of an incident prior to fire detection equipment the advanced notice to all building occupant has the potential to save many lives. applying this requirement only to the newly installed diagrams or replacement diagrams will reduce the administrative burden significantly.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Adding the locations of the nearest pull stations will not increase the cost of construction. It will be an immeasurable increase to produce diagrams with fire alarms identified on it in addition to the evacuation diagrams.

F26-21

F27-21

IFC: 403.9, 403.9.3 (New), 403.9.3.1 (New), 403.9.3.2 (New)

Proponents: Chad Sievers, representing NYS Dept. of State (chad.sievers@dos.ny.gov); Kevin Duerr-Clark, New York State Department of State, representing New York State Department of State (kevin.duerr-clark@dos.ny.gov)

2021 International Fire Code

Revise as follows:

403.9 Group R occupancies. Group R occupancies shall comply with Sections 403.9.1 through ~~403.9.3.4~~ 403.9.4.4

Add new text as follows:

403.9.3 Group R-3 transient occupancies. Group R-3 lodging houses, transient congregate living facilities and transient boarding houses shall comply with Sections 403.9.3.1 and 403.9.3.2.

403.9.3.1 Evacuation diagrams for transient occupancies. A diagram depicting two evacuation routes and the location of the nearest fire alarms boxes shall be posted on or immediately adjacent to every required egress door from each sleeping unit.

403.9.3.2 Emergancy Instructions. The evacuation diagram will include the following instructions:

1. Procedures to be followed when a smoke alarm activates or fire alarm signal sounds.
2. Procedures to be followed in case of fire or appearance of smoke.

Reason Statement: The diagrams will provide quick and important information to the occupants in case of an emergency. This information will be readily available and consistent with other transient lodging occupancies such as hotels. Even though the R - 3 classification typically represents a smaller building than a R - 1 occupancy, some of the buildings' layouts may be more confusing as many transient lodging houses (Bed and Breakfasts) are converted from older homes. The transient occupants will likely not be familiar with the structure to use an alternative route for egress or activate the alarm system.

Cost Impact: The code change proposal will increase the cost of construction

The requirement to provide diagrams and some supplemental information will cause a very minor cost increase in the construction cost of a R-3 building with transient occupants.

F27-21

F28-21

IFC: 403.1, 403.10, 403.10.6 (New), 403.10.6.1 (New)

Proponents: Robert J Davidson, Davidson Code Concepts, LLC, representing Tesla, USA (rjd@davidsoncodeconcepts.com)

2021 International Fire Code

Revise as follows:

403.1 General. In addition to the requirements of Section 401, occupancies, uses and outdoor locations shall comply with the emergency preparedness requirements set forth in Sections 403.2 through 403.11.3.3. Where a fire safety and evacuation plan is required by Sections 403.2 through ~~403.10.5~~ 403.10.6, evacuation drills shall be in accordance with Section 405 and employee training shall be in accordance with Section 406.

403.10 Special uses. Special uses shall be in accordance with Sections 403.10.1 through ~~403.10.5~~ 403.10.6.

Add new text as follows:

403.10.6 Lithium-ion and lithium metal batteries. An approved fire safety and evacuation plan in accordance with Section 404 shall be prepared and maintained for occupancies that involve activities for the research and development, testing, manufacturing, handling, storage of lithium-ion batteries or lithium metal batteries or the repair or servicing of vehicles powered by lithium-ion batteries or lithium metal batteries.

Exceptions. A fire safety and evacuation plan is not required for the storage or merchandizing of any of the following:

1. New or refurbished batteries installed for use in the equipment or vehicles they are designed to power
2. New or refurbished batteries packed for use with the equipment or vehicles they are designed to power for merchandizing purposes;
3. New or refurbished lithium-ion batteries rated at no more than 300 Watt-hours and lithium metal batteries containing no more than 25 grams of lithium metal in their original retail packaging;
4. The storage, repair and charging activities in detached one- and two-family dwellings and townhouses, provided that such devices are for personal use.

403.10.6.1 Mitigation planning. The approved fire safety and evacuation plan shall include thermal runaway event mitigation measures addressing activities undertaken to prevent thermal runaway, early detection of a thermal runaway event and mitigations measures to be undertaken to limit the size and impact of the event on occupants and the facility.

Reason Statement: Lithium-ion and lithium batteries have been a contributing factor in a growing number of fire incidents for several years, and they are being used in an ever increasing number of products and applications. This proposal requires a fire safety and evacuation plan to be prepared and maintained for occupancies involving battery related activities, and storage, handling and use. Emergency action plans and early mitigation are key elements in providing for occupant and facility safety and for reducing the size of an event.

403.10.6 identifies a broad range of occupancies, use and activities that involve lithium-ion and lithium metal batteries that have the potential of a large event due to a thermal runaway.

The exceptions to 403.10.6 are designed to not require a fire safety and evacuation plan for the storage and merchandizing of products containing lithium-ion or lithium metal batteries, or the storage and merchandizing of small batteries in retail packaging. An exception is included for personal use vehicle and devices in detached one- and two-family dwellings and townhouses. These exceptions are similar to those in other proposals this cycle.

At 403.10.6.1 the fire safety and evacuation plan must take into consideration mitigation planning for a thermal runaway event involving the lithium-ion and lithium metal batteries. Early mitigation is a key to preventing events and controlling the size of event should one occur.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

There will be an operational cost related to writing and maintaining the plan and employee training. However many of these occupancies are already required to maintain fire response plans and provide employee training.

F28-21

F29-21

IFC: 407.1

Proponents: Chad Sievers, representing NYS Dept. of State (CHAD.SIEVERS@DOS.NY.GOV); Gregory Benton, representing NYS DOS Division of Building Standards and Codes (gregory.benton@dos.ny.gov); China Clarke, representing New York State Dept of State (china.clarke@dos.ny.gov)

2021 International Fire Code

Revise as follows:

407.1 General. ~~Where operating or closing a hazardous materials storage, use, or handling facility subject to permits under Section 5001.5, or where required by the fire code official, the provision of Sections 407.2 through 407.7 shall be applicable. The provisions of Sections 407.2 through 407.7 shall be applicable where hazardous materials subject to permits under Section 5001.5 are located on the premises or where required by the fire code official.~~

Reason Statement: This provision had been misinterpreted as only to apply during the initial permitting. As that is clearly not the intent of the provision, but to apply the hazardous communication provisions continuously to the operations surrounding hazardous materials and ensuring the safety of workers and first responders.

Cost Impact: The code change proposal will not increase or decrease the cost of construction. This proposal does not add additional mandates, nor require additional labor, materials, equipment, appliances, or other devices, or as required by the current code. Therefore this proposal will not increase the cost of construction, as it is an editorial change that will increase the clarity and uniformity of the codes.

F29-21

F30-21

IFC: 503.1, 503.1.1

Proponents: Chase Browning, representing Medford Fire Department

2021 International Fire Code

Revise as follows:

503.1 Where required. Fire apparatus access roads shall be provided and maintained in accordance with Sections 503.1.1 through ~~503.1.3~~ 503.6

Exceptions:

1. The fire code official is authorized to modify or exempt fire apparatus access roads 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.
 - 1.4. Solar photovoltaic power generation facilities.

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 Statement: The current language in 503.1.1 includes "The fire apparatus access road shall **comply with the requirements of this section** and shall extend to within 150 ft...." (bold text added by proponent for emphasis). If the intent is for access roads to meet all of 503 in order to 'comply,' then the text should be revised in 503.1 to include all of 503.1 through 503.6.

Also, the exceptions were revised slightly to provide more flexibility when addressing site-specific conditions that would benefit from modifications to the road beyond extending the 150 ft dimension. This is already a common practice to provide incentives for developers to include sprinklers, and this revised text will provide clearer support for modifying widths, allowing steeper grades, turning radii, etc.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The intent is to provide additional design flexibility and equivalency.

F31-21

IFC: 508.1.6; IBC: [F] 911.1.6

Proponents: Kevin Brinkman, representing National Elevator Industry, Inc. (klbrinkman@neii.org)

2021 International Fire Code

Revise as follows:

508.1.6 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 *interior exit 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 email 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.
14. Work table.
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 B44.
18. Elevator emergency or standby power selector switch(es), ~~where emergency or standby power is provided~~ in accordance with ASME A17.1/CSA B44.

2021 International Building Code

Revise as follows:

[F] 911.1.6 Required features. The fire command center shall comply with NFPA 72 and shall contain all of 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 *interior exit stairway* doors simultaneously.
8. Sprinkler valve and waterflow 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 system, 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 contains, but is not limited to, 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 and building engineer and their respective work phone number, cell phone number, 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* and *exit stairway* information that includes: number of *exit access* and *exit stairways* in the building, each *exit access* and *exit stairway* designation and floors served, location where each *exit access* 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, 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, 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, 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 of hazardous material, quantity of hazardous material.
14. Work table.
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 B44.
18. Elevator emergency or standby power selector switch(es), ~~where emergency or standby power is provided, in accordance with ASME A17.1/CSA B44~~

Reason Statement: To clarify that the criteria for when a switch is required is found in ASME A17.1/CSA B44 and that the IBC and IFC requirements are to indicate where the switch is located in the building. This is consistent with the language for the fire recall switch. No switch is needed if the emergency or standby power is sufficient to operate all elevators and associated equipment simultaneously. See also corresponding

change to IBC 911.1.6.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The cost does not change since the proposed change is just a clarification of current requirements.

F31-21

F32-21

IFC: (New), CHAPTER 5, SECTION 510, 510.1, 510.2, 510.3, 510.4, 510.4.1, 510.4.1.1, 510.4.1.2, 510.4.1.3, 510.4.2, 510.4.2.1, 510.4.2.2, 510.4.2.3, 510.4.2.4, 510.4.2.5, 510.4.2.6, 510.4.2.7, 510.4.2.8, 510.5, 510.5.1, 510.5.2, 510.5.3, 510.5.4, 510.5.5, 510.6, 510.6.1, 510.6.2, 510.6.3, 510.6.4, 1103.2; IBC: CHAPTER 9, SECTION 918, [F] 918.1

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

2021 International Fire Code

Add new definition as follows:

EMERGENCY RESPONDER COMMUNICATIONS ENHANCEMENT SYSTEM (ERCES). An infrastructure solution installed within a building to enhance the communications capabilities for first responders that utilizes solutions such as a signal booster, voting receiver, base station, or other technology capable of enhancing the radio frequency (RF) to ensure effective public safety communications.

CHAPTER 5 FIRE SERVICE FEATURES

SECTION 510 EMERGENCY RESPONDER COMMUNICATION COVERAGE.

Revise as follows:

510.1 Emergency responder communication coverage in new buildings. *Approved* in-building, ~~two-way emergency responder communication coverage~~ emergency responder communications enhancement system (ERCES) for emergency responders shall be provided in all new buildings. In-building, ~~two-way emergency responder communication coverage~~ ERCES within the building shall be based on the existing coverage levels of the public safety communication systems utilized by the jurisdiction, measured 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.

510.2 Emergency responder communication enhancement system coverage in existing buildings. Existing buildings shall be provided with *approved* in-building, ~~two-way emergency responder communication coverage~~ communications enhancement system for emergency responders as required in Chapter 11.

510.3 Permit required. A construction permit for the installation of or modification to in-building, ~~two-way~~ emergency responder communication enhancement coverage systems and related equipment is required as specified in Section 105.6.4. Maintenance performed in accordance with this code is not considered a modification and does not require a permit.

510.4 Technical requirements. Equipment required to provide in-building, ~~two-way~~ emergency responder communication enhancement system coverage shall be

listed in accordance with UL 2524. Systems, components and equipment required to provide the in-building, ~~two-way~~ emergency responder communication enhancement coverage system shall comply with Sections 510.4.1 through 510.4.2.8.

510.4.1 Emergency responder communication enhancement coverage system signal strength. The building shall be considered to have an acceptable in-building, ~~two-way~~ emergency responder communication enhancement system coverage where signal strength measurements in 95 percent of all areas and 99 percent of areas designated as *critical areas* by the *fire code official* on each floor of the building meet the signal strength requirements in Sections 510.4.1.1 through 510.4.1.3.

510.4.1.1 Minimum signal strength into the building. The minimum inbound signal strength 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 a minimum of -95dBm throughout the coverage area and sufficient to provide not less than a Delivered Audio Quality (DAQ) of 3.0 or an equivalent Signal-to-Interference-Plus-Noise Ratio (SINR) applicable to the technology for either analog or digital signals.

510.4.1.2 Minimum signal strength out of the building.

510.4.1.3 System performance. Signal strength shall be sufficient to meet the requirements of the applications being utilized by public safety for emergency operations through the coverage area as specified by the *fire code official* in Section 510.4.2.2.

Revise as follows:

510.4.2 System design. The in-building, ~~two-way~~ emergency responder communication ~~enhancement coverage~~ system shall be designed in accordance with Sections 510.4.2.1 through 510.4.2.8 and NFPA 1221.

510.4.2.1 Amplification systems and components. Buildings and structures that cannot support the required level of in-building, ~~two-way~~ emergency responder communication ~~coverage system~~ shall be equipped with systems and components to enhance the radio signals and achieve the required level of in-building, ~~two-way~~ emergency responder communication ~~coverage enhancement system~~ specified in Sections 510.4.1 through 510.4.1.3. In-building, ~~two-way~~ emergency responder communication ~~enhancement~~ systems utilizing radio-frequency-emitting devices and cabling shall be *approved* by the *fire code official*. Prior to installation, all RF-emitting devices shall have the certification of the radio licensing authority and be suitable for public safety use.

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

510.4.2.3 Standby power. In-building, ~~two-way~~ emergency responder communication ~~enhancement 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 1203. The standby power supply shall be capable of operating the in-building, ~~two-way~~ emergency responder communication ~~coverage enhancement~~ system at 100-percent system capacity for a duration of not less than 12 hours.

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 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 exists, isolation shall be maintained between the donor antenna and all inside antennas to not less than 20dB greater than the system gain under all operating conditions.
5. Active RF-emitting devices used for in-building, ~~two-way~~ emergency responder communication ~~coverage enhancement~~ systems shall have built-in oscillation detection and control circuitry.
6. The installation of amplification systems or systems that operate on or provide the means to cause interference on any in-building, ~~two-way~~ emergency responder communication ~~enhancement system~~ network shall be coordinated and *approved* by the *fire code official*.

510.4.2.5 System monitoring. The in-building, ~~two-way~~ emergency responder communication ~~coverage 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 in-building, ~~two-way~~ emergency responder communication ~~coverage enhancement~~ system.
8. Oscillation of active RF-emitting device(s).

510.4.2.6 Additional frequencies and change of frequencies. The in-building, ~~two-way~~ emergency responder communication ~~coverage enhancement~~ system shall be capable of modification or expansion in the event frequency changes are required by the FCC or other radio licensing authority, or additional frequencies are made available by the FCC or other radio licensing authority.

510.4.2.7 Design documents. The *fire code official* shall have the authority to require "as-built" design documents and specifications for in-building, ~~two-way~~ emergency responder communication ~~coverage enhancement~~ systems. The documents shall be in a format acceptable to the *fire code official*.

510.4.2.8 Radio communication antenna density. Systems shall be engineered to minimize the near-far effect. In-building, ~~two-way~~ emergency responder communication ~~coverage enhancement~~ system designs shall include sufficient antenna density to address reduced gain conditions.

Exception: Systems where all portable devices within the same band use active power control features.

510.5 Installation requirements. The installation of the in-building, ~~two-way~~ emergency responder communication ~~coverage-enhancement~~ system shall be in accordance with NFPA 1221 and Sections 510.5.2 through 510.5.5.

510.5.1 Mounting of the donor antenna(s). To maintain proper alignment with the system designed donor site, donor antennas shall be permanently affixed on the building or where *approved*, mounted on a movable sled with a clearly visible sign stating "MOVEMENT OR REPOSITIONING OF THIS ANTENNA IS PROHIBITED WITHOUT APPROVAL FROM THE FIRE CODE OFFICIAL." The antenna installation shall be in accordance with the applicable requirements in the *International Building Code* for weather protection of the building envelope.

510.5.2 Approval prior to installation. Amplification systems capable of operating on frequencies licensed to any public safety *agency* by the FCC or other radio licensing authority shall not be installed without prior coordination and approval of the *fire code official*.

510.5.3 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 an *approved* organization or *approved* 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.

Revise as follows:

510.5.4 Acceptance test procedure. Where an in-building, ~~two-way~~ emergency responder communication ~~coverage-enhancement~~ 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 or equipment *approved* by the *fire code official*.
3. Failure of more than one test area shall 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 two 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 to be a 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 at subsequent annual inspections.
8. Systems shall be tested using two portable radios simultaneously conducting subjective voice quality checks. One portable radio shall be positioned not greater than 10 feet (3048 mm) 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.

510.5.5 FCC compliance. The in-building, ~~two-way~~ emergency responder communication ~~coverage-enhancement~~ system installation and components shall comply with all applicable federal regulations including, but not limited to, FCC 47 CFR Part 90.219.

510.6 Maintenance. The in-building, ~~two-way~~ emergency responder communication ~~coverage-enhancement~~ system shall be maintained operational at all times in accordance with Sections 510.6.1 through 510.6.4.

510.6.1 Testing and proof of compliance. The *owner* of the building or *owner's* authorized agent shall have the in-building, ~~two-way~~ emergency responder communication ~~coverage-enhancement~~ system 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 510.5.4.
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. All active components shall be checked to verify operation within the manufacturer's specifications.

At the conclusion of the testing, a report, which shall verify compliance with Section 510.5.4, shall be submitted to the *fire code official*.

510.6.2 Additional frequencies. The buildingowner shall modify or expand the in-building, ~~two-way~~ emergency responder communication ~~coverage-enhancement~~ system at his or her expense in the event frequency changes are required by the FCC or other radio licensing authority, or additional frequencies are made available by the FCC or other radio licensing authority. Prior approval of an in-building, ~~two-way~~ emergency responder communication ~~coverage-enhancement~~ system on previous frequencies does not exempt this section.

510.6.3 Nonpublic safety system. Where other nonpublic safety amplification systems installed in buildings reduce the performance or cause interference with the in-building, ~~two-way~~ emergency responder communication ~~coverage-enhancement~~ system, the nonpublic safety amplification system shall be corrected or removed.

510.6.4 Field testing.

Revise as follows:

1103.2 Emergency responder communication ~~coverage-enhancement~~ in existing buildings. Existing buildings other than Group R-3, that do not have *approved* in-building, ~~two-way~~ emergency response communication ~~coverage-enhancement~~ for emergency responders in the building based on existing coverage levels of the public safety communication systems, 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 in-building, ~~two-way~~ emergency responder communication ~~coverage-enhancement~~ system is not needed.

2021 International Building Code

CHAPTER 9 FIRE PROTECTION AND LIFE SAFETY SYSTEMS

Revise as follows:

SECTION 918 EMERGENCY RESPONDER COMMUNICATION ~~COVERAGE ENHANCEMENT~~.

[F] 918.1 General. In-building ~~two-way~~ emergency responder communication ~~coverage-enhancement~~ shall be provided in all new buildings in accordance with Section 510 of the International Fire Code.

Reason Statement: The purpose of this proposal is simply to align the terminology in Section 510 with that being used by industry. The revisions shown simply go through and revise that term within IFC Section 510 and 1103.2 and IBC Section 918.

Cost Impact: The code change proposal will not increase or decrease the cost of construction. This proposal is to provide clarity on the proper terminology used for in building communication systems as used by industry. This proposal therefore will not have an impact on cost.

F33-21

IFC: 510.1, 510.1.1 (New); IBC: [F] 918.1

Proponents: Mark Chubb, representing ManitouNW LLC (mark.chubb@manitouunw.com)

2021 International Fire Code

Revise as follows:

510.1 Emergency responder communication coverage in new buildings. *Approved* in-building, two-way emergency responder communication coverage for emergency responders shall be provided in all of the following:

1. New buildings-high-rise buildings
2. New underground buildings.
3. New buildings of Type I or II construction that exceed the sprinkler-protected allowable area in Table 506.2 of the *International Building Code* without increases for street frontage or open perimeter
4. New complexes consisting of two or more interconnected buildings where the point of fire service access is located more than 200-ft from the most remote occupied area within the building.

~~In-building, two-way emergency responder communication coverage within the building shall be based on the existing coverage levels of the public safety communication systems utilized by the jurisdiction, measured 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.

Add new text as follows:

510.1.1 Public Safety Communication Systems. Section 510 shall not require improvement of the existing public safety communication systems.

2021 International Building Code

Revise as follows:

[F] 918.1 General. In-building two-way emergency responder communication coverage shall be provided in ~~all~~ new buildings in accordance with Section 510 of the International Fire Code.

Reason Statement: Many, if not most, public safety radio systems are not designed, operated, or maintained to achieve complete coverage over the entire territory or all terrain protected by the served emergency response agencies. Similarly, these systems often provide varying and often inconsistent coverage inside buildings. Such coverage limitations reflect public policy, risk management, and cost considerations consistent with the provision of public safety services.

Expanding the coverage of public safety radio systems in a manner that allocates costs equitably with respect to the benefits achieved is often impractical. As such privatizing the costs and benefits of in-building radio coverage in certain instances reflects a reasonable and appropriate approach to enhancing public safety and protecting emergency responders.

To date, the application of the existing requirements has been shown to have costs in excess of benefits gained in many instances and has produced undesirable and unwanted side effects with respect to radio frequency interference (see Safer Buildings Coalition media release dated December 21, 2020). For the reasons stated above, benchmarking system requirements to the performance of public safety radio systems at the exterior of buildings may prove unreliable. Requiring the installation of two-way radio coverage systems in smaller buildings or densely populated areas also imposes significant costs on building owners, which often exceed the costs of other required fire and life safety systems. A few jurisdictions have even applied these requirements in buildings where fire detection and alarm or automatic sprinkler systems are not otherwise required.

This proposal seeks to align requirements for in-building radio coverage systems with historic thresholds for two-way communication systems and conditions shown to affect radio coverage and emergency responder safety. Prior to the adoption of these provisions requiring two-way

communication systems were based on building height above or below fire service grade-level access and building area. Certain construction features, such as steel-frames and reinforced concrete, have also been shown to inhibit radio frequency propagation.

Bibliography: Safer Buildings Coalition (2020). Media Release: No Noise! Safer Buildings Coalition Affirms FCC Rules for Signal Boosters--Issues Call for Action: SBC calls for a cross functional effort to address public safety radio interference. PR Newswire. Available online at <https://www.prnewswire.com/news-releases/no-noise-safer-buildings-coalition-affirms-fcc-rules-for-signal-boosters---issues-call-to-action-301196660.html>, accessed December 21, 2020.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal will not affect the cost of construction in buildings that require emergency responder radio coverage systems.

F33-21

F34-21

IFC: 510.1, (New)

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

2021 International Fire Code

Revise as follows:

510.1 Emergency responder communication coverage in new buildings. *Approved* in-building, two-way emergency responder communication coverage for emergency responders shall be provided in all new buildings. In-building, two-way emergency responder communication coverage within the building shall be based on the existing coverage levels of the public safety communication systems utilized by the jurisdiction, measured at the exterior of the building. The two-way emergency responder communications coverage system where required, shall be of a type determined by the fire code official and the frequency license holder(s). 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~~ communications coverage system.
2. Where it is determined by the *fire code official* that the ~~radio~~ communications coverage system is not needed.
3. In facilities where emergency responder ~~radio~~ communications 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~~ communications coverage system.
4. One-story buildings not exceeding 12,000 square feet with no below ground area(s).

Add new definition as follows:

FREQUENCY. The particular waveband at which a communications system broadcast or transmits.

FREQUENCY LICENSE HOLDER(S). The person(s) or entity(s) that are issued the license from the frequency licensing authority of United States or other country of jurisdiction for the frequencies being used by both the in-building emergency responder communications enhancement system and the emergency services communications system that it enhances.

FREQUENCY LICENSING AUTHORITY. The government authority in a country or territory that issues frequency licenses for the use of communications frequencies by authorized entities and individuals.

TWO-WAY EMERGENCY RESPONDER COMMUNICATIONS SYSTEM. An infrastructure solution installed within a building to enhance the communications capabilities for first responders that utilizes solutions such as a signal booster, voting receiver, base station, or other technology capable of enhancing the radio frequency (RF) to ensure effective public safety communications. The standard industry term for these systems is an In-building Emergency Responder Communications Enhancement System (ERCES).

Reason Statement: When solving the communications coverage issues within a building it is vital to have a full understanding of the actual public safety communication systems that are being utilized within the coverage area. The frequency license holder of those radio frequencies (RF) must be involved in determining which solution if any can be utilized to enhance RF without creating harmful interference. Based on current code language, many people have a false belief that only a bi-directional amplifier should be used when in fact that particular solution may create harmful interference otherwise known as noise on the public-safety macro communications system rendering it inoperable for the entire community and all emergency responders.

The term "radio" was removed last cycle and replaced with the term "communications" as there are multiple modulation technologies utilized by emergency responders to communicate during their operations.

The insertion of the definitions are provided to improve clarity and context. These definitions provide multiple benefits to the users of the International Fire Code. The definition of Two-way emergency responder communication coverage system also known as an Emergency Responder Communications Enhancement System (ERCES) clarifies that there are multiple types of solutions that may be available and utilized to solve for the lack of in-building coverage for emergency responders. The failure to select the proper solution and coordinate the design, installation and maintenance of the solution with the frequency license holder as required by the frequency licensing authority creates a safety issue for anyone needing to operate on those frequencies. The safety of emergency responders and the integrity of the public safety communications system is of upmost importance. Whereby, the frequency license holder(s) and the frequency licensing authority must be involved in the design, installation and maintenance of an ERCES, definitions of those are being provided.

As we have highlighted, the issue of harmful interference (noise) can be detrimental to a community's public safety communications network. When planning for communications coverage, it is vital that solutions only be installed where truly needed. Simply putting a signal booster in small buildings

with relatively short travel distances for first responders to reach the outside of buildings must be factored into the equation. Many communities have instituted minimum thresholds that must be met before requiring an in-building two-way emergency responder communication coverage systems. In evaluating this threshold, this proposal is recommending that one-story buildings without underground areas not exceeding 12,000 square feet be the baseline for requiring such systems. The trigger of 12,000 square feet is utilized in other areas of this code such as Section 903.3 and for high-piled combustible storage.

Many communities are evaluating legislating a minimum threshold and it is more productive for the code development process set that number by evaluating risk verses gain rather than doing so at a political level.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal provides clarification of intent and sets a minimum threshold for the installation of an ERCES.

F34-21

F35-21

IFC: 510.3 (New), FCC Chapter 80 (New)

Proponents: Mark Chubb, representing ManitouNW LLC

2021 International Fire Code

Add new text as follows:

510.3 Commercial Cellular and Broadband Coverage Enhancements Not Required. The provisions of this section do not require signal boosters or other coverage enhancements to facilitate the use of cellular or broadband communication services covered by 47 CFR, Parts 22, 24, or 27 inside new or existing buildings.

Add new standard(s) as follows:

FCC

Federal Communications Commission
Wireless Telecommunications Bureau
(WTB)
Washington DC 20554

47 CFR Part 22-2021: Public Mobile Services

47 CFR 24-2021: Personal Communication Services

47 CFR Part 27-2021: Miscellaneous Wireless Communication Services

Staff Analysis: A review of the following standards proposed for inclusion in the code, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

- FCC 47 CFR Part 22-2021, Public Mobile Services
- FCC 47 CFR Part 24-2021, Personal Communication Services
- FCC 47 CFR Part 27-2021, Miscellaneous Wireless Communication Services

Reason Statement: The Safer Buildings Coalitions and its supporters have promoted the application and enforcement of emergency responder communications coverage requirements broadly, arguing, in part, that these services will enhance public access to 911 services. These admonitions and the proximity of cellular service radio spectrum to public safety radio system allocations has encouraged some agencies and installers to require signal boosters and other coverage enhancements for this purpose.

Cellular and broadband services governed by Federal Communications Commission (FCC) regulations are generally provided to consumers by commercial entities on a for-profit basis. Requiring building owners to make investments in coverage enhancements to augment the services of these businesses for the benefit of individual users, even for the purpose of making 911 calls or accessing public safety services by other means, arguably violates the 4th and 14th Amendments to the U.S. Constitution. The public benefit obligations of FCC licensees do not require them to provide universal coverage or unlimited access. Extending such obligations to building owners represents an unreasonable and excessive imposition inconsistent with accepted norms for providing public goods.

In addition, ever expanding access to cellular and broadband services has been shown to impose an undue burden on public safety answering points and public safety services (see Connell & Lopez, 2017). Excess call volume and increased frequency of nuisance or false calls is imposing unreasonable and undesirable burdens on these essential public services.

Bibliography: Connell, R. & R. Lopez (2017). Cell phones overwhelm 911 system, Monterey Herald, August 27, 2017. Available online at <https://www.montereyherald.com/2007/08/27/cell-phones-overwhelm-911-system/>, accessed December 22, 2020.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposed change does not affect the cost of construction.

F35-21

F36-21

IFC: 510.3 (New), 510.3, 510.3.2 Operational permit. (New)

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

2021 International Fire Code

Add new text as follows:

510.3 Permits. Permits for in-building, two-way emergency responder communication coverage systems shall be in accordance with Sections 510.3.1 and 510.3.2.

Revise as follows:

~~510.3~~ **510.3.1 Construction permit required.** A construction permit for the initial installation of or modification to in-building, two-way emergency responder communication coverage systems and related equipment is required as specified in Section 105.6.4. Maintenance performed in accordance with this code is not considered a modification and does not require a permit.

Add new text as follows:

510.3.2 Operational permit. . Where required by the fire code official, an operational permit shall be issued for the operation of an in-building two-way emergency responder communications coverage system.

Reason Statement: Due to the critical nature of an emergency responder communications enhancement system (ERCES), it is important to issue a permit for the initial installation or system modification. Equally important is the annual operation of the ERCES. Renewable permits and written authorization by the Frequency License Holder are two different components that need to be addressed for the life of the ERCES in order to comply with retransmitting of a licensed frequency. When written authorization from the frequency license holder(s) is required by the authority granting the license, it shall be obtained before activating the ERCES. A renewable permit provides a method to maintain the required authorization.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The primary benefit of both a construction and operational permit is documentation that a system has been installed and continues to operate. Renewable permits and written authorization by the Frequency License Holder are required for all ERCES and a renewable permit provides for this requirement.

F36-21

F37-21

IFC: 510.4.1.1, 510.4.1.2, (New)

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

2021 International Fire Code

Revise as follows:

510.4.1.1 Minimum signal strength into the building. The minimum ~~inbound~~ downlink signal strength shall be sufficient to provide usable voice communications throughout the coverage area as specified by the *fire code official*. The ~~inbound~~ downlink signal level shall be ~~a minimum of -95dBm throughout the coverage area and~~ sufficient to provide not less than a Delivered Audio Quality (DAQ) of 3.0 throughout the coverage area using either narrowband analog, digital or wideband LTE signals or an equivalent Bit Error Rate (BER) or Signal-to-Interference-Plus-Noise Ratio (SINR) applicable to the technology for either analog or digital signals.

510.4.1.2 Minimum signal strength out of the building. The minimum ~~outbound~~ uplink signal strength shall be sufficient to provide usable voice communications throughout the coverage area as specified by the *fire code official*. The ~~outbound~~ uplink signal level shall be sufficient to provide not less than a Delivered Audio Quality (DAQ) of 3.0 using either narrowband analog, digital or wideband LTE digital signals or an equivalent Bit Error Rate (BER) or Signal-to-Interference-Plus-Noise Ratio (SINR) applicable to the technology for either analog or digital signals.

Add new definition as follows:

DOWNLINK. The signal from the base station/tower site to the portable

UPLINK. The signal from the portable to the base station/tower site.

Reason Statement: The revisions in 510.4.1.1 and 510.4.1.2 replace the terms Inbound and Outbound with Downlink and Uplink which are standard industry terms.

Additionally, the proposal clarifies the intent to provide usable communications for analog, digital and LTE technologies. Many communications systems are in use by public safety agencies in the United States and other countries. A number of them have different operational characteristics. A prescribed signal strength measurement might not produce usable voice communications for all system types (e.g., VHF, UHF, 700/800 MHz, analog, P-25, 4 slot TDMA, 2 slot TDMA, etc.). Requiring the fire code official to provide operational parameters required for usable voice communications for the systems in use eliminates possible confusion regarding the specified value, as determined by the fire code official and the frequency license holder(s). A preferred indicator of proper system performance and coverage is to use the Delivered Audio Quality (DAQ) measurement system whether the signals are analog or digital.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

This proposal provides clarity and aligns the terms uplink and downlink which are standard industry terms. Additionally, it clarifies the signals to be measured and the methods associated with measuring them.

F37-21

F38-21

IFC: 510.4.2.2, 510.4.2.2.1 (New), 510.4.2.2.2 (New)

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

2021 International Fire Code

Revise as follows:

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

Add new text as follows:

510.4.2.2.1 Contents. This document shall contain relevant information from the *fire code official* and the frequency license holder(s) including, but not be limited to:

1. The various frequencies and other modulation technologies required.
2. Point of contact information for the frequency license holder(s)
3. The location of and the effective radiated power of public safety radio site(s)
4. The maximum propagation delay in microseconds
5. The applications being used and
6. Supporting technical information necessary for system design.

510.4.2.2.2 Availability. Two-way emergency responder communications coverage system design personnel shall be provided with access to the *fire code official* documentation.

Reason Statement: The text is revised to ensure that the frequency license holder(s) are involved in determining the best solution for the design and installation of an in-building enhancement system.

In addition, the revised text identifies that the information must be available and provided to system designers. Furthermore, the proposal clarifies that the AHJ needs to identify not just frequencies but also other modulation technologies that may be required within their jurisdiction based on operational protocols.

Below shows how Section 510.4.2.2 has been broken into several sections.

510.4.2.2 Technical criteria.

The *fire code official* ~~and the frequency license holder(s)~~ shall maintain a document providing the specific technical information and requirements for the in-building, two-way emergency responder communication coverage system.

510.4.2.2.1 Contents. This document shall contain relevant information from the *fire code official* and the frequency license holder(s) including, but not be limited to:

1. The various frequencies and other modulation technologies required,
2. Point of contact information for the frequency license holder(s)
3. The location of and the effective radiated power of public safety radio site(s)_
4. The maximum propagation delay in microseconds
5. The applications being used and
6. Supporting technical information necessary for system design.

510.4.2.2.2 Availability. Two-way emergency responder communications coverage system design personnel shall be provided with access to the fire code official documentation.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal clarifies the necessary information needed to properly design and install an in-building enhancement solution.

F38-21

F39-21

IFC: 510.4.2.4

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

2021 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 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 exists, isolation shall be maintained between the donor antenna and all inside antennas to not less than 20dB greater than the system gain under all operating conditions.
5. Active RF-emitting devices used for in-building, two-way emergency responder communication coverage systems shall have built-in oscillation detection and control circuitry to reduce gain and maintain operation. When a signal booster detects oscillation, a supervisory signal shall be transmitted. In the event of uncorrectable oscillation, the system shall be permitted to shut down.
6. The installation of amplification systems or systems that operate on or provide the means to cause interference on any in-building, two-way emergency responder communication coverage network shall be coordinated and *approved by the fire code official* and the frequency license holder(s).

Reason Statement: The text is revised to clarify signal booster oscillation protection operation in order to limit the ability of the signal booster to automatically shut down, thereby leaving first responders without any radio communications capability. Additionally, the term Frequency License Holder is inserted to ensure they have been involved in the process to prevent harmful interference to the entire public safety macro communications systems prior to the installation and activation of an enhancement solution.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Additional text is simply related to providing clarification of the the intent of the provisions and the need to have the involvement of the frequency license holder(s).

F39-21

F40-21

IFC: 510.4.2.5, 510.4.2.5.1 (New)

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

2021 International Fire Code

Revise as follows:

510.4.2.5 System monitoring. The in-building, two-way emergency responder communication coverage 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. Signal Source Malfunction ~~of the donor antenna(s).~~
4. Failure of active RF-emitting device(s).
5. Low-battery capacity at 70-percent of the 12-hour operating capacity has been depleted ~~reduction of operating capacity.~~
6. Failure of critical system components.
7. The communications link between the *fire alarm system* and the in-building, two-way emergency responder communication coverage system.
8. Oscillation of active RF-emitting device(s).

Add new text as follows:

510.4.2.5.1 Single supervisory input. Where approved a single supervisory input to the fire alarm system to monitor all system supervisory signals shall be permitted.

Reason Statement: The proposal provides language to clarify that different radio frequency (RF) design solutions, other than a signal booster with a donor antenna, may be utilized to solve for reduced communications coverage within a building. Therefore, the term "donor antenna" was changed to signal source in order to provide for other types of solutions that may be installed such as voting receivers, base stations, etc. Additionally, the proposal provides for a single supervisory input where approved by the AHJ to supervise the communication enhancement system.

Cost Impact: The code change proposal will decrease the cost of construction

This proposal would decrease cost where the fire code official allows for a single supervisory signal for monitoring the two-way emergency responder communication coverage system.

F40-21

F41-21

IFC: 510.4.2.6

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

2021 International Fire Code

Revise as follows:

510.4.2.6 Additional frequencies and change of frequencies. The in-building, two-way emergency responder communication coverage system shall be capable of modification or expansion in the event frequency changes are required by the FCC or other ~~radio frequency~~ licensing ~~authorities authority~~, or additional frequencies are made available by the FCC or other ~~radio frequency~~ licensing ~~authorities authority~~.

Reason Statement: This proposal provides standard terminology that is currently utilized within the industry.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal aligns current terminology and does not increase the cost of construction.

F41-21

F42-21

IFC: 510.4.2.8, 510.4.2.9 (New), 510.5.2

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

2021 International Fire Code

Revise as follows:

510.4.2.8 Near Far Effect Radio communication antenna density. ~~Systems shall be engineered to minimize the near far effect. In building, two-way emergency responder communication coverage system designs shall include sufficient antenna density to address reduced gain conditions. Where a signal booster is required by the RF system designer, the dynamic range of the in-building emergency responder communications coverage system shall be designed to minimize the effects of strong signal automatic gain control on weak signal uplink performance, near-far effect.~~

~~**Exception:** Systems where all portable devices within the same band use active power control features.~~

Add new text as follows:

510.4.2.9 Noise Interference. Where a signal booster is used, signal booster type(s) and the uplink signal and noise levels shall be coordinated with and approved by all frequency license holder(s) that may be adversely impacted by any transmitted noise resulting from the in-building two-way emergency responder communications coverage system. Systems shall be in compliance with all frequency licensing authority requirements.

Revise as follows:

510.5.2 Approval prior to installation. ~~Amplification~~ Communication Enhancement systems capable of operating on frequencies licensed to any public safety agency by the FCC or other frequency radio licensing authority shall not be installed or activated without prior coordination and approval of the *fire code official* and the frequency license holder.

Reason Statement: Near-far problems arise when a passive distributed antenna system (DAS) is not designed correctly and is caused when a transmission from a portable radio that is really close (i.e., near) to a DAS antenna and it overpowers the uplink amplifier. When this occurs the near portable radio uses up the available gain of the bi-directional amplifier (BDA) so that another transmission that is happening at the same time on a different frequency from a radio that is further away from a DAS antenna (i.e., far radio) would not be amplified as much. The near-far problem can be an issue with an improperly design class A channelized or Cass B broadband BDAs. This proposed change aligns the proper text with the conditions that occur when a signal booster is improperly designed or installed and creates a near-far condition. Creating a near-far condition is a life safety condition for emergency responders as their communications devices will not work properly.

When solving the communications coverage issues within a building it is vital to have a full understanding of the actual public safety communication systems that are being utilized within the coverage area. The frequency license holder of those radio frequencies (RF) must be involved in determining which solution if any can be utilized to enhance RF without creating harmful interference. Based on current code language, many people have a false belief that these systems are simple plug and play solutions. When signal boosters are selected as the solution to solve the in-building communications problem, the can and do create harmful interference otherwise known as noise on the public-safety macro communications system rendering it inoperable for the entire community and all emergency responders.

Involving the frequency license holder throughout the process, provides the opportunity for those legally responsible for operating the public safety macro communications system to determine the overall impact the solution will have on their system and therefore, they can make recommendations that provide for a functional solution. In the United States, it is a federal requirement that the frequency license holder must provide written consent to activate a signal booster on their communications system. The result of an improperly designed and installed signal booster system results in harmful noise/interference. The proposed section on noise/interference provides direction to make sure the proper solution has been selected. An additional factor the frequency license holder must have knowledge of is where other signal boosters are located as when multiple signal boosters are placed to close to each other harmful interference occurs. The frequency license holder needs to maintain a list of locations where systems have been installed and the only way to do that is to know they exist.

The safety of emergency responders and the integrity of the public safety communications system is of utmost importance. Therefore, the frequency license holder(s) and the frequency licensing authority must be involved in the design, installation and maintenance of an ERCES.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

This proposal clarifies the original intent of the section as it relates to near-far conditions and ensures the frequency license holder is involved in the process.

F42-21

F43-21

IFC: 510.4.2, 510.5, NFPA Chapter 80, NFPA Chapter 80 (New)

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

2021 International Fire Code

Revise as follows:

510.4.2 System design. The in-building, two-way emergency responder communication coverage system shall be designed in accordance with Sections 510.4.2.1 through 510.4.2.8 and NFPA 1225-1221.

510.5 Installation requirements. The installation of the in-building, two-way emergency responder communication coverage system shall be in accordance with NFPA 1225-1221 and Sections 510.5.2 through 510.5.5.

Delete without substitution:

NFPA

National Fire Protection Association
1 Batterymarch Park
Quincy MA 02169-7471

~~1221—19: Standard for the Installation, Maintenance and Use of Emergency Services Communications Systems~~

Add new standard(s) as follows:

NFPA

National Fire Protection Association
1 Batterymarch Park
Quincy MA 02169-7471

1225-2021: Standards for Emergency Services Communications

Staff Analysis: A review of the standard proposed for inclusion in the code, NFPA 1225-2021, Standards for Emergency Services Communications, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

Reason Statement: Through the NFPA consolidation process, NFPA standard 1221 was changed to NFPA 1225. This proposal aligns the subject of Emergency Responder Communications with the correct NFPA standard. NFPA 1225 2022 Edition will need to be added to the referenced standards.

Cost Impact: The code change proposal will not increase or decrease the cost of construction. This is a simple change of NFPA standard numbers due to the NFPA consolidation process.

F43-21

F44-21

IFC: 510.5.2.1 (New)

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

2021 International Fire Code

Add new text as follows:

510.5.2.1 Active RF-Emitting Devices. Active RF-emitting devices shall meet the following requirements in addition to any other requirements determined by the *fire code official* or the frequency license holder(s):

1. Active RF-emitting devices that have a transmitted power output sufficient to require certification of the frequency licensing authority shall have the certification of the radio frequency licensing authority prior to installation.
2. All active RF-emitting devices shall be compatible for their intended use, as required by the frequency licensing authority, the frequency license holder(s), and the *fire code official*, simultaneously at the time of installation.
3. Written authorization shall be obtained from the frequency license holder(s) prior to the initial activation of any RF-emitting devices required to be certified by the frequency licensing authority.

Reason Statement: This proposal clarifies the requirement from the frequency licensing authority that written permission must be obtained in order to retransmit or broadcast on a licensed frequency. Failure to do so is in violation of law in many areas such as the United States as required by the Federal Communications Commission in Part 90.219. It is imperative that there be communications between the frequency license holder and the fire code official prior to installing and operating any enhancement system. Additionally, it is imperative that Active RF-emitting devices where used are certified by the frequency licensing authority.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

This proposal clarifies the requirements to have in-building emergency responder communication system equipment certified by the frequency licensing authority in accordance with federal requirements. Additionally, it requires written authorization by the frequency license holder(s) prior to activation of the system to prevent harmful interference.

F44-21

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

2021 International Fire Code

Revise as follows:

510.5.4 Acceptance test procedure. Where an in-building, two-way emergency responder communication 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 or by a method approved by the *fire code official*:

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 more than one test area shall 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 two 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 to be a 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 at subsequent annual inspections.
8. Systems shall be tested using two portable radios simultaneously conducting subjective voice quality checks. One portable radio shall be positioned not greater than 10 feet (3048 mm) 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 Statement: With the advent of new technology and testing tools, there are multiple acceptable methods that can be utilized for testing the installation and operation of an emergency responder communications enhancement system (ERCES). By adding the proposed text "or by a method acceptable to the *fire code official*" the use of these newer capabilities can be utilized where approved.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

This proposed change broadens the ability to utilize additional testing methods and processes to ensure compliance with the code.

F46-21

IFC: 510.5.6 (New), UL Chapter 80 (New)

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

2021 International Fire Code

Add new text as follows:

510.5.6 Lightning Protection. The donor antenna coaxial cable(s) shall meet the following requirements

1. The donor antenna coaxial cable(s) shall be protected by a listed antenna lead-in protector in accordance with Article 820 of NFPA 70 .
2. Antenna lead-in protector shall be listed to UL 497C or UL 497E.
3. The antenna, antenna mast, and antenna lead-in protector shall be grounded in accordance with Article 820 of NFPA 70 .

Add new standard(s) as follows:

UL

Underwriters Laboratories LLC
333 Pfingsten Road
Northbrook IL 60062

497C-2001: Protectors for Coaxial Communications Circuits - with revisions through February 10, 2017

497E-2011:

Protectors for Antenna Lead-In Conductors – with revisions

Staff Analysis: A review of the standards proposed as follows for inclusion in the code with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

- UL 497C-2001, Protectors for Coaxial Communications Circuits - with revisions through February 10, 2017
- UL 497E-2011: Protectors for Antenna Lead-In Conductors – with revisions

Reason Statement: Overvoltage Protection of an ERCES is paramount to maintain the operation of the system for emergency responders use during an emergency. For ERCES solutions that incorporate an outside antenna or antenna mast, the protection must be provided as referenced in NFPA 70 Article 820. The requirement for lightning protection is currently referenced in NFPA 1221 however, the incorrect standard (NFPA 780) is referenced. This proposal provides the correct references for providing protection of a system installed within a building.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

This proposal provides the correct reference standards for the installation of lightning protection for an ERCES.

F46-21

F47-21

IFC: (New), 510.5.6 (New), 510.5.6.1 (New), 510.5.6.2 (New), 510.5.6.3 (New), 510.5.6.4 (New), 510.5.6.5 (New)

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

2021 International Fire Code

Add new definition as follows:

BACKBONE CABLE. A communications cable that is an integral component in an in-building two-way emergency responder communication coverage system that carries the radio frequency (RF) signals necessary for system operation. The backbone cable carries the RF signals from the donor antenna signal source, through the amplifiers, and up to the connection point of the distribution antenna cables. The backbone cable could be comprised of fiber-optic, copper, or coaxial cable, but it does not radiate RF energy along its path.

BACKBONE CABLE COMPONENTS. Connectors utilized within the backbone to acquire and distribute radio frequency (RF) signals to the in-building emergency responder communications coverage system.

Add new text as follows:

510.5.6 Fire-resistance rating of backbone cables and backbone cable components. Fire-resistance rating of backbone cables and backbone cable components shall be in accordance with Sections 510.5.6.1 through 510.5.6.5.

510.5.6.1 Automatic sprinkler system protection. Backbone cables and backbone cable components installed in buildings that are fully protected by an automatic sprinkler system in accordance with Section 903.3.1.1 are not required to have a fire-resistance-rating.

510.5.6.2 Buildings without automatic sprinkler systems. Backbone cables and backbone cable components installed in non-sprinklered buildings, buildings that are partially protected by an automatic sprinkler system or high-rise buildings shall be protected from attack by fire in accordance with one of the following:

1. Protected by a cable with a listed fire-resistance rating in accordance with the following:
 - 1.1 Where the primary structural frame of a building is required to have a fire-resistance rating of 2 hours or more or is classified as heavy timber construction, the minimum fire-resistance rating shall be 2 hours.
 - 1.2 Where the primary structural frame of a building is required to have a fire-resistance rating of less than 2 hours, the minimum fire resistance rating shall be 1 hour.
 - 1.3 Where the primary structural frame of a building does not require a fire-resistance rating, a fire resistance rating shall not be required
2. Protected by an enclosure or protected area having a fire-resistance rating in accordance with the following:
 - 2.1 Where the primary structural frame of a building is required to have a fire-resistance rating of 2 hours or more or is classified as heavy timber construction, the minimum fire-resistance rating shall be 2 hours.
 - 2.2 Where the primary structural frame of a building is required to have a fire-resistance rating of less than 2 hours, the minimum fire resistance rating shall be 1 hour.
 - 2.3 Where the primary structural frame of a building does not require a fire-resistance rating, a fire resistance rating shall not be required.

510.5.6.3 Continuity of protection. Where backbone cables and distribution antenna cables are run in a fire-resistant-rated enclosure or protected area, both of the following shall apply:

1. The connection between the backbone cable and the distribution antenna cables shall be made within an enclosure or in a protected area identified in Section 510.5.6.2.
2. Passage of the distribution antenna distribution cable in and out of the enclosure or protected area shall be fire-stopped to an equivalent rating of the enclosure or protected area.

510.5.6.4 Connection of fire rated cable. Where both the backbone cables and the backbone cable components are fire-resistance-rated in accordance with Section 510.5.6.2 Item 1, the connection of the distribution antenna cable shall not be required to be made within an enclosure or protected area.

510.5.6.5 Mechanical protection. Mechanical protection of work and raceways for coaxial cables shall comply with Article 820 of NFPA 70.

Reason Statement: This Proposal provides direction and clarification on pathway survivability as required within NFPA 1221 for an emergency responder communications enhancement system (ERCES) for backbone cables and backbone cable components. Backbone cables and backbone cable components in some instances must be protected from the attack by fire with reasonable requirements that are consistent with the structural integrity of the building in which they are installed. Section 510.5.6. As currently worded in NFPA 1221 it states that "Backbone cables shall be routed through an enclosure that matches the building's fire rating." The problem with that requirement is the building itself does not have a fire rating,

various components of the building do. Furthermore, there is no benefit to requiring a rating for a cable used in an ERCES when the building itself does not require an equal or higher rating. Additionally, this proposal provides credit for fire sprinklers when these systems are installed in buildings other than a high-rise. When pathway survivability was initially provided for an ERCES it noted that if these system were installed in lieu of a wired two-way fire department communications system, they must have pathway survivability. The only time a wired two-way fire department communications system is required is in a high-rise building. It is important to understand the following when installing an ERCES:

- Backbone cables are not protected from attack by fire when installed in metal conduit. Metal conduit only provides physical protection of the cable and should only be required when needed in accordance with NFPA 70 Article 820.

- Installing backbone cables in conduit adds unnecessary cost to the installation of the system without improving the performance or solving a known problem that is occurring in the field.

- There needs to be a specified fire-resistance rating for backbone cables as it relates to the structural frame rating of the building. More specifically, columns. Without a defined component there is no method for determining the correct rating.

- Backbone cables and backbone cable components shall have the same level of protection from attack by fire if they are installed in a fire rated enclosure or if the cable itself has a fire-resistant rating.

Cost Impact: The code change proposal will decrease the cost of construction

Pathway survivability is already required through a reference to NFPA 1221. However, the reference is unclear as to when and what type of pathway survivability is required. This proposal provides clarification as to when and what type of protection is needed where required.

F48-21

IFC: 510.6.3, FCC Chapter 80 (New)

Proponents: Mark Chubb, representing ManitouNW LLC

2021 International Fire Code

Revise as follows:

510.6.3 Nonpublic safety system. Conditions of operation. Where other ~~nonpublic safety amplification systems~~ radio frequency emitters installed in buildings ~~intentionally or unintentionally reduce or inhibit~~ the performance or cause interference with the in-building, two-way emergency responder communication coverage system, the ~~nonpublic safety amplification system shall be corrected or removed~~ conflict shall be resolved as provided in 47 CFR 15.5. Emergency responder radio coverage systems shall be installed, operated, and maintained in compliance with 47 CFR, Parts 15 and 90.

Add new standard(s) as follows:

FCC

Federal Communications Commission
Wireless Telecommunications Bureau
(WTB)
Washington DC 20554

47 CFR Part 15 - 2021: Radio Frequency Devices

47 CFR Part 90-2021: Private Land Mobile Radio Devices

Staff Analysis: A review of the following standards proposed for inclusion in the code, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

- FCC 47 CFR Part 15-2021, Radio Frequency Devices,
- FCC 47 CFR Part 90-2021, Private Land Mobile Radio Devices

Reason Statement: Regulations promulgated and enforced by the Federal Communications Commission (FCC) govern the design, operation, and maintenance of radio equipment. These regulations generally preempt local regulations governing such matters. The current text of the section presumes public safety communications services always have priority over other radio services and users. This is inconsistent with federal regulations and assumes local officials' decisions and actions with respect to enforcement of these provisions reflects the public interest and not the particular interest of their radio system users. This is not consistent with the scope and application of FCC regulations, which should govern the operation of radio frequency equipment by licensed and unlicensed users and the resolution of conflicts arising from radio-frequency interference. The proposed language references the general obligations of radio equipment operators and the requirements governing signal boosters under FCC regulations.

Bibliography: 47 CFR, Part 15 -- Radio Frequency Devices
47 CFR, Part 90 -- Private Land Mobile Radio Services

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Compliance with FCC regulations is already required.

F48-21

F49-21

IFC: 601.1, 601.2, SECTION 603, 603.1, 603.4.2 (New), 603.4.3 (New), 603.4.1, 603.5.1, 603.5.1.1, 603.6.2, 604.5, 605.5, 606.3, 608.2

Proponents: Jonathan Roberts, representing UL LLC (jonathan.roberts@ul.com)

2021 International Fire Code

Revise as follows:

601.1 Scope. The provisions of this chapter shall apply to the installation, operation, testing and maintenance of the following building services and systems:

1. Electrical systems, equipment and wiring.
2. Information technology server rooms.
3. Elevator systems, emergency operation and recall.
4. Fuel-fired appliances, heating systems, chimneys and fuel oil storage.
5. Commercial cooking equipment and systems.
6. Commercial cooking oil storage.
7. Mechanical refrigeration systems.
8. Hyperbaric facilities.
9. Clothes dryer exhaust systems.

601.2 Permits. ~~Permits shall be obtained for refrigeration systems, battery systems and solar photovoltaic power systems as set forth in Sections 405.5 and 405.6.~~

SECTION 603 ELECTRICAL EQUIPMENT, WIRING AND HAZARDS.

603.1 General. Electrical equipment, wiring and systems required by this code or the International Building Code shall be installed, used and maintained in accordance with NFPA 70 and Sections 603.2 through 603.10.

Add new text as follows:

603.4.2 Disconnect means marking. 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.

603.4.3 Multiple supply connections marking. Where buildings or structures are supplied by more than one power source, markings shall be provided at each service equipment location and at all interconnected electric power production sources identifying all electric power sources at the premises in accordance with NFPA 70.

Revise as follows:

603.4.1 Labeling Electrical room marking. 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.~~

~~Where buildings or structures are supplied by more than one power source, markings shall be provided at each service equipment location and at all interconnected electric power production sources identifying all electric power sources at the premises in accordance with NFPA 70.~~

603.5.1 Listing. Relocatable power taps shall be *listed* and labeled in accordance with UL 1363. Current taps shall be *listed* and *labeled* in accordance with UL 498A.

603.5.1.1 Listing in Group I-2 occupancies and ambulatory care facilities. In Group I-2 occupancies and ambulatory care facilities, relocatable power taps shall be *listed* and labeled in accordance with UL 1363 except under the following conditions:

1. In Group I-2, Condition 2 occupancies, relocatable power taps providing power to patient care-related electrical equipment in the patient care vicinity, as defined by NFPA 99, shall be *listed* and labeled in accordance with UL 1363A or UL 60601-1.
2. In Group I-2, Condition 1 facilities, in care recipient rooms using line-operated patient care-related electrical equipment, relocatable power taps in the patient care vicinity, as defined by NFPA 99, shall be *listed* and labeled in accordance with UL 1363A or UL 60601-1.
3. In ambulatory care facilities, relocatable power taps providing power to patient care-related electrical equipment in the patient care vicinity, as defined by NFPA 99, shall be *listed* and labeled in accordance with UL 1363A or UL 60601-1.

603.6.2 Ampacity. The ampacity of the extension cords shall be not less than the rated ~~capacity~~ ampacity of the portable appliance supplied by the

cord.

604.5 Maintenance of elevators. Elevator features and lobbies required by Section 3006 of the *International Building Code* shall be inspected, tested and maintained in accordance with Sections 604.5.1 through 604.5.4.

605.5 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 and ambulatory care facilities.

Exceptions:

1. Portable unvented fuel-fired heaters listed and labeled in accordance with UL 647 are permitted to be used in one- and two-family dwellings, where operated and maintained in accordance with the manufacturer's instructions.
2. Portable outdoor gas-fired heating appliances in accordance with Section 605.5.2.

606.3 Operations and maintenance. Commercial cooking systems shall be operated, inspected and maintained in accordance with Sections 606.3.1 through 606.3.4.

608.2 Permits. ~~An operational permit~~ Permits shall be obtained for refrigeration systems as set forth in section 105.5.44 in accordance with Sections 105.5 and 105.6.

Reason Statement: This proposal is a "clean-up" of several items inadvertently overlooked in the comprehensive Chapter 6 re-organization submitted by F-CAC and approved last cycle. This proposal:

1. Makes the language and terminology consistent throughout the chapter; adds "testing" and "inspection" to the scoping sections where appropriate.
2. Adds "and labeled" after "listing" where appropriate and to be consistent with other requirements in this Chapter for listing and labeling of equipment.
3. Moves the permit requirement from the Chapter General Section to Section 608 for mechanical refrigeration; removes references for permits for equipment or operations no longer regulated by this Chapter.
4. Revised and or added section titles for additional clarity.

Note that Section 603.4.1 was broken into several sections as follows:

603.4.1 Labeling. Electrical room marking. Doors into electrical control panel rooms shall be marked with a plainly visible and legible sign stating "ELECTRICAL ROOM" or similar *approved* wording.

603.4.2 Disconnect means marking. 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.

603.4.3 Multiple supply connections marking. Where buildings or structures are supplied by more than one power source, markings shall be provided at each service equipment location and at all interconnected electric power production sources identifying all electric power sources at the premises in accordance with NFPA 70.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal does not add any new technical requirements

F50-21

IFC: 603.5.1, 603.5.1.1, UL Chapter 80 (New)

Proponents: Jonathan Roberts, representing UL LLC (jonathan.roberts@ul.com)

2021 International Fire Code

Revise as follows:

603.5.1 Listing. Relocatable power taps shall be *listed* in accordance with UL 1363. Relocatable power taps attached to furnishings shall be listed and labeled in accordance with UL 962A. Current taps shall be *listed* and *labeled* in accordance with UL 498A.

603.5.1.1 Listing in Group I-2 occupancies and ambulatory care facilities. In Group I-2 occupancies and ambulatory care facilities, relocatable power taps shall be listed in accordance with UL 1363 except under the following conditions:

1. In Group I-2, Condition 2 occupancies, relocatable power taps providing power to patient care-related electrical equipment in the patient care vicinity, as defined by NFPA 99, shall be listed in accordance with UL 1363A, UL 2930, or UL 60601-1.
2. In Group I-2, Condition 1 facilities, in care recipient rooms using line-operated patient care-related electrical equipment, relocatable power taps in the patient care vicinity, as defined by NFPA 99, shall be listed in accordance with UL 1363A, UL 2930, or UL 60601-1.
3. In ambulatory care facilities, relocatable power taps providing power to patient care-related electrical equipment in the patient care vicinity, as defined by NFPA 99, shall be listed in accordance with UL 1363A, UL 2930, or UL 60601-1.

Add new standard(s) as follows:

UL

Underwriters Laboratories LLC
333 Pfingsten Road
Northbrook IL 60062

UL 962A-2018: Furniture Power Distribution Units (with revisions through September 1, 2020)

UL 2930-2020: Outline of Investigation for Cord-and-Plug-Connected Health Care Facility Outlet Assemblies

Staff Analysis: A review of the following standards proposed for inclusion in the code, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

- UL 962A-2018: Furniture Power Distribution Units (with revisions through September 1, 2020)
- UL 2930-2020: Outline of Investigation for Cord-and-Plug-Connected Health Care Facility Outlet Assemblies.

Reason Statement: UL 1363 is for general use relocatable power taps. UL 962A is used for relocatable power taps that are attached to furnishings, such as desks or curio cabinets.

Healthcare facility outlet assemblies (HFOAs) are another type of relocatable power tap used in healthcare facilities, and are listed in accordance with UL 2930. HFOAs are intended for use as movable connections to the power supply for cord-and-plug-connected medical electrical utilization equipment in health care facilities in accordance with Article 517 of ANSI/NFPA 70, National Electrical Code (NEC) and ANSI/NFPA 99, Health Care Facilities Code, for use in Category 2 (General Patient Care) spaces or Category 1 (Critical Patient Care) spaces, including patient care vicinities.

HFOAs include a patient equipment grounding point terminal or jack that is intended to be connected to the patient equipment grounding point of the health care facility to create a redundancy in the grounding path. If a malfunction or insulation breakdown occurs, the grounding point terminal or jack provides a secondary path of least resistance for the current and reduces the risk of electric shock to a patient. HFOAs are intended for cord-and-plug connection of medical utilization equipment that has been authorized by the health care facility governing body and that has been verified as having touch and leakage current suitably low for patient care use.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal recognizes alternatives for different types of relocatable power taps for specific uses.

F51-21

IFC: 603.6.4

Proponents: Jonathan Roberts, representing UL LLC (jonathan.roberts@ul.com)

2021 International Fire Code

Revise as follows:

603.6.4 Grounding. Extension cords shall contain an equipment grounding conductor ~~be grounded~~ where serving ~~grounded~~ portable appliances required to be connected to an equipment grounding conductor.

Reason Statement: The proposed change would replace the term “grounded” with the appropriate terms used in NFPA 70. Extension cords are not “grounded” as they do not have exposed non-current carrying metal parts. Extension cords contain an equipment grounding conductor. Additionally, NEC Section 250.114 identifies specific portable cord and plug connected appliances that are required to be connected to an equipment grounding conductor. NFPA 70 intentionally uses the phrase “connected to an equipment grounding conductor” instead of “grounded” to clarify the requirements of Part VI of Article 250. Replacing the term “grounded” with “connected to an equipment grounding conductor” and “contains and equipment grounding conductor” is the correct terminology and aligns with the language used in NFPA 70.

Cost Impact: The code change proposal will not increase or decrease the cost of construction. This is change in language to an already existing product, it does not add new requirements.

F51-21

F52-21

IFC: 605.4.1.1, 605.4.2.1, 605.4.2.2, UL Chapter 80 (New)

Proponents: Jeffrey Shapiro, representing Self (jeff.shapiro@intlcodeconsultants.com)

2021 International Fire Code

Revise as follows:

605.4.1.1 Approval. Outdoor fuel oil storage tanks shall be in accordance with UL 142, UL 142A or UL 2085.

605.4.2.1 Approval. Indoor fuel oil storage tanks shall be in accordance with UL 80, UL 142, UL 142A or UL 2085.

605.4.2.2 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 tanks shall not exceed the following:

1. 660 gallons (2498 L) in unsprinklered buildings, where stored in a tank complying with UL 80, UL 142, UL 142A or UL 2085.
2. 1,320 gallons (4996 L) in buildings equipped with an *automatic sprinkler* system in accordance with Section 903.3.1.1, where stored in a tank complying with UL 142 or UL 142A. The tank shall be *listed* as a secondary containment tank, and the secondary containment shall be monitored visually or automatically.
3. 3,000 gallons (11 356 L) in buildings equipped with an automatic sprinkler system in accordance with Section 903.3.1.1, where stored in protected above-ground tanks complying with UL 2085 and Section 5704.2.9.7. The tank shall be *listed* as a secondary containment tank, as required by UL 2085, and the secondary containment shall be monitored visually or automatically.

Add new standard(s) as follows:

UL

Underwriters Laboratories LLC
333 Pfingsten Road
Northbrook IL 60062

UL 142A-2018: Special Purpose Aboveground Tanks for Specific Flammable or Combustible Liquids

Staff Analysis: A review of the standard proposed for inclusion in the code, UL 142A-2018, Special Purpose Aboveground Tanks for Specific Flammable or Combustible Liquids, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

Reason Statement: UL 142A is a listing standard for "Special Purpose Aboveground Tanks for Specific Flammable or Combustible Liquids," and tanks listed to this standard are sometimes used as generator base or day tanks. Tanks listed to this standard are recognized by NFPA 30 in the 2021 edition. Note: in previous code cycles, I represented the Steel Tank Institute, but I no longer have that affiliation or any other client interest in this issue.

Cost Impact: The code change proposal will not increase or decrease the cost of construction. Equipment tanks are not specifically associated with the cost of construction, but regardless, adding this standard simply provides another option for equipment selection that is not mandatory.

F52-21

F53-21 Part I

PART I IFC: 608.9, 608.9.1, 608.11, 608.13, 608.13.2, 608.13.3, 608.13.4, 608.13.5, 608.13.6, 608.13.7, 608.14

PART II IFC: [M] 608.17

Proponents: Jeffrey Shapiro, representing IAR (jeff.shapiro@intlcodeconsultants.com)

THIS IS A TWO PART CHANGE. PART 1 OF THIS PROPOSAL WILL BE HEARD BY THE FIRE CODE COMMITTEE AND PART II OF THIS PROPOSAL WILL BE HEARD BY THE MECHANICAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Fire Code

Revise as follows:

608.9 Refrigerant detection. Machinery rooms shall be provided with a refrigerant detector with an audible and visible alarm. ~~Where ammonia is used as the refrigerant, detection shall comply with IAR 2. For refrigerants other than ammonia, refrigerant detection shall comply with Section 608.9.1.~~ 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. Twenty-five percent of the lower flammable limit (LFL).

Detection of a refrigerant concentration exceeding the upper detection limit or 25 percent of the lower flammable limit (LFL), whichever is lower, shall stop refrigerant equipment in the machinery room in accordance with Section 608.10.1.

Delete without substitution:

~~**608.9.1 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. Twenty-five percent of the lower flammable limit (LFL).~~

~~Detection of a refrigerant concentration exceeding the upper detection limit or 25 percent of the lower flammable limit (LFL), whichever is lower, shall stop refrigerant equipment in the machinery room in accordance with Section 608.10.1.~~

Revise as follows:

608.11 Emergency pressure control system. Permanently installed refrigeration systems in machinery rooms containing more than 6.6 pounds (3 kg) of flammable, toxic or highly toxic refrigerant ~~or ammonia~~ shall be provided with an emergency pressure control system in accordance with Sections 608.11.1 and 608.11.2.

608.13 Discharge and termination of pressure relief and purge systems. Pressure relief devices, fusible plugs and purge systems discharging to the atmosphere from refrigeration systems containing flammable, toxic or highly toxic refrigerants ~~or ammonia~~ shall comply with Sections 608.13.2 through ~~608.13.4~~ and 608.13.3.

608.13.2 Flammable refrigerants. Systems containing more than 6.6 pounds (3 kg) of flammable refrigerants having a density equal to or greater than the density of air shall discharge vapor to the atmosphere only through an *approved* treatment system in accordance with Section ~~608.13.5~~ ~~608.13.4~~ or a flaring system in accordance with Section ~~608.13.6~~ 608.13.5. Systems containing more than 6.6 pounds (3 kg) of flammable refrigerants having a density less than the density of air shall be permitted to discharge vapor to the atmosphere provided that the point of discharge is 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*.

608.13.3 Toxic and highly toxic refrigerants. Systems containing more than 6.6 pounds (3 kg) of toxic or highly toxic refrigerants shall discharge vapor to the atmosphere only through an *approved* treatment system in accordance with Section ~~608.13.5~~ 608.13.4 or a flaring system in accordance with Section ~~608.13.6~~ 608.13.5.

Delete without substitution:

~~**608.13.4 Ammonia refrigerant.** Systems containing more than 6.6 pounds (3 kg) of ammonia refrigerant shall discharge vapor to the atmosphere~~

in accordance with one of the following methods:

1. Directly to atmosphere where the *fire code official* determines, on review of an analysis prepared in accordance with Section 104.8.2, that a health hazard would not result from atmospheric discharge of ammonia.
2. Through an *approved* treatment system in accordance with Section 608.13.5.
3. Through a flaring system in accordance with Section 608.13.6.
4. Through an *approved* ammonia diffusion system in accordance with Section 608.13.7.
5. By other *approved* means.

Exception: Ammonia/water absorption systems containing less than 22 pounds (10 kg) of ammonia and for which the ammonia circuit is located entirely outdoors.

Revise as follows:

608.13.4 608-13.5 Treatment systems. Treatment systems shall be designed to reduce the allowable discharge concentration of the refrigerant gas to not more than 50 percent of the IDLH at the point of exhaust. Treatment systems shall be in accordance with Chapter 60.

608.13.5 608-13.6 Flaring systems. Flaring systems for incineration of flammable refrigerants shall be designed to incinerate the entire discharge. The products of refrigerant incineration shall not pose health or environmental hazards. Incineration shall be automatic upon initiation of discharge, shall be designed to prevent blowback and shall not expose structures or materials to threat of fire. Standby fuel, such as LP-gas, and standby power shall have the capacity to operate for one and one-half the required time for complete incineration of refrigerant in the system. Standby electrical power, where required to complete the incineration process, shall be in accordance with Section 1203.

Delete without substitution:

608.13.7 Ammonia diffusion systems. Ammonia diffusion systems shall include a tank containing 1 gallon of water for each pound of ammonia (8.3 L of water for each 1 kg of ammonia) that will be released in 1 hour from the largest relief device connected to the discharge pipe. The water shall be prevented from freezing. The discharge pipe from the pressure relief device shall distribute ammonia in the bottom of the tank, but not lower than 33 feet (10 058 mm) below the maximum liquid level. The tank shall contain the volume of water and ammonia without overflowing.

Revise as follows:

608.14 Mechanical ventilation exhaust. 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 608.18.

F53-21 Part II

IFC: [M] 608.17

Proponents: Jeffrey Shapiro, representing IIAR (jeff.shapiro@intlcodeconsultants.com)

2021 International Fire Code

Revise as follows:

[M] 608.17 Electrical equipment. Where refrigerant 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 1101.1.2, Exception 1 of the International Mechanical Code.~~
2. Machinery rooms for systems containing Group A2L refrigerants that are provided with ventilation in accordance with Section 608.18.

Reason Statement: This is a companion to the FCAC proposal that updates and correlates scoping of the IFC and IMC refrigeration system provisions. The 2021 IMC and all other model mechanical and fire codes no longer directly regulate ammonia refrigeration systems. Instead, they require compliance with ANSI/IIAR standards that provide comprehensive requirements for ammonia refrigeration, from system design through system decommissioning. Revisions provided by this proposal duplicate that approach in the IFC. The 2020 edition of IIAR 2, which will be referenced by the 2024 IFC, serves as both a code and standard with respect to design of ammonia refrigeration systems, and it incorporates content that was previously handled by model fire and mechanical codes. A gap analysis between the IFC and IIAR 2 has been performed to verify that the 2020 edition of IIAR 2 includes 2021 IFC provisions.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

The proposal removes overlapping requirements from the IFC that are provided by IIAR standards. IIAR standards already apply by specific references in the IFC, so there is no added cost associated with eliminating the overlap.

F53-21 Part II

F54-21 Part I

PART I IFC: [M] 608.1, 608.1.1, 608.1.2

PART II IMC: 1101.1, 1101.1.1, 1101.1.2

Proponents: Jeffrey Shapiro, International Code Consultants, representing IIAR (jeff.shapiro@intlcodeconsultants.com)

THIS IS A TWO PART CHANGE. PART 1 WILL BE HEARD BY THE FIRE CODE COMMITTEE AND PART 2 OF THIS PROPOSAL WILL BE HEARD BY THE MECHANICAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Fire Code

Revise as follows:

[M] 608.1 Scope. Refrigeration systems shall ~~comply be installed in accordance with the~~ *International Mechanical Code* ~~and this section, as specified in Sections 608.1.1 and 608.1.2.~~

608.1.1 Refrigerants other than ammonia. ~~Refrigeration systems using a refrigerant other than ammonia shall comply with Section 608 and~~
~~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.~~

608.1.2 Ammonia refrigeration. Refrigeration systems using ammonia refrigerant ~~and the buildings in which such systems are installed shall~~
comply with IIAR 2 for system design; IIAR 6 for inspection, testing and maintenance; ~~and IIAR 7 for operating procedures~~; IIAR 8 for
decommissioning of ammonia refrigeration systems shall comply with IIAR 8, and IIAR 9 for engineering practices for existing ammonia refrigeration
systems shall be in accordance with IIAR 9 systems. Refrigeration systems using ammonia refrigerant shall not be required to comply with Section 608.

F54-21 Part I

F54-21 Part II

IMC: 1101.1, 1101.1.1, 1101.1.2

Proponents: Jeffrey Shapiro, International Code Consultants, representing IIAR (jeff.shapiro@intlcodeconsultants.com)

2021 International Mechanical Code

Revise as follows:

1101.1 Scope. This chapter shall govern the design, installation, construction and repair of refrigeration systems that vaporize and liquefy a fluid during the refrigerating cycle. Permanently installed refrigerant storage systems and other components shall be considered as part of the refrigeration system to which they are attached.

1101.1.1 Refrigerants other than ammonia. ~~Refrigeration systems using Refrigerant piping design and installation for systems containing a refrigerant other than ammonia, including pressure vessels and pressure relief devices, shall comply with this chapter, and ASHRAE 15, and the International Fire Code.~~

1101.1.2 Ammonia refrigerant. Refrigeration systems using ammonia as the refrigerant shall comply with IIAR 2 for system design, IIAR 3 for valves, IIAR 4 for installation, and IIAR 5 for start-up, and shall not be required to comply with this chapter.

Reason Statement: This proposal was developed and approved by FCAC, as the proponent, but just before the submittal deadline, it was identified that staff could not find a record of PMGCAC also supporting it, which would be required for the proposal to go forward as a CAC proposal because it touches on the IMC. Rather than have this go unsubmitted, I agreed to sponsor the proposal and submitted it.

The scoping for provisions regulating refrigeration systems in the IFC and IMC are not correlated. This proposal accomplishes correlation and provides proper references to ASHRAE and IIAR standards. It also modifies the IMC by adding a needed reference to the IFC for refrigerants other than ammonia. The IFC includes regulations for such refrigerants that are not duplicated in the IMC. A companion change has been submitted to the IFC that will remove ammonia-specific regulations covered by reference standards. The IMC removed ammonia-specific requirements last cycle in deference to ANSI standards published by IIAR, which is the approach now used by all model codes, pending the correlating change to the IFC. Ammonia refrigeration systems are comprehensively regulated by IIAR standards, and the latest version of IIAR 2 serves as both a code and a standard, incorporating content that was previously handled by model fire and mechanical codes.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is not related to construction and has no impact on construction costs.

F54-21 Part II

F55-21

IFC: 608.1.1, IIAR Chapter 80 (New)

Proponents: Jeffrey Shapiro, representing IIAR (jeff.shapiro@intlcodeconsultants.com)

2021 International Fire Code

Revise as follows:

608.1.1 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. Refrigeration systems containing carbon dioxide as the refrigerant shall also comply with BSR/IIAR CO2.

Add new standard(s) as follows:

IIAR

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

BSR/IIAR CO2-2021: Safety Standard for Closed-Circuit Carbon Dioxide Refrigeration Systems

Staff Analysis: A review of the standard proposed for inclusion in the code, BSR/IIAR CO2-2021: Safety Standard for Closed-Circuit Carbon Dioxide Refrigeration Systems, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

Reason Statement: BSR/IIAR CO2 is in the process of completion for issuance in 2021. It is a new standard governing refrigeration systems that use carbon dioxide as the refrigerant, and it is designed to be a companion to ASHRAE 15, providing additional design requirements that are unique to carbon dioxide systems to supplement ASHRAE 15 and going beyond the scope of ASHRAE 15 by regulating the complete life-cycle of carbon dioxide systems. Carbon dioxide has become increasingly popular as an industrial refrigerant because it is considered efficient and climate friendly. Including IIAR's new standard will assure that these systems are properly regulated.

Cost Impact: The code change proposal will increase the cost of construction. The new standard includes requirements that reflect industry good practice but are not currently mandatory. By including the standard as a mandatory reference standard in the IMC, following industry good practice will no longer be optional for carbon dioxide systems.

F55-21

F56-21

IFC: 608.12

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Fire Code

Revise as follows:

608.12 Storage, use and handling. Flammable and combustible materials shall not be stored in machinery rooms for 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. Storage, use or handling of extra refrigerant or refrigerant oils shall be as required by Chapters 50, 53, 55 and 57.

Exception: These provisions shall not apply to:

1. ~~This provision shall not apply to~~ Spare parts, tools and incidental materials necessary for the safe and proper operation and maintenance of the system.
2. Refrigerant removed from equipment during a repair or replacement and temporarily stored in a pressure vessel complying with ASME BPVC Section VIII, for reuse after the repair or replacement has been completed.

Reason Statement: During repairs and replacement, refrigerant is removed from a system and stored in the machinery room in ASME rated pressure vessels. The proposed exception recognizes this practice. It must be noted that the machinery room has refrigerant detectors as well as ventilation in the event of a leak. Hence, the machinery room is an appropriate environment for temporarily storing the refrigerant that will be added back into the system following any repair or replacement. Since the refrigerant is either in the refrigeration equipment or pressure vessel, there is no added hazard to the machinery room. It should be noted that in a machinery room any group of refrigerant can be used in the refrigeration equipment.

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 and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: <https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/>

Cost Impact: The code change proposal will not increase or decrease the cost of construction
None, this practice appears to be an industry standard for containers and best practice.

F56-21

F57-21 Part I

PART I IFC: 610.1.2

PART II IPMC: 607.1, [F] 607.2 (New)

Proponents: Jonathan Roberts, representing UL LLC (jonathan.roberts@ul.com)

THIS IS A TWO PART CODE CHANGE. PART 1 OF THIS PROPOSAL WILL BE HEARD BY THE FIRE CODE COMMITTEE AND PART 2 OF THIS PROPOSAL WILL BE HEARD BY THE PROPERTY MAINTENANCE & ZONING COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Fire Code

Revise as follows:

610.1.2 Maintenance. The lint trap, mechanical and heating components, and the exhaust duct system of a clothes dryer shall undergo periodic removal of accumulations of lint ~~be maintained~~ in accordance with the manufacturer's operating instructions to prevent obstruction of the ~~accumulation of lint or debris that prevents the exhaust of air and products of combustion.~~

F57-21 Part I

F57-21 Part II

IPMC: 607.1, [F] 607.2 (New)

Proponents: Jonathan Roberts, representing UL LLC (jonathan.roberts@ul.com)

2021 International Property Maintenance Code

Revise as follows:

607.1 General. Duct systems shall be maintained free of obstructions and shall be capable of performing the required function.

Add new text as follows:

[F] 607.2 Clothes dryer exhaust duct systems maintenance. The lint trap, mechanical and heating components, and the exhaust duct system of a clothes dryer shall undergo periodic removal of accumulations of lint in accordance with the manufacturer's operating instructions to prevent obstruction of exhaust air and products of combustion.

Staff Analysis: Note that the scoping of Section 607.2 will be determined at the end of the code change cycle. This proposal must first be reviewed and acted upon by the Property Maintenance Code Committee.

Reason Statement: This proposal 1) modifies the current language in the IFC to specifically require the removal of lint from these appliances as necessary to ensure that proper ventilation is maintained free of obstruction and 2) adds the same requirement into the IMPC for consistence in the application and enforcement of this maintenance requirement.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This will be maintenance after installation so it will not affect the cost of construction.

F57-21 Part II

F58-21

IFC: 701.6, 701.6.1 (New), 901.6.3

Proponents: Andrew Bevis, National Fire Sprinkler Association, representing National Fire Sprinkler Association

2021 International Fire Code

Revise as follows:

701.6 Owner's responsibility. The *owner* shall maintain an inventory of all required *fire-resistance-rated* construction, construction installed to resist the passage of smoke and the construction included in Sections 703 through 707 and Sections 602.4.1 and 602.4.2 of the *International Building Code*. Such construction 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.

Add new text as follows:

701.6.1 Recordkeeping. Records of all required system inspections, testing, repairs, and maintenance shall be maintained in accordance with Section 109.3.

Revise as follows:

901.6.3 Records. Records of all system inspections, tests and maintenance ~~required by the referenced standards~~ shall be maintained in accordance with Section 109.3.

Reason Statement: The intent of this proposal is to provide correlation and consistency for record keeping requirements throughout the IFC. The previous requirements provided no guidance for owners to maintain their records to Section 108.3. Furthermore, the deletion of "required by referenced standards" is already covered by 108.3. Having the requirement for a record of inspections and repairs buried in the center of this section hides the requirement for uniform maintenance. The previous requirements provided no guidance for owners to maintain their records to Chapter 1.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is an editorial clarification and coordination with record keeping requirements.

F58-21

F59-21

IFC: 705.2.6, 705.2.7 (New)

Proponents: Michael Fischer, Kellen Company, representing The International Door Association (Mike@doors.org)

2021 International Fire Code

Revise as follows:

705.2.6 Testing of horizontal and vertical sliding fire doors. Horizontal and vertical sliding ~~and rolling 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:

705.2.7 Periodic inspection and testing of rolling fire doors. Rolling fire door assemblies shall be periodically inspected and tested in accordance with NFPA 80. Service personnel providing or conducting inspection and testing shall possess a valid certificate issued by an approved organization, or the fire door assembly manufacturer, for the type of system and work performed. Records of inspections and testing shall be maintained.

Reason Statement: NFPA 80 includes requirements for the periodic inspection and testing of rolling fire doors, and has recently been updated to provide additional clarity on the qualifications of the inspection and testing personnel. Rolling fire doors require specific product training to ensure the inspection personnel will be able to properly conduct the inspection and testing, including a visual inspection of the door assembly, a check of the door operation, a drop test, and resetting of the door to operational status. The complex nature of these products dictates that personnel be familiar with the type and feature of the door assembly, as well as manufacturer-specific details necessary to help ensure the door will function as intended and as required by the code.

The updates to NFPA 80 include a defined term "Trained Rolling Steel Fire Door Systems Technician" to describe the importance of ensuring that personnel conducting the inspections be properly trained. This provision is consistent with the recommendations in DASMA (Door and Access Systems Manufacturers Association) Technical Data Sheet #271 that door drop testing be conducted by a "trained door systems technician".

Section 705 of the IFC contains no provisions for training of inspection personnel; this proposal brings the NFPA 80 provisions into the code to help ensure that inspections, testing, and resetting of rolling fire doors are conducted by qualified technicians and rolling fire doors in use as part of fire-resistance rated assemblies will perform as intended. Because it is intended to address only rolling fire door assemblies and door drop test procedures, it removes rolling doors from existing Section 705.2.6, and creates a new section for these products.

Bibliography: <https://www.dasma.com/wp-content/uploads/pubs/TechDataSheets/RollingDoor/TDS271.pdf>

Cost Impact: The code change proposal will not increase or decrease the cost of construction

The proposal clarifies requirements contained in the referenced standards for the qualifications of inspection and testing personnel.

F59-21

F60-21 Part I

PART I IFC: 803.11.1

PART II IBC: 2603.9

Proponents: Jeffrey Shapiro, representing Self (jeff.shapiro@intlcodeconsultants.com); Tim Earl, representing GBH International (tearl@gbhinternational.com)

THIS IS A TWO PART CODE CHANGE. PART 1 WILL BE HEARD BY THE INTERNATIONAL FIRE CODE COMMITTEE AND PART 2 WILL BE HEARD BY THE INTERNATIONAL BUILDING CODE FIRE SAFETY COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Fire Code

Revise as follows:

803.11.1 Foam plastics combustibility characteristics. ~~Foam plastic materials shall be allowed to be used as interior wall and ceiling finish only where in accordance with 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.~~

F60-21 Part I

F60-21 Part II

IBC: 2603.9

Proponents: Jeffrey Shapiro, representing Self (jeff.shapiro@intlcodeconsultants.com); Tim Earl, representing GBH International (tearl@gbhint.com)

2021 International Building Code

Revise as follows:

2603.9 Special approval. Foam plastic shall not be required to comply with the requirements of Section 2603.4 or those of Section 2603.6 where specifically approved based on one of the following large-scale tests, ~~such as, but not limited to,~~

1. NFPA 286 ~~(with using~~ the acceptance criteria of Section 803.1.1.1)
2. FM 4880
3. UL 1040
4. UL 1715

Such testing shall be ~~related to the actual end-use configuration and~~ be performed on the finished manufactured foam plastic assembly in the maximum thickness intended for use. Foam plastics that are used as *interior finish* on the basis of these special tests shall also conform to the *flame spread* and smoke-developed requirements of Chapter 8. Assemblies tested shall include seams, joints and other typical details used in the installation of the assembly and shall be tested in the manner intended for use.

Reason Statement: The revision to IFC Section 803.11 is for correlation with the approach taken by the companion IBC section, 803.4. IBC Section 803.4 simply references compliance with IBC Section 2603.9. However, IFC Section 803.11 (covers the same topic) currently includes additional text that partially duplicates text from IBC Section 2603.9. There is no reason for IFC Section 803.11 to partially duplicate IBC text when the section already specifically directs you to the IBC section, where the text is being pulled from.

Regarding the change to Section 2603.9, the current text "such as, but not limited to, NFPA 286 (with the acceptance criteria of Section 803.1.1.1), FM 4880, UL 1040 or UL 1715" and "such testing shall be related to the actual end-use configuration and be performed on the finished manufactured foam plastic assembly" creates an opportunity for "creative" compliance that I recently became aware of. This "creative" solution does not seem to meet the spirit of the codes' foam plastic regulations. So what is it?

I've learned that two testing laboratories are recognizing permissible use of exposed foam plastic based on a full-scale test that evaluates controlling a fire by oxygen depletion. From what I gather, the approach involves having a sealed attic and requiring a sealing cover over attic stair/hatch opening, perhaps with a sign requiring that the stairs be kept closed. In theory, with a limited oxygen supply in the space, any fire that starts in the space and involves exposed foam plastic (without a thermal barrier) would flash quickly, consume oxygen in the space and, at least temporarily, self-extinguish. While that might seem OK, the ability to maintain such spaces as airtight during the life of a structure certainly seems questionable, and do we really want to allow unprotected foam in these spaces under the philosophy of accepting almost instantaneous fire growth with the hope of self-extinguishment? I've seen exposed foam flashover a room corner test in less than 20 seconds, and relying on self-extinguishment by oxygen depletion doesn't seem like a sound strategy for fire safety for the life of a structure. Further, I wonder about the risk of a backdraft explosion when firefighters responding to the attic fire open the attic and introduce new oxygen into a well-insulated and previously superheated space. I also understand that there is an engineer's report that accompanies test reports for this approach that is being presented to jurisdictions to encourage approval of the approach.

When I contacted one of the laboratories reportedly conducting this test and asked for test documentation or a copy of the engineering report or engineer's letter, I was told that all of this is proprietary and could not be shared. Hence, I've prepared this proposal to bring this "loophole" (in my opinion) out in the open. I am hopeful that the testing labs and/or industry who are promoting the acceptability of this approach to fire safety for exposed foam plastic will show up at the code development hearing to provide sufficient technical justification, as perhaps there's something that's not yet come forward that should be considered. Lacking acceptable justification, it is my opinion that the enabling text in ICC codes should be deleted to close what I regard as a loophole in our approach to fire safety for foam plastics. It is important that the International Code prescribe reasonable and appropriate approval parameters for the use of foam plastics, because ICC Evaluation Service, who produce AC377 and ICC 1100 Standard for Spray-applied Polyurethane Foam Plastic Insulation, and other evaluation and testing companies are otherwise without limitation with respect to what they choose to develop as acceptable testing and approval parameters. If the code provides specific regulations, evaluation services and test labs will be obliged to follow the code, or at least explain variances in their approval criteria.

Furthermore, it is worth noting that, when this "loose" code text was added to legacy codes, standardized testing of foam plastics had not yet reached maturity. Today however, we have several recognized and standardized tests for this purpose, and continuing to maintain "loose" text in the code seems unjustified. If the oxygen depletion strategy is one that ICC might ultimately choose to recognize, then that strategy should become associated with a standardized test procedure that can be included in the code versus leaving the current loophole.

It is noted that similar text appears in Section 316.6 of the IRC, and it is my intent to process a correlating code proposal to the IRC in Group B.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

The proposal does not add any requirements but deletes a permitted approach for approval of foam plastic materials. There is the potential that materials that had been approved based on non standard tests would have to be retested.

F61-21

IFC: 901.6.1, TABLE 901.6.1; IPMC: [F] 704.2, TABLE 704.2

Proponents: William Koffel, representing Air Movement and Control Association (wkoffel@koffel.com)

2021 International Fire Code

901.6.1 Standards. *Fire protection systems* shall be inspected, tested and maintained in accordance with the referenced standards *listed* in Table 901.6.1.

Revise as follows:

TABLE 901.6.1
FIRE PROTECTION SYSTEM MAINTENANCE STANDARDS

SYSTEM	STANDARD
Portable fire extinguishers	NFPA 10
Carbon dioxide fire-extinguishing systems	NFPA 12
Halon 1301 fire-extinguishing systems	NFPA 12A
Dry-chemical extinguishing systems	NFPA 17
Wet-chemical extinguishing systems	NFPA 17A
Water-based fire protection systems	NFPA 25
Fire alarm systems	NFPA 72
<u>Fire dampers</u>	<u>NFPA 80</u>
<u>Smoke dampers</u>	<u>NFPA 105</u>
Smoke and heat vents	NFPA 204
Water-mist systems	NFPA 750
Clean-agent extinguishing systems	NFPA 2001
Aerosol fire-extinguishing systems	NFPA 2010

2021 International Property Maintenance Code

[F] 704.2 Standards. Fire protection systems shall be inspected, tested and maintained in accordance with the referenced standards listed in Table 704.2 and as required in this section.

Revise as follows:

TABLE 704.2
FIRE PROTECTION SYSTEM MAINTENANCE STANDARDS

SYSTEM	STANDARD
Portable fire extinguishers	NFPA 10
Carbon dioxide fire-extinguishing system	NFPA 12
Halon 1301 fire-extinguishing systems	NFPA 12A
Dry-chemical extinguishing systems	NFPA 17
Wet-chemical extinguishing systems	NFPA 17A
Water-based fire protection systems	NFPA 25
Fire alarm systems	NFPA 72
<u>Fire dampers</u>	<u>NFPA 80</u>
<u>Smoke dampers</u>	<u>NFPA 105</u>
Smoke and heat vents	NFPA 204
Water-mist systems	NFPA 750
Clean-agent extinguishing systems	NFPA 2001

Reason Statement: Fire dampers and smoke dampers as covered under NFPA 80 and 105 are other fire protection systems requiring maintenance which should be listed in this table.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

This proposal does not increase cost since it is an editorial change which simply refers to existing damper requirements as outlined in the 2021 International Fire Code, section 706, where NFPA 80 and NFPA 105 are already mentioned. This proposal does not make technical changes.

F61-21

F62-21

IFC: CHAPTER 9, SECTION 903, 903.1, 903.2; IBC: CHAPTER 9, SECTION 903, [F] 903.1, [F] 903.2

Proponents: Robert J Davidson, Davidson Code Concepts, LLC, representing Tesla, USA (rjd@davidsoncodeconcepts.com)

2021 International Fire Code

CHAPTER 9 FIRE PROTECTION AND LIFE SAFETY SYSTEMS

SECTION 903 AUTOMATIC SPRINKLER SYSTEMS.

903.1 General. *Automatic sprinkler systems* shall comply with this section.

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.

Exception: Spaces or areas in telecommunications buildings used exclusively for telecommunications equipment, associated electrical power distribution equipment, batteries not required to have fire suppression by Section 1207 for energy storage systems and standby engines, provided that 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.

2021 International Building Code

CHAPTER 9 FIRE PROTECTION AND LIFE SAFETY SYSTEMS

SECTION 903 AUTOMATIC SPRINKLER SYSTEMS.

[F] 903.1 General. *Automatic sprinkler systems* shall comply with this section.

Revise as follows:

[F] 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.

Exception: Spaces or areas in telecommunications buildings used exclusively for telecommunications equipment, associated electrical power distribution equipment, batteries not required to have fire suppression by Section 1207 of the *International Fire Code* for energy storage systems and standby engines, provided that 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 or not less than 2-hour *horizontal assemblies* constructed in accordance with Section 711, or both.

Reason Statement: This is a correlation fix.

The "batteries" reference is legacy language that goes back years, and since then the fire and building codes have had significant upgrades on specific requirements for batteries, i.e., energy storage systems.

The batteries referred to in the existing language were lead-acid and nickel-cadmium battery systems less than 50 V ac, 60 V dc that are in telecommunications facilities for installations of communications equipment under the exclusive control of communications utilities which is a current exemption under Section 1207 of the fire code. The reason this correlation is necessary is because that exception is new and specific to the lead-acid technology, lithium-ion batteries for example would not have the exception.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

Since this simply correlates old language with the new requirements for energy storage systems, there is no impact on construction costs. It could save constructions costs by eliminating the confusion of having a project move forward without suppression that is required, then the increased costs to correct the error.

F63-21

IFC: 903.2.1.1, 903.2.1.3, 903.2.1.4; IBC: [F] 903.2.1.1, [F] 903.2.1.3, [F] 903.2.1.4

Proponents: Timothy Stacy, representing Southern Oregon Fire Code Officials

2021 International Fire Code

Revise as follows:

903.2.1.1 Group A-1. An *automatic sprinkler system* shall be provided throughout stories containing Group A-1 occupancies and 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* where alcoholic beverages are being consumed has an *occupant load* of 100 or more.
3. 4. The *fire area* is located on a floor other than a *level of exit discharge* serving such occupancies.
4. 5. The *fire area* contains a multiple-theater complex.

903.2.1.3 Group A-3. An *automatic sprinkler system* shall be provided throughout stories containing Group A-3 occupancies and 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* where alcoholic beverages are being consumed has an *occupant load* of 100 or more.
3. 4. 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 throughout stories containing Group A-4 occupancies and throughout all stories from the Group A-4 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* where alcoholic beverages are being consumed has an *occupant load* of 100 or more.
3. 4. The *fire area* is located on a floor other than a *level of exit discharge* serving such occupancies.

2021 International Building Code

Revise as follows:

[F] 903.2.1.1 Group A-1. An *automatic sprinkler system* shall be provided throughout stories containing Group A-1 occupancies and 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* where alcoholic beverages are being consumed has an *occupant load* of 100 or more.
3. 4. The *fire area* is located on a floor other than a *level of exit discharge* serving such occupancies.
- 4.5. The *fire area* contains a multi-theater complex.

[F] 903.2.1.3 Group A-3. An *automatic sprinkler system* shall be provided throughout stories containing Group A-3 occupancies and 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 where alcoholic beverages are being consumed has an occupant load of 100 or more.

3.4. The fire area is located on a floor other than a level of exit discharge serving such occupancies.

[F] 903.2.1.4 Group A-4. An automatic sprinkler system shall be provided throughout stories containing Group A-4 occupancies and throughout all stories from the Group A-4 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 where alcoholic beverages are being consumed has an occupant load of 100 or more.

3.4. The fire area is located on a floor other than a level of exit discharge serving such occupancies.

Reason Statement: Serving and consuming alcohol occurs across a variety of assembly use-groups, which can result in an increased hazard to the community. Cognitive impairment can result in delayed response and evacuation during emergencies, which increases the risk to occupants in assembly spaces. It is not uncommon to see alcohol being served and consumed in an A-3 gymnasium-type occupancy, for example, or in the seating area of a theater designated as A-1. Revision to the A-2 section is not being proposed since the 100 occupant provision is already provided in the code.

Cost Impact: The code change proposal will increase the cost of construction

Reducing the threshold for the sprinkler scoping provisions will likely increase construction costs, but design benefits also live inside the code that should be examined case by case.

F63-21

F64-21

IFC: 903.2.1.8 (New); IBC: [F] 903.2.1.8 (New)

Proponents: Andrew Bevis, National Fire Sprinkler Association, representing National Fire Sprinkler Association; Jeffrey Hugo, representing NFSA (hugo@nfsa.org)

2021 International Fire Code

Add new text as follows:

903.2.1.8 Assembly occupancies serving alcohol. A fire area where alcoholic beverages are being consumed that exceeds 100 occupants shall be equipped with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2.

2021 International Building Code

Add new text as follows:

[F] 903.2.1.8 Assembly occupancies serving alcohol. A fire area where alcoholic beverages are being consumed that exceeds 100 occupants shall be equipped with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2.

Reason Statement: The nature of assembly occupancies has evolved over time and the protection of those occupancies should evolve as well. New types of assembly spaces are being created and with the creation of those spaces so should the protection evolve. Additionally, with these new types of assembly occupancies, new types of fire loads are appearing. When these things are combined with increased occupancy loads of individuals under the influence of alcohol; the opportunity for tragedy increases exponentially. One of these new occupancies is the use of “wedding barns.” These are barns that are being built or retrofitted to hold wedding ceremonies and receptions. Naturally, these barns have unique fire loads that many occupancies would not normally have present. (I.e., hay bales for seating and decoration, lanterns for lighting and décor, heating equipment for winter months, etc.) The NFPA (National Fire Protection Association) conducted a study on structure fires in barns. The study shows that during a four-year period there were 830 structure fires in barns with one civilian death, 10 civilian injuries and around \$28 million in property damage annually. The leading causes for these fires were heating equipment, electrical distribution, and lighting. As with most wedding events, substantial amounts of alcohol are involved. All these factors combined create a hazardous space filled with occupants whose reactions and thought processes are slowed and impaired. Additionally, in A-1 occupancies such as movie theatres and concert halls are evolving to become more of a luxury event. Many movie theatres and concert venues across the nation are now selling alcohol to its patrons or are renting the space to private parties. Also, many other types of occupancies within the assembly category provide alcohol to attendees. Protecting these spaces with sprinkler systems is a need that has been present for some time.

Fires are occurring in these types of spaces where sprinkler systems are present, and lives are being saved. An automatic sprinkler system extinguished a fire that erupted during a wedding banquet at a hotel in San Antonio, Texas. In Rancho Santa Fe, California sprinklers make a difference in golf clubhouse fire during a wedding party. The Battalion Fire Chief Fred Cox stated that, “... without fire sprinklers this could have been a major fire. The fire was well established before sprinkler activation, and without them, it would have easily spread unchecked through a very large and open attic space before being detected.” Two fires were extinguished by a single sprinkler in golf clubhouse in Grapevine, Texas on two separate occasions. Four fire sprinklers held a fire in check under a table in the kitchen of the indoor go kart racing facility until fire crews arrived on scene. Damage was contained to the table involved and slight charring on the wall where the table was situated. Addison Fire Marshal stated, “Without the fire sprinkler activation, we would have had a total loss of the kitchen.” This facility serves alcohol and hosts parties on a regular basis.

Finally, most authorities having jurisdiction have a resource within their structure to help identify these types of occurrences when occupancies are being changed or the use of the space has been modified. Most jurisdictions require a liquor license to serve alcohol. This aids in the enforcement of this development.

Cost Impact: The code change proposal will increase the cost of construction

Adding a requirement for fire areas where alcoholic beverages are being consumed that exceeds 100 occupants in assembly occupancies serving alcohol to be equipped with an automatic sprinkler system will increase the cost of construction. Currently, only Group A-2 occupancies require automatic sprinkler systems for occupant loads of 100 or more.

F64-21

F65-21

IFC: 903.2.2, 903.2.2.1 (New); IBC: [F] 903.2.2, [F] 903.2.2.1 (New)

Proponents: Andrew Bevis, National Fire Sprinkler Association, representing National Fire Sprinkler Association; Jeffrey Hugo, representing NFSA (hugo@nfsa.org)

2021 International Fire Code

Revise as follows:

903.2.2 Ambulatory care facilities Group B. ~~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:~~ An automatic sprinkler system shall be provided throughout buildings containing a Group B occupancy where one of the following conditions exists:

- ~~1. Four or more care recipients are incapable of self-preservation.~~
- ~~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.~~
1. Buildings having more than three stories above grade plane.
2. Business occupancies that have areas used in the cooking of food.

Exception: Areas only using microwaves and small food preparation appliances

~~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 as well as all floors below where such care is provided, and all floors between the level of ambulatory care and the nearest level of exit discharge, 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.~~

Add new text as follows:

903.2.2.1 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.
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 as well as all floors below where such care is provided, and all floors between the level of ambulatory care and the nearest level of exit discharge, 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.

2021 International Building Code

Revise as follows:

[F] 903.2.2 Ambulatory care facilities Group B. ~~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:~~ An automatic sprinkler system shall be provided throughout buildings containing a Group B occupancy where one of the following conditions exists:

- ~~1. Four or more care recipients are incapable of self-preservation.~~
- ~~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.~~
1. Buildings having more than three stories above grade plane.
2. Business occupancies that have areas used in the cooking of food

Exception: Areas only using microwaves and small food preparation appliances

~~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 as well as all floors below where such care is provided, and all floors between the level of ambulatory care and the~~

~~nearest level of exit discharge, 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.

Add new text as follows:

[F] 903.2.2.1 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.
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 as well as all floors below where such care is provided, and all floors between the level of ambulatory care and the nearest level of exit discharge, 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 Statement: Item #1: With the ever-decreasing land availability in metropolitan areas, landowners and design professionals are having to construct vertically. Employee areas are becoming more open and less boundaries are being added. In addition, accessory use assembly areas, team gathering areas and the like are being more and more incorporated in the today's modern office. This is causing a large increase in occupancy loads on floors plates. Due to the increasing occupancy loads it is causing travel times, evacuation times, and the like are all being increased. This will lead to an increase in fire related injuries and deaths. By providing automatic sprinkler systems in these business occupancies, it will provide the time required for occupants to exit the structure safely and reduce the risk of fire related injury and death. It will also provide additional time and flexibility for fire operations to occur efficiently and safely.

Item #2: The use of ambulatory surgery centers (ASC) has spiked in recent years, partly because they're more convenient for patients than hospitals. It's also cheaper as well. As of 2017, more than half of outpatient surgeries were performed in an ASC setting. That is an increase of 32% since 2005. The ASC market is projected to increase to \$40 billion by 2020. Drivers for revenue growth are lower outpatient surgery costs compared to other settings, improved safety driven by technological advancements, and the aging U.S. population. There are more than 6,100 ASCs in the U.S. and as of 2016, more than 5,500 were Medicare-certified. As medical technology continues to advance, so will the increase of ability to complete more and more procedures in ASCs. This will increase the load of patients who are not capable of self-preservation. Couple this with a lack of knowledge of the surgery facility layout, those patients and other occupants are at greater risk of fire related death or injury.

Item #3: There has been an increase in cooking related fires in business occupancies. According to the latest report by the U.S. Fire Administration, cooking fires in business occupancies have increased by 43% since 2003. This is due to the increased extravagance in workplaces. Employees are required to work longer hours and increase production. Employers are feeling the need to provide nicer facilities for the employees, so that to maintain moral and production. Among these facilities are extravagant break areas that include full kitchens with all the necessary appliances. Combine this with the ever-decreasing land availability in metropolitan areas, it has caused owners and design professionals to construct vertically. This has caused higher risk areas to be pushed vertically and an increase in building evacuation times due to height.

Cost Impact: The code change proposal will increase the cost of construction

The proposal will increase the cost of construction for these additional business occupancies that will require an automatic sprinkler system.

F66-21

IFC: CHAPTER 9, SECTION 903, 903.1, 903.2.2 (New), 903.2.2, 903.2.2.2 (New), 903.2.4, 903.2.7, 903.2.7.3 (New), 903.2.9, 903.2.9.1; IBC: CHAPTER 9, SECTION 903, [F] 903.1, 903.2.2 (New), [F] 903.2.2, 903.2.2.2 (New), [F] 903.2.4, [F] 903.2.7, 903.2.7.3 (New), [F] 903.2.9, [F] 903.2.9.1

Proponents: Robert J Davidson, Davidson Code Concepts, LLC, representing Tesla, USA (rjd@davidsoncodeconcepts.com)

2021 International Fire Code

CHAPTER 9 FIRE PROTECTION AND LIFE SAFETY SYSTEMS

SECTION 903 AUTOMATIC SPRINKLER SYSTEMS.

903.1 General. *Automatic sprinkler systems* shall comply with this section.

Revise as follows:

903.2.2 Group B. An automatic sprinkler system shall be provided for Group B occupancies as follows:

903.2.2.1 903.2.2 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.
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 as well as all floors below where such care is provided, and all floors between the level of ambulatory care and the nearest *level of exit discharge*, 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.

903.2.2.2 Laboratories; research and development or testing. An automatic sprinkler system shall be installed throughout the fire areas utilized for the research and development or testing of lithium-ion or lithium metal batteries.

903.2.4 Group F-1. An *automatic sprinkler system* shall be provided throughout all buildings containing a Group F-1 occupancy where one of the following conditions exists:

1. A Group F-1 *fire area* exceeds 12,000 square feet (1115 m²).
2. A Group F-1 *fire area* is located more than three stories above *grade plane*.
3. The combined area of all Group F-1 *fire areas* on all floors, including any mezzanines, exceeds 24,000 square feet (2230 m²).
4. A Group F-1 occupancy used to manufacture lithium-ion or lithium metal batteries.
5. A Group F-1 occupancy used to manufacture vehicles, energy storage systems or equipment containing lithium-ion or lithium metal batteries where the batteries are installed as part of the manufacturing process.

903.2.7 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).

Revise as follows:

903.2.7.3 Lithium-ion or lithium metal battery storage. An automatic sprinkler system shall be provided in a room or space within a Group M occupancy where required for the storage of lithium-ion or lithium metal batteries by Section 322 or Chapter 32 of this code.

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 fire area used for the storage of lithium-ion or lithium metal powered vehicles where the fire area exceeds 500 square feet (46.4 m²)

903.2.9.1 Repair garages. An *automatic sprinkler system* shall be provided throughout all buildings used as repair garages in accordance with Section 406.8 of the International Building Code, as shown:

1. Buildings having two or more stories above *grade plane*, including *basements*, with a *fire area* containing a repair garage exceeding 10,000 square feet (929 m²).
2. Buildings not more than one story above *grade plane*, with a *fire area* containing a repair garage exceeding 12,000 square feet (1115 m²).
3. Buildings with repair garages servicing vehicles parked in *basements*.
4. A Group S-1 *fire area* used for the repair of commercial motor vehicles where the *fire area* exceeds 5,000 square feet (464 m²).
5. A Group S-1 fire area used for the repair of vehicles powered by lithium-ion or lithium metal batteries that exceeds 500 square feet (46.4 m²).

2021 International Building Code

CHAPTER 9 FIRE PROTECTION AND LIFE SAFETY SYSTEMS

SECTION 903 AUTOMATIC SPRINKLER SYSTEMS.

[F] **903.1 General.** *Automatic sprinkler systems* shall comply with this section.

Revise as follows:

903.2.2 Group B. An automatic sprinkler system shall be provided for Group B occupancies as follows:

[F] **903.2.2.1 903.2.2 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*.
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 as well as all floors below where such care is provided, and all floors between the level of ambulatory care and the nearest *level of exit discharge*, 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.

903.2.2.2 Laboratories; testing, research and development. An automatic sprinkler system shall be installed throughout the fire areas utilized for the research and development or testing of lithium-ion or lithium metal batteries.

[F] **903.2.4 Group F-1.** An *automatic sprinkler system* shall be provided throughout all buildings containing a Group F-1 occupancy where one of the following conditions exists:

1. A Group F-1 *fire area* exceeds 12,000 square feet (1115 m²).
2. A Group F-1 *fire area* is located more than three stories above *grade plane*.
3. The combined area of all Group F-1 *fire areas* on all floors, including any *mezzanines*, exceeds 24,000 square feet (2230 m²).
4. A Group F-1 occupancy used to manufacture lithium-ion or lithium metal batteries.
5. A Group F-1 occupancy used to manufacture vehicles, energy storage system or equipment containing lithium-ion or lithium metal batteries.

[F] **903.2.7 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).

Revise as follows:

903.2.7.3 Lithium-ion or lithium metal battery storage. An automatic sprinkler system shall be provided in a room or space within a Group M occupancy where required for the storage of lithium-ion or lithium metal batteries by Section 322 or Chapter 32 of the International Fire Code.

[F] 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 fire area used for the storage of lithium-ion or lithium metal powered vehicles where the fire area exceeds 500 square feet (46.4 m²).

[F] 903.2.9.1 Repair garages. *An automatic sprinkler system shall be provided throughout all buildings used as repair garages in accordance with Section 406, as shown:*

1. Buildings having two or more *stories above grade plane*, including basements, with a *fire area* containing a *repair garage* exceeding 10,000 square feet (929 m²).
2. Buildings not more than one *story above grade plane*, with a *fire area* containing a *repair garage* exceeding 12,000 square feet (1115 m²).
3. Buildings with *repair garages* servicing vehicles parked in basements.
4. A Group S-1 *fire area* used for the repair of commercial motor vehicles where the *fire area* exceeds 5,000 square feet (464 m²).
5. A Group S-1 fire area used for the repair of vehicles powered by lithium-ion or lithium metal batteries that exceeds 500 square feet (46.4 m²).

Staff Analysis: Note that several proposed sections refer to proposed Section 322 within proposal F25-21.

Reason Statement: Over the last few cycles there have been a series of proposals dealing with energy storage systems that have highlighted the fire potential presented by lithium-ion and lithium metal batteries. Systems as small as 21 kWh would require the installation of an automatic sprinkler system. However, we have yet to fill in the blanks concerning these batteries in other occupancies and activities where there is a similar or greater potential for a fire event. This cycle there are additional topics covered by submittals such as battery collection and storage, personal mobility devices and emergency action plans.

To safely and effectively deal with the potential fire involving a thermal runaway involving a lithium-ion or lithium metal battery requires early detection, a mitigation plan and suppression. This proposal is to cover the suppression side of the equation.

903.2.2 is modified to cover Group B as a topic, the ambulatory care language is just renumbered.

903.2.2.2 is intended to capture testing, research and development activities where there can be an increased risk of thermal runaway and where in some cases it is intentional caused.

903.3.2.4 Item 4 captures the manufacture of the batteries; Item 5 captures the manufacture of vehicles, ESS and equipment where the battery is installed as part of the manufacturing process.

903.2.7.3 is a coordinating pointer where an M Group occupancy would require suppression based upon proposed Section 322 and currently by Chapter 32.

903.2.9 Item 5 captures the storage of battery powered vehicles. The 500 square foot correlates with the threshold above which Chapter 32 would require suppression for just lithium-ion battery storage.

903.2.9.1 Item 5 captures areas used to repair battery powered vehicles. The same 500 square foot threshold is used here.

Cost Impact: The code change proposal will increase the cost of construction

On a straight forward analysis this series of changes increases the cost construction. However, the majority of facilities involved in these activities do have suppression and any new construction of this nature includes suppression. Balanced against the cost of a fire that can not be extinguished routinely the installation of the suppression is ultimately a savings.

F67-21

IFC: 903.2.8.3; IBC: [F] 903.2.8.3

Proponents: Jeffrey Shapiro, representing Self (jeff.shapiro@intlcodeconsultants.com)

2021 International Fire Code

Delete without substitution:

~~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.~~

2021 International Building Code

Delete without substitution:

~~[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.~~

Reason Statement: These sections are unnecessary and are out of place. Group R4, Division 2 occupancies would default to NFPA 13R systems under Section 903.3.1.2, so there's no need to say that NFPA 13R systems are "permitted" in Section 903.2.8.3. Note that all of the subsections in 903.2.8 other than this one allow the use of NFPA 13D systems per Section 903.3.1.3. That is appropriate and necessary because this is the basis for getting some Group R occupancies out of NFPA 13R and into NFPA 13D. The Group R4, Division 2 provision is different in that it essentially "permits" what is otherwise already allowed. Although I am a consultant to NFSA, this proposal is submitted on my own behalf.

Cost Impact: The code change proposal will not increase or decrease the cost of construction Editorial. This change does not impact application of the code.

F67-21

F68-21

IFC: 903.2.10, 903.2.11.3; IBC: [F] 903.2.10, [F] 903.2.11.3

Proponents: Steve Skalko, Stephen V. Skalko P.E. & Associates LLC, representing Precast Concrete Institute (svskalko@svskalko-pe.com); Edith Smith, representing PCI (esmith@pci.org)

2021 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 where ~~any~~ either of the following conditions exist:

1. Where the *fire area* of the enclosed parking garage, in accordance with Section 406.6 of the *International Building Code*, exceeds 12,000 square feet (1115 m²).
2. Where the enclosed parking garage, in accordance with Section 406.6 of the *International Building Code*, is located beneath other groups.

Exception: Enclosed parking garages located beneath Group R-3 occupancies.

3. ~~Where the *fire area* of the open parking garage, in accordance with Section 406.5 of the *International Building Code*, exceeds 48,000 square feet (4460 m²).~~

903.2.11.3 Buildings 55 feet or more in height. An automatic sprinkler system shall be installed throughout buildings that have one or more stories with an *occupant load* of 30 or more located 55 feet (16 764 mm) or more above the lowest level of fire department vehicle access, measured to the finished floor.

ExceptionExceptions:

1. Occupancies in Group F-2.
2. Open parking garages

2021 International Building Code

Revise as follows:

[F] 903.2.10 Group S-2 enclosed parking garages. An automatic sprinkler system shall be provided throughout buildings classified as enclosed parking garages where ~~any~~ either of the following conditions exists:

1. Where the fire area of the enclosed parking garage in accordance with Section 406.6 exceeds 12,000 square feet (1115 m²).
2. Where the enclosed parking garage in accordance with Section 406.6 is located beneath other groups.

Exception: Enclosed parking garages located beneath Group R-3 occupancies.

3. ~~Where the *fire area* of the open parking garage in accordance with Section 406.5 exceeds 48,000 square feet (4460 m²).~~

[F] 903.2.11.3 Buildings 55 feet or more in height. An automatic sprinkler system shall be installed throughout buildings that have one or more stories with an *occupant load* of 30 or more located 55 feet (16 764 mm) or more above the lowest level of fire department vehicle access, measured to the finished floor.

Exception Exceptions:

1. Occupancies in Group F-2.
2. Open parking garages

Reason Statement: Code change F110-18 that modified Section 903.2.10 of the International Fire Code (and International Building Code) to require sprinkler protection in open parking garages was based on a single fire incident that occurred in the UK in January, 2018. All the details of this incident were not known at the time of the 2018 Code Action Hearing (CAH). However, upon review of the final report by the Merseyside Fire and Rescue Service (MFRS), the parking garage in question, referred to as a car park in the UK, had design features that likely contributed to fire spread between floors resulting in a far larger number of vehicles becoming involved than typical for vehicle fire incidences [Merseyside Fire Rescue Service, *Kings Dock Car Park Fire Protection Report*, April 2018, Merseyside, UK].

The following are two of the most notable differences of these design features contributing to the spread of fire in the UK car park incident:

1. The car park had a light gauge aluminum drainage tray attached to the underside of each precast floor panel and in line with the joint of the precast floor system. The trays led to plastic vertical piping to transfer liquids to the building storm water drainage system. The design called for a 1/2-inch gap between floor panels to permit drainage into the aluminum tray below. This gap in the floor joints allowed burning fuel spills from vehicle gas tanks to flow into the aluminum tray, which has a low melting point, thus allowing the spill to continue directly to floors below and spread fire to vehicles on lower floors.
 - o In the United States the floor joints are not commonly left open. They are typically sealed by a combination backer rod and sealant or covered by the placement of a concrete topping with tooled and sealed joints. This not only minimizes spread of fire by leaking fuels to floors below, but also inhibits the spread of flames from the incident floor to vehicles on floors above.
2. The building code requirements in the UK permitted only a 15-minutes structural fire resistance of the precast concrete floors for the Kings Dock car park. The fire exposure from the initial vehicle (and subsequent vehicles) damaged the underside of the floor panels above sufficient enough to permit the fire to extend upward to vehicles on the next parking level.
 - o In the US the typical precast floor systems in open parking garages meet at least a minimum of a 1-hour fire resistance, which increases significantly the ability to prevent fire spread between floors.

Further, data on fire incidences in the United States show that fires in open parking garages are very low. The US Fire Administration statistics show an average of over 1.7 million fires for the period from 1999 to 2002 [FA-311, *Fire in the United States 1994-2004*, 14th edition, August 2007] . When compared to the 1760 average total parking garage fires described in an NFPA study of parking garage fires [M. Ahrens, *Structure and Vehicle Fires in General Vehicle Parking Garages*, NFPA, January 2006], the parking garage fires represent less than 0.1% of the fire incidences.

F110-18 also cited changing material composition in vehicles increases risk of fire incidences. Fire experience in the United States, as noted above, does not support this premise. In fact, one of the conclusions in a recent study of fire incidences in parking structures funded by the National Fire Protection Association Research Foundation [*Modern Vehicle Hazards in Parking Structures and Vehicle Carriers*, July 2020], states “*Though fires in vehicles are not uncommon, large fires in parking structures are fairly rare*”. The study also noted most of the recent fire incidences “*have not involved any human fatalities and few injuries*”. Improvements to fire safety requirements in the International Building Code in the last decade have focused on life safety, which usually includes requiring sprinkler protection. However, the NFPA-RF Study affirms that life safety in open parking garages, both in terms of injuries and fatalities, is not an issue. Other factors cited in F110-18 include the increased use stored energy systems in vehicles (i.e., electric vehicles). No doubt electric vehicles are on the rise, albeit somewhat slowly. The most common electric vehicles use lithium-ion batteries as their source of power. The risk of fire from these batteries is when a thermal runaway of the battery cells occurs. Though there have been isolated incidences of thermal runaway in lithium-ion batteries with no apparent cause, most instances of thermal runaway occurrences happen in vehicles related to damage when the vehicle is involved in an accident. The NFPA-RF study points out that “*lithium-ion batteries are more difficult to extinguish than gasoline or diesel fires, requiring large amounts of water to fully contain and mitigate the hazard*”. This raises questions, even with increased electric vehicle use, whether adding sprinklers is an effective measure since the sprinkler protection will not deliver large quantities of water to the seat of the battery fire. As a side note, the move to electric vehicles reduces the risk of fire spread from liquid fuels in vehicle gas tanks.

Based on the information above the requirement for mandatory sprinkler protection in open parking garages should be removed from the IFC. It imposes an unnecessary and unwarranted cost to the owners both in terms of installation as well as long term maintenance of the system. This is especially compounded in colder climates subject to freezing where dry pipe systems will be required.

Cost Impact: The code change proposal will decrease the cost of construction

The net effect of this code change proposal will be to decrease the cost of construction by eliminating an unnecessary and unwarranted expense for the cost to install a sprinkler protection system.

F69-21

IFC: 202 (New), SECTION 322 (New), 322.1 (New), 903.2.11.6 (New), 322.2 (New); IBC: 202 (New), [F] 903.2.11.6 (New)

Proponents: Andrew Bevis, representing National Fire Sprinkler Association (bevis.andrew1988@gmail.com); Jeffrey Hugo, representing NFSA (hugo@nfsa.org); Joe Scibetta, representing BuildingReports (jscibetta@buildingreports.com)

2021 International Fire Code

Add new definition as follows:

ANIMAL HOUSING FACILITY. Area of a building or structure, including interior and adjacent exterior spaces, where animals are fed, rested, worked, exercised, treated, exhibited, or used for production. Such facilities include but are not limited to barns and stables; kennels; animal shelters; animal hospitals and veterinary facilities; zoos; laboratories; agricultural facilities housing animals; and mercantile or business occupancies with animals.

Add new text as follows:

SECTION 322 ANIMAL HOUSING FACILITIES.

322.1 Sources of Ignition. Smoking or the use of heating or other devices employing an open flame, or the use of spark-producing equipment is prohibited in all areas of an animal housing facility, including agricultural buildings housing livestock or poultry.

903.2.11.6 Animal housing facilities. An automatic sprinkler system in accordance with Section 903.3 shall be provided throughout animal housing facilities that contain Group R occupancies or where occupants are expected to delay their emergency egress to care for animals.

322.2 Waste Housekeeping. Permanent storage of waste shall be prohibited in aisles, hallways, or other types of egress components.

2021 International Building Code

Add new definition as follows:

ANIMAL HOUSING FACILITY. Area of a building or structure, including interior and adjacent exterior spaces, where animals are fed, rested, worked, exercised, treated, exhibited, or used for production. Such facilities include but are not limited to barns and stables; kennels; animal shelters; animal hospitals and veterinary facilities; zoos; laboratories; agricultural facilities housing animals; and mercantile or business occupancies with animals.

Add new text as follows:

[F] 903.2.11.6 Animal housing facilities. An automatic sprinkler system in accordance with Section 903.3 shall be provided throughout animal housing facilities that contain Group R occupancies or where occupants are expected to delay their emergency egress to care for animals.

Reason Statement: This proposal does two things: it addresses a special type of occupancy that is not covered by IBC or IFC by providing a definition of animal housing and it addresses when residential occupancies are mixed with animal housing facilities. It is important for the IBC to recognize the special operations that take place in these unique facilities, where a secondary population is wholly reliant on a primary population for the necessary, prompt attention required during a fire emergency. Additionally, this proposal addresses the concerns of the code committee from the previous cycle. Further clarification is provided within the definition of what type of facilities are considered animal housing facilities. This proposal's main goal is to make the protection of human occupant's paramount, i.e., where residential dwelling or sleeping units are part of the animal housing facility. It also addresses the concern from the committee that the protection of occupant's lives was secondary. The model codes currently do not adequately address facilities in which people may delay evacuation for the care of animals.

Many states exempt agricultural buildings and is often and traditionally lumped in with "animal housing". A lot of jurisdictions and residents unconsciously do not get permits or inquire about construction codes because of being classified as an agricultural community. The addition of a dwelling unit to a barn, stable, or veterinary office triggers permits and automatic fire sprinkler systems.

Fire data indicates that 98% of civilian injuries in livestock or poultry storage properties were due to structure fires. While 64% of those fires were caused by heating equipment and electrical distribution and lighting equipment. Fires within livestock production properties, 84% of civilian injuries were due to structure fires. While 53% of those fires were caused by heating equipment and electrical distribution and lighting equipment.

Fire sprinklers are installed in some animal housing facilities and have a significant impact saving lives and property. The McKinney, TX Fire Department responded to an incident at The Collin County Animal Shelter. First responders upon arrival noted the fire alarm was sounding and strobes activated. The investigation revealed the fire sprinkler system had activated and extinguished the fire within the shelter. A single sprinkler is credited for the minimal fire damage and reinforced the value of fire sprinkler systems. Shelter staff reported no injuries to the 124 sheltered animals. "This successful sprinkler save continues to demonstrate the effectiveness of automatic fire sprinkler systems in a commercial environment. Had a fire sprinkler system not been present, the outcome may have been very different," said Deputy Fire Marshal Andrew Barr.

Another fire occurred in the Sea Life Center's avian curatorial on the second floor of the facility. Firefighters saw smoke coming from the building upon arrival and discovered that the fire sprinkler system had already extinguished what was believed to have been a small electrical fire. No staff or other animals were injured in the fire.

Cost Impact: The code change proposal will increase the cost of construction

The change may increase the cost of construction due to the increased level of life safety for the occupants.

F69-21

F70-21

IFC: 903.3.1.1.1; IBC: [F] 903.3.1.1.1

Proponents: Andrew Bevis, National Fire Sprinkler Association, representing National Fire Sprinkler Association (bevis@nfsa.org); Jeffrey Hugo, representing NFSA (hugo@nfsa.org)

2021 International Fire Code

Revise as follows:

903.3.1.1.1 Exempt locations. Automatic sprinklers 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. Sprinklers 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. 1. A room or space where sprinklers are considered undesirable because of the nature of the contents and constitutes a serious life or fire hazard, where *approved* by the fire code official.
3. 2. 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. 3. Rooms or areas that are of noncombustible construction with wholly noncombustible contents.
5. 4. Fire service access elevator machine rooms and machinery spaces.
6. 5. Machine rooms, machinery spaces, control rooms and control spaces associated with occupant evacuation elevators designed in accordance with Section 3008 of the International Building Code.

2021 International Building Code

Revise as follows:

[F] 903.3.1.1.1 Exempt locations. Automatic sprinklers 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. Sprinklers 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. 1. A room or space where sprinklers are considered undesirable because of the nature of the contents and constitutes a serious life or fire hazard, where *approved* by the fire code official.
3. 2. 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. 3. Rooms or areas that are of noncombustible construction with wholly noncombustible contents.
5. 4. Fire service access elevator machine rooms and machinery spaces.
6. 5. Machine rooms, machinery spaces, control rooms and control spaces associated with occupant evacuation elevators designed in accordance with Section 3008.

Reason Statement: This is an editorial change to the omitted sprinkler locations. The first two locations were essentially the same locations and caused confusion among authorities having jurisdiction. This simplifies the section and clarifies the allowable omissible locations.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is already a requirement and is an editorial clarification.

F70-21

F71-21

IFC: CHAPTER 9, SECTION 903, 903.1, 903.3.1.1, 903.3.1.1.3 (New); IBC: CHAPTER 9, SECTION 903, [F] 903.1, [F] 903.3.1.1, [F] 903.3.1.1.3 (New)

Proponents: Robert J Davidson, Davidson Code Concepts, LLC, representing Tesla, USA (rjd@davidsoncodeconcepts.com)

2021 International Fire Code

CHAPTER 9 FIRE PROTECTION AND LIFE SAFETY SYSTEMS

SECTION 903 AUTOMATIC SPRINKLER SYSTEMS.

903.1 General. *Automatic sprinkler systems* shall comply with this section.

903.3.1.1 NFPA 13 sprinkler systems. Where the provisions of this code require that a building or portion thereof be equipped throughout with an *automatic sprinkler system* in accordance with this section, sprinklers shall be installed throughout in accordance with NFPA 13 except as provided in Sections 903.3.1.1.1 and 903.3.1.1.2.

Add new text as follows:

903.3.1.1.3 Lithium-ion or lithium metal batteries. Where sprinkler protection is required by this code for areas containing lithium-ion or lithium metal batteries, the design of the system shall be based upon a series of fire tests conducted or witnessed and reported by an approved testing laboratory involving test scenarios that address the range of variables associated with the intended arrangement of the hazards to be protected.

2021 International Building Code

CHAPTER 9 FIRE PROTECTION AND LIFE SAFETY SYSTEMS

SECTION 903 AUTOMATIC SPRINKLER SYSTEMS.

[F] 903.1 General. *Automatic sprinkler systems* shall comply with this section.

[F] 903.3.1.1 NFPA 13 sprinkler systems. Where the provisions of this code require that a building or portion thereof be equipped throughout with an *automatic sprinkler system* in accordance with this section, sprinklers shall be installed throughout in accordance with NFPA 13 except as provided in Sections 903.3.1.1.1 and 903.3.1.1.2.

Add new text as follows:

[F] 903.3.1.1.3 Lithium-ion or lithium metal batteries. Where sprinkler protection is required by this code for areas containing lithium-ion or lithium metal batteries, the design of the system shall be based upon a series of fire tests conducted or witnessed and reported by an approved testing laboratory involving test scenarios that address the range of variables associated with the intended arrangement of the hazards to be protected.

Reason Statement: For the past few code cycles the IFC and IBC have been upgraded to address the potential fire event from lithium-ion and lithium metal batteries. This cycle there are additional proposals to cover battery storage, personal mobility devices, manufacturing and more. Automatic sprinkler systems are relied upon for fire protection. In the case of ESS the design of the sprinkler system is based upon a large scale fire testing at an approved laboratory because there was recognition that currently there is no guidance in NFPA 13. The same lack of guidance exists for any situation involving lithium-ion or lithium metal batteries. In the commodity classification portion of NFPA 13-2019 this issue is highlighted by "Table A.20.4(a) Examples of Commodities Not Addressed by Classifications in Section 20.4" which specifically lists lithium-ion and lithium metal batteries.

The recognition of the need for the submitted design to be based upon witnessed fire tests is missed by code officials as often as it is by designers and installers. The purpose of this new language is to provide important guidance to ensure that the submitted design is documented to be able to address the potential for a high heat release event.

Table A.20.4(a) Examples of Commodities Not Addressed by Classifications in Section 20.4

Ammunition Components
- Bulk primers and powder
Batteries
- Lithium and other similar exotic metals
- Lithium-ion and other rechargeable batteries that contain combustible electrolyte
Boat Storage
- Stored on racks
Boxes, Crates
- Empty, wood slatted*
Carpet Rolls
Combustible Metals — unless specifically identified otherwise
Compressed or Liquefied Flammable Gases (i.e., filled propane cylinders) — unless specifically identified otherwise
Explosives
- Blasting primers and similar items
Fertilizers (nitrates)
Fireworks
- Consumer and display
Flammable and Combustible Liquids — unless specifically identified otherwise
- Liquids that contain greater than 20 percent alcohol
Hanging Garments, Bulk Storage
Lighters (butane)
- Loose in large containers (Level 3 aerosol)
Storage Container
- Large container storage of household goods

*Should be treated as idle pallets.

Bibliography: NFPA 13-2019 "Table A.20.4(a) Examples of Commodities Not Addressed by Classifications in Section 20.4"

Cost Impact: The code change proposal will not increase or decrease the cost of construction

In reality, this should be occurring now based upon the IFC/IBC use of NFPA 13 as the standard. In that case there would be no increase in cost. But for those designers, installers and property owners that were not aware of this issue there could be an increased cost for the necessary compliance.

F72-21

IFC: 903.3.1.2; IBC: [F] 903.3.1.2

Proponents: Andrew Bevis, National Fire Sprinkler Association, representing National Fire Sprinkler Association; Jeffrey Hugo, representing NFSA (hugo@nfsa.org); Paula Cino, representing National Multifamily Housing Council (pcino@nmhc.org); Dan Buuck, National Association of Home Builders, representing National Association of Home Builders (dbuuck@nahb.org); Margo Thompson, Newport Ventures, representing National Multifamily Housing Council (mthompson@newportventures.net)

2021 International Fire Code

Revise as follows:

903.3.1.2 NFPA 13R sprinkler systems. *Automatic sprinkler systems* in Group R occupancies shall be permitted to be installed throughout in accordance with NFPA 13R where the Group R occupancy meets all of the following conditions:

1. Four stories or less above *grade plane*.
2. The floor level of the highest story is ~~30~~ 35 feet (~~9144~~ 10668 mm) or less above the lowest level of fire department vehicle access.
3. The floor level of the lowest story is ~~30~~ 35 feet (~~9144~~ 10668 mm) or less below the lowest level of fire department vehicle access.

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 *grade plane*.

2021 International Building Code

Revise as follows:

[F] 903.3.1.2 NFPA 13R sprinkler systems. *Automatic sprinkler systems* in Group R occupancies shall be permitted to be installed throughout in accordance with NFPA 13R where the Group R occupancy meets all of the following conditions:

1. Four stories or fewer above *grade plane*.
2. The floor level of the highest *story* is ~~30~~ 35 feet (~~9144~~ 10668 mm) or less above the lowest level of fire department vehicle access.
3. The floor level of the lowest *story* is ~~30~~ 35 feet (~~9144~~ 10668 mm) or less below the lowest level of fire department vehicle access.

The number of stories of Group R occupancies constructed in accordance with Sections 510.2 and 510.4 shall be measured from grade plane.

Reason Statement: During the previous code development cycle, an issue of significant concern was rectified with respect to NFPA 13R sprinklers in Group R occupancies in podium-style buildings and allowance for as many as four stories up to 60' in height above grade to be constructed on top of the horizontal building separation. However, while continuing to allow for NFPA 13R systems in four story Group R occupancies, the height limit from fire department vehicle access to the floor level of the highest story was changed to only 30'. In most cases, this height limit will not allow for NFPA 13R sprinklers in a four-story apartment building.

According to feedback from contractors, developers, and design professionals, typical height of floor assembly framing in multifamily buildings is slightly less than twelve inches. A four-story apartment building with 8'-6" ceiling heights and the necessary 8" to 12" foundation exposure above grade, would exceed this 30' limit. Likewise, a very common mixed use building type of three stories of residential occupancy above ground level retail space would also exceed the 30' limit. The current 30' limit is at the very low end of fourth-story floor level height and offers little flexibility for floor-to-ceiling heights greater than 8'-0". With the current 30' limitation, NFPA 13R sprinkler systems are essentially limited to three-story buildings: The NFPA 13R standard was specifically created to permit these systems in buildings up to four stories. This proposal will allow the use of NFPA 13R sprinkler systems as envisioned by the standard.

It is also important to understand that the floor level measurement is not taken from the grade adjacent to the building but from the lowest level of fire department vehicle access, which can be up to 150 feet away. The difference in elevation over that distance can be significant, further limiting the number of buildings which can meet this section. Below is an example of a 4-story multifamily building. The 4th floor is at a height of 32' above grade. However, the dimension used as the threshold for a 13R system increases where the lowest level of fire department vehicle access is below the level of grade at the building.



The dimension of 35' was selected as the limit because it allows more flexibility for building design and floor-to-ceiling height while still remaining well within the 75' reach of typical fire truck ladders. It is also significantly lower than the 60' height limit which had been in place prior to the code change in 2021.

NFPA 13R systems have been extremely effective in protecting human lives as well as preventing significant property damage from fire in low-rise residential buildings since the NFPA 13R Standard was first published in 1989. A 2016 issue of the NFPA Journal published the findings of a workshop attended by subject matter experts that focused on the adequacy of 13R sprinklers. Overarching conclusions were 1) that major fires in 13R-protected buildings were the exception – not the rule and 2) that there was not sufficient evidence to indicate that 13R sprinklers have not been effective in protecting human life and reducing property damage. To quote the June 2016 NFPA Report describing the outcomes of the workshop:

- *"NFPA 13R/13D are effective standards that reduces loss of life and building damage due to a fire event."*
- *"To consider or make any changes to NFPA 13R/13D, better (more refined) data needs to be identified as well as collected on a consistent basis. A national database that describes fire events with information on building type/codes would assist in making intelligent changes to any sprinkler standards."*

Essentially limiting the use of NFPA 13R sprinkler systems to Group R buildings three-stories or less does not recognize other significant changes in the codes in recent cycles that offer increased fire protection. Furthermore, there may be some unintended consequences with respect to the current language. Recent cycles have seen changes such as sprinkler requirements for balconies in buildings where 13R sprinklers are used, increased attic protection if it is not sprinklered such as construction of the attic using fire retardant wood or non-combustible materials, and the recent 2021 requirement for special inspections of sealing fire penetrations and draft stopping. All of these ancillary provisions have increased fire protection and stringency of the fire code. Furthermore, by reducing the use of NFPA 13R systems in R-2 occupancies, requirements for sprinkler protection of balconies in these buildings have also been reduced – historically, an issue of significant concern. By extending requirements for NFPA 13 sprinklers in R-2 occupancies, sprinkler requirements for balconies are fewer or non-existent when compared to the absolute mandate of sprinklers on balconies for NFPA 13R systems through the IBC.

Census data reports that of the 13,000 multifamily buildings completed in 2019, more than 10,000 (77%) of these buildings were four stories or less. By reducing the percentage of multifamily buildings where NFPA 13R sprinklers are permitted, the code language as it currently stands will significantly impact housing affordability. The National Multifamily Housing Council estimates that moving from NFPA 13R to NFPA 13 sprinkler systems would carry an incremental installed cost increase of approximately \$1.00/sq. ft. to \$2.00/sq. ft. of overall building area on average across the US.

NFPA 13R sprinklers are a very effective means of assuring life safety and property protection in Group R buildings four stories and less while maintaining housing affordability. An increase in height to 35' above or below the lowest level of fire department vehicle access is reasonable and modest and can easily be reached by the typical fire truck ladder. This proposal recognizes the long-standing effectiveness of 13R life safety systems, which have been allowed since the early years of the I-codes as well as the legacy codes.

Cost Impact: The code change proposal will decrease the cost of construction

Costs associated with requirements for attic protection in NFPA 13 systems not only includes the additional sprinklers and piping but also costs associated with increased hydraulic demand and water supply as well as necessary freeze protection in cold and even moderate climates. Greater density and spacing of sprinklers, larger pipe diameter, sprinklers in concealed spaces, and especially, requirements for attic protection (with some exceptions) all contribute to the added cost. This cost increase does not include the final cost with markup to the building owner or the potential need to add a fire pump in the NFPA 13 system. Moving from a 13R system to a 13 system for a \$9,342,688, four-story, 48-unit apartment building increased construction costs by \$102,255 or a little over \$2,100/unit. (Home Innovation Research Labs, *Cost Analysis of Proposed Group A Code Changes (2018-2019 ICC Code Development Cycle)* – October 2018). This would have a substantial impact on both tenant rental rates and owner-occupied units. The detailed cost analysis is shown below.

Four-Story Building on Grade, 48 Units & Common Areas



[ELEVATION]

Table F117-A. Cost of NFPA 13 Sprinkler System Compared to NFPA 13R System

Component	Unit	Material	Labor	Total	w/O&P	Qty	Cost
Residential sprinkler heads	EA	16	21.50	37.5	53	292	15,476
3/4" diameter CPVC piping (NFPA 13R)	LF	7	6.90	13.9	19.05	4292	81,763
Wet standpipe riser, schedule 20, 4" diameter pipe	FL	5800	2875	--	8675	4	34,700
Total NFPA 13R System							131,939
Additional sprinkler heads (attic)	EA	16	21.50	37.5	53	44	2,332
Additional sprinkler heads (non-exempt bathrooms)	EA	16	21.50	37.5	53	2	106
3/4" diameter CPVC piping (NFPA 13R)	LF	7	6.90	13.9	19.05	(4292)	(81,763)
1-1/2" CPVC piping (NFPA 13)	LF	18.55	9.75	28.3	36.50	4292	156,658
Additional 1-1/2" CPVC piping for new sprinkler heads (NFPA 13)	LF	18.55	9.75	28.3	36.50	618	22,557
Additional floor, wet standpipe riser, schedule 20, 4" diameter pipe	FL	1475	890	--	2365	1	2,365
Total NFPA 13 System							234,194
Total to Builder							102,255

F72-21

F73-21

IFC: 903.4.2; IBC: [F] 903.4.2

Proponents: Chase Browning, representing Medford Fire Department

2021 International Fire Code

Revise as follows:

903.4.2 Alarms. For *automatic sprinkler systems* installed in accordance with Section 903.3.1.1 or 903.3.1.2, ~~A~~ an approved audible device, located on the exterior of the building in an *approved* location, shall be connected to each *automatic sprinkler system*. Such sprinkler waterflow alarm devices shall be activated by water flow equivalent to the flow of a single sprinkler of the smallest orifice size installed in the system. Where a fire alarm system is installed, actuation of the *automatic sprinkler system* shall actuate the building fire alarm system.

2021 International Building Code

Revise as follows:

[F] 903.4.2 Alarms. For *automatic sprinkler systems* installed in accordance with Section 903.3.1.1 or 903.3.1.2, ~~A~~ an approved audible device, located on the exterior of the building in an approved location, shall be connected to each *automatic sprinkler system*. Such sprinkler waterflow alarm devices shall be activated by water flow equivalent to the flow of a single sprinkler of the smallest orifice size installed in the system. Where a fire alarm system is installed, actuation of the *automatic sprinkler system* shall actuate the building fire alarm system.

Reason Statement: It is appropriate to provide an audible alarm for NFPA 13 and NFPA 13R systems, however, NFPA 13D (903.3.1.3) does not require such a device.

Cost Impact: The code change proposal will decrease the cost of construction
Not including the exterior bell will reduce costs.

F73-21

F74-21

IFC: 903.4.2; IBC: [F] 903.4.2

Proponents: Michael O'Brian, representing Self (mobrian@codesavvyconsultants.com); Richard Boisvert, Michigan Fire Inspectors Society, representing Michigan Fire Inspectors Society (rboisvert@brightonareafire.com)

2021 International Fire Code

Revise as follows:

903.4.2 Alarms. An *approved* audible and visual device, located on the exterior of the building in an *approved* location, shall be connected to each *automatic sprinkler system*. Such sprinkler water flow alarm devices shall be activated by water flow equivalent to the flow of a single sprinkler of the smallest orifice size installed in the system. The exterior audible and visual device shall be powered by the fire alarm control unit or fire alarm system. Where a fire alarm system is installed, actuation of the automatic sprinkler system shall actuate the building fire alarm system.

2021 International Building Code

Revise as follows:

[F] 903.4.2 Alarms. An approved audible and visual device, located on the exterior of the building in an approved location, shall be connected to each *automatic sprinkler system*. Such sprinkler waterflow alarm devices shall be activated by water flow equivalent to the flow of a single sprinkler of the smallest orifice size installed in the system. The exterior audible and visual device shall be powered by the fire alarm control unit or fire alarm system. Where a fire alarm system is installed, actuation of the *automatic sprinkler system* shall actuate the building fire alarm system.

Reason Statement: Fire Code Officials have long found that the exterior device is not properly maintained and have changed the exterior bell to a audio/visual device. This code change does two things. The first is to update the external alarm device to be an AV Device. This device is a weather proof Horn/Strobe device that is common on many fire alarm and sprinkler system. This proposal also adds that the device is powered by the Fire Alarm System or Fire Alarm Control Unit (When required by IFC 903.4).

Most automatic fire sprinkler systems are required to be monitored and have the ability to include an exterior horn/strobe or similar device located in an approved location. By adding this requirement, we truly increase the ability of system maintenance for the life of the building. In directly this proposal:

1. Removes the need for an electrician to wire the new exterior bell which is many times powered by 110v.
2. Adding the device to the fire alarm system as required by 903.4 or 907, creates a system which will be maintained on a regular basis.
3. The added visual component, can aid in the location of exterior features such as the FDC and alert others to a water flow alarm.

This proposal does not add alarm system requirements as found by IFC/IBC 907.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The existing exterior bell and the cost of the audible/visual notification device have similar cost comparisons.

F74-21

F75-21 Part I

PART I IFC: 315.3.1, TABLE 903.2.5.2, 903.3.1, 903.4, [BE] TABLE 1006.2.1, [BE] TABLE 1017.2, [BE]TABLE 1020.2, 1103.4.1, 1103.5.4, 2703.10.4.4.1, 3204.2, 3206.10.1.1, 3303.3, 3501.3, TABLE 5104.3.2, E103.1.5, 903.5; **IBC:** 410.5.3.2, [F] 415.11.12.3, 901.4, [F] 903.2.5.2, TABLE 903.2.5.2, TABLE 903.2.11.6, [F] 903.3.1, [F] 903.5, [F] 909.6.1, TABLE 1006.2.1, TABLE 1017.2, 3007.2.2, [BF] 1705.15

PART II IRC: P2904.1, P2904.3.4, P2904.4.2, P2904.7, P2904.8.1

Proponents: Andrew Bevis, National Fire Sprinkler Association, representing National Fire Sprinkler Association (bevis@nfsa.org); Jeffrey Hugo, NFSA, representing NFSA (hugo@nfsa.org)

THIS IS A TWO PART CODE CHANGE. PART 1 OF THIS PROPOSAL WILL BE HEARD BY THE FIRE CODE COMMITTEE AND PART 2 OF THIS PROPOSAL WILL BE HEARD BY THE INTERNATIONAL RESIDENTIAL CODE PLUMBING AND MECHANICAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Fire Code

Revise as follows:

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.

Exceptions:

1. The 2-foot (610 mm) ceiling clearance is not required for storage along walls in nonsprinklered areas of buildings.
2. The 18-inch (457 mm) ceiling clearance is not required for storage along walls in areas of buildings equipped with an *automatic sprinkler system* in accordance with Section 903.3.1.1, 903.3.1.2 or 903.3.1.3.

TABLE 903.2.5.2
GROUP H-5 AUTOMATIC SPRINKLER SYSTEM DESIGN CRITERIA

LOCATION	OCCUPANCY HAZARD CLASSIFICATION
Fabrication areas	Ordinary Hazard Group 2
Service corridors	Ordinary Hazard Group 2
Storage rooms without dispensing	Ordinary Hazard Group 2
Storage rooms with dispensing	Extra Hazard Group 2
Corridors	Ordinary Hazard Group 2

903.3.1 Standards. Automatic sprinkler systems shall be designed and installed in accordance with Section 903.3.1.1, unless otherwise permitted by Sections 903.3.1.2 and 903.3.1.3 and other chapters of this code, as applicable.

903.4 Automatic Sprinkler system supervision and alarms. Valves controlling the water supply for *automatic sprinkler systems*, pumps, tanks, water levels and temperatures, critical air pressures and waterflow switches on all automatic sprinkler systems shall be electrically supervised by a *listed* fire alarm control unit.

Exceptions:

1. *Automatic sprinkler systems* protecting one- and two-family *dwelling*s.
2. Limited area sprinkler systems in accordance with Section 903.3.8.
3. *Automatic sprinkler systems* installed in accordance with NFPA 13R where a common supply main is used to supply both domestic water and the *automatic sprinkler system*, and a separate shutoff valve for the *automatic sprinkler system* is not provided.
4. Jockey pump control valves that are sealed or locked in the open position.
5. Control valves to commercial kitchen hoods, paint spray booths or dip tanks that are sealed or locked in the open position.
6. Valves controlling the fuel supply to fire pump engines that are sealed or locked in the open position.
7. Trim valves to pressure switches in dry, preaction and deluge sprinkler systems that are sealed or locked in the open position.
8. Underground key or hub gate valves in roadway boxes.

**[BE] TABLE 1006.2.1
SPACES WITH ONE EXIT OR EXIT ACCESS DOORWAY**

OCCUPANCY	MAXIMUM OCCUPANT LOAD OF SPACE	MAXIMUM COMMON PATH OF EGRESS TRAVEL DISTANCE (feet)		
		Without <u>Automatic</u> Sprinkler System (feet)		With <u>Automatic</u> Sprinkler System (feet)
		Occupant Load		
		OL ≤ 30	OL > 30	
A ^c , E, M	49	75	75	75 ^a
B	49	100	75	100 ^a
F	49	75	75	100 ^a
H-1, H-2, H-3	3	NP	NP	25 ^b
H-4, H-5	10	NP	NP	75 ^b
I-1, I-2 ^d , I-4	10	NP	NP	75 ^a
I-3	10	NP	NP	100 ^a
R-1	10	NP	NP	75 ^a
R-2	20	NP	NP	125 ^a
R-3 ^e	20	NP	NP	125 ^{a, g}
R-4 ^e	20	NP	NP	125 ^{a, g}
S ^f	29	100	75	100 ^a
U	49	100	75	75 ^a

For SI: 1 foot = 304.8 mm.

NP = Not Permitted.

- a. Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2. See Section 903 for occupancies where automatic sprinkler systems are permitted in accordance with Section 903.3.1.2
- b. Group H occupancies equipped throughout with an automatic sprinkler system in accordance with Section 903.2.5.
- c. For a room or space used for assembly purposes having fixed seating, see Section 1030.8.
- d. For the travel distance limitations in Group I-2, see Section 407.4 of the International Building Code.
- e. The common path of egress travel distance shall apply only in a Group R-3 occupancy located in a mixed occupancy building or within a Group R-3 or R-4 congregate living facility.
- f. The length of common path of egress travel distance in a Group S-2 open parking garage shall be not more than 100 feet.
- g. For the travel distance limitations in Groups R-3 and R-4 equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.3, see Section 1006.2.2.6.

**[BE] TABLE 1017.2
EXIT ACCESS TRAVEL DISTANCE^a**

OCCUPANCY	WITHOUT <u>AUTOMATIC</u> SPRINKLER SYSTEM (feet)	WITH <u>AUTOMATIC</u> SPRINKLER SYSTEM (feet)
A, E, F-1, M, R, S-1	200	250 ^{b, e}
I-1	Not Permitted	250 ^b
B	200	300 ^c
F-2, S-2, U	300	400 ^c
H-1	Not Permitted	75 ^d
H-2	Not Permitted	100 ^d
H-3	Not Permitted	150 ^d
H-4	Not Permitted	175 ^d
H-5	Not Permitted	200 ^c
I-2, I-3	Not Permitted	200 ^c
I-4	150	200 ^c

For SI: 1 foot = 304.8 mm.

a. See the following sections for modifications to exit access travel distance requirements:

Section 402.8 of the International Building Code: For the distance limitation in malls.

Section 407.4 of the International Building Code: For the distance limitation in Group I-2.

Sections 408.6.1 and 408.8.1 of the International Building Code: For the distance limitations in Group I-3.

Section 411.2 of the International Building Code: For the distance limitation in special amusement areas.

Section 412.6 of the International Building Code: For the distance limitations in aircraft manufacturing facilities.

Section 1006.2.2.2: For the distance limitation in refrigeration machinery rooms.

Section 1006.2.2.3: For the distance limitation in refrigerated rooms and spaces.

Section 1006.3.4: For buildings with one exit.

Section 1017.2.2: For increased distance limitation in Groups F-1 and S-1.

Section 1030.7: For increased limitation in assembly seating.

Section 3103.4 of the International Building Code: For temporary structures.

Section 3104.9 of the International Building Code: For pedestrian walkways.

b. Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2. See Section 903 for occupancies where automatic sprinkler systems are permitted in accordance with Section 903.3.1.2.

c. Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.

d. Group H occupancies equipped throughout with an automatic sprinkler system in accordance with Section 903.2.5.1.

e. Group R-3 and R-4 buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.3. See Section 903.2.8 for occupancies where automatic sprinkler systems are permitted in accordance with Section 903.3.1.3.

**[BE]TABLE 1020.2
CORRIDOR FIRE-RESISTANCE RATING**

OCCUPANCY	OCCUPANT LOAD SERVED BY CORRIDOR	REQUIRED FIRE-RESISTANCE RATING (hours)	
		Without <u>automatic</u> sprinkler system	With <u>automatic</u> sprinkler system
H-1, H-2, H-3	All	Not Permitted	1 ^c
H-4, H-5	Greater than 30	Not Permitted	1 ^c
A, B, E, F, M, S, U	Greater than 30	1	0
R	Greater than 10	Not Permitted	0.5 ^c /1 ^d
I-2 ^a	All	Not Permitted	0
I-1, I-3	All	Not Permitted	1 ^{b, c}
I-4	All	1	0

- a. For requirements for occupancies in Group I-2, see Sections 407.2 and 407.3 of the International Building Code.
- b. For a reduction in the fire-resistance rating for occupancies in Group I-3, see Section 408.8 of the International Building Code.
- c. Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 where allowed.
- d. Group R-3 and R-4 buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.3. See Section 903.2.8 for occupancies where automatic sprinkler systems are permitted in accordance with Section 903.3.1.3.

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 where in compliance with Condition 2.2.1 or 2.2.2.
 - 2.2.1. Glass walls forming a smoke partition shall be permitted where all of the following conditions are met:
 - 2.2.1.1. 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.
 - 2.2.1.2. 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).
 - 2.2.1.3. Windows in the glass wall shall be nonoperating type.
 - 2.2.1.4. 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 automatic sprinkler system operates.
 - 2.2.1.5. The automatic sprinkler system shall be designed so that the entire surface of the glass is wet upon activation of the sprinkler system without obstruction.
 - 2.2.2. A *fire barrier* is not required where a glass-block wall assembly complying with Section 2110 of the International Building Code and having a $\frac{3}{4}$ -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 of the International Building Code.

1103.5.4 High-rise buildings. Where Appendix M has not been adopted, existing high-rise buildings that do not have a previously *approved fire automatic sprinkler system* shall be equipped with an *automatic sprinkler system* in accordance with Section 903.3.1.1 where any of the following conditions apply:

1. The high-rise building has an occupied floor located more than 120 feet (36 576 mm) above the lowest level of fire department vehicle access.
2. The high-rise building has occupied floors located more than 75 feet (22 860 mm) and not more than 120 feet (36 576 mm) above the lowest level of fire department vehicle access, and the building does not have at least two *interior exit stairways* complying with Section 1104.10 that are separated from the building interior by fire assemblies having a *fire-resistance rating* of not less than 2 hours with opening protection in accordance with Table 716.1(2) of the *International Building Code*.
3. The high-rise building has occupied floors located more than 75 feet (22 860 mm) and not more than 120 feet (36 576 mm) above the lowest level of fire department vehicle access, and the building does not have a fire alarm system that includes smoke detection in mechanical equipment, electrical, transformer, telephone equipment and similar rooms; *corridors*; elevator lobbies; and at doors penetrating *interior exit stairway* enclosures. Building owners shall file a compliance schedule with the *fire code official* not later than 365 days after receipt of a written notice. The compliance schedule shall not exceed 12 years for completion of the *automatic sprinkler system* retrofit.

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.

3204.2 Designation based on engineering analysis. The designation of a *high-piled combustible storage* area, or portion thereof, is allowed to be based on a lower hazard class than that of the highest class of commodity stored where a limited quantity of the higher hazard commodity has been demonstrated by engineering analysis to be adequately protected by the *automatic sprinkler system* provided. The engineering analysis shall consider the ability of the *automatic* sprinkler system to deliver the higher density required by the higher hazard commodity. The higher density shall be based on the actual storage height of the pile or rack and the minimum allowable design area for sprinkler operation as set forth in the density/area figures provided in NFPA 13. The contiguous area occupied by the higher hazard commodity shall not exceed 120 square feet (11 m²) and additional areas of higher hazard commodity shall be separated from other such areas by 25 feet (7620 mm) or more. The *automatic* sprinkler system shall be capable of delivering the higher density over a minimum area of 900 square feet (84 m²) for wet pipe systems and 1,200 square feet (111 m²) for dry pipe systems. The shape of the design area shall be in accordance with Section 903.

3206.10.1.1 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.

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

Exceptions:

1. Aisles in *high-piled storage areas* exceeding 2,500 square feet (232 m²) in area, that are open to the public and designated to contain high-hazard commodities, and that are protected by a n *automatic* sprinkler system designed for multiple-row racks of high-hazard commodities, shall be not less than 44 inches (1118 mm) wide.
2. Aisles that are in *high-piled storage areas* exceeding 2,500 square feet (232 m²) in area, not open to the public and protected by a n *automatic* sprinkler system designed for multiple-row racks, shall be not less than 24 inches (610 mm) wide.

3303.3 Daily fire safety inspection. The site safety director shall be responsible for completion of a daily fire safety inspection at the project site. Each day, all building and outdoor areas shall be inspected to ensure compliance with the inspection list in this section. The results of each inspection shall be documented and maintained on-site until a certificate of occupancy has been issued. Documentation shall be immediately available on-site for presentation to the *fire code official* upon request.

1. Any contractors entering the site to perform hot work each day have been instructed in the hot work safety requirements in Chapter 35, and hot work is performed only in areas *approved* by the site safety director.
2. Temporary heating equipment is maintained away from combustible materials in accordance with the equipment manufacturer's instructions.
3. Combustible debris, rubbish and waste material is removed from the building in areas where work is not being performed.
4. Temporary wiring does not have exposed conductors.
5. *Flammable liquids* and other hazardous materials are stored in locations that have been *approved* by the site safety director when not involved in work that is being performed.
6. Fire apparatus access roads required by Section 3311 are maintained clear of obstructions that reduce the width of the usable roadway to less than 20 feet (6096 mm).
7. Fire hydrants are clearly visible from access roads and are not obstructed.

8. The location of fire department connections to standpipe and in-service automatic sprinkler systems are clearly identifiable from the access road and such connections are not obstructed.
9. Standpipe systems are in service and continuous to the highest work floor, as specified in Section 3313.1.
10. Portable fire extinguishers are available in locations required by Sections 3316 and 3318.3.

3501.3 Restricted areas. Hot work shall only be conducted in areas designed or authorized for that purpose by the personnel responsible for a hot work program. Hot work shall not be conducted in the following areas unless approval has been obtained from the *fire code official*:

1. Areas where the automatic sprinkler system is impaired.
2. Areas where there exists the potential of an explosive atmosphere, such as locations where flammable gases, liquids or vapors are present.
3. Areas with readily ignitable materials, such as storage of large quantities of bulk sulfur, baled paper, cotton, lint, dust or loose combustible materials.
4. On board ships at dock or ships under construction or repair.
5. At other locations as specified by the *fire code official*.

TABLE 5104.3.2
SEGREGATED STORAGE OF LEVEL 2 AND 3 AEROSOL PRODUCTS AND PLASTIC AEROSOL 3 PRODUCTS IN GENERAL PURPOSE
WAREHOUSES

STORAGE SEPARATION	MAXIMUM SEGREGATED STORAGE AREA ^a		AUTOMATIC SPRINKLER SYSTEM REQUIREMENTS
	Percentage of building area (percent)	Area limitation (square feet)	
Separation area ^{e, f}	15	20,000	Notes b, c
Chain-link fence enclosure ^d	20	20,000	Notes b, c
1-hour fire-resistance-rated interior walls	20	30,000	Note b
2-hour fire-resistance-rated interior walls	25	40,000	Note b
3-hour fire-resistance-rated interior walls	30	50,000	Note b

For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929 m².

- a. The maximum segregated storage area shall be limited to the smaller of the two areas resulting from the percentage of building area limitation and the area limitation.
- b. Automatic sprinkler system protection in aerosol product storage areas shall comply with NFPA 30B and be approved. Building areas not containing aerosol product storage shall be equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1.
- c. Automatic sprinkler system protection in aerosol product storage areas shall comply with NFPA 30B and be approved. Sprinkler system protection shall extend a minimum 20 feet beyond the aerosol storage area.
- d. Chain-link fence enclosures shall comply with Section 5104.3.2.1.
- e. A separation area shall be defined as an area extending outward from the periphery of the segregated aerosol product storage area as follows:
 - 1. The limits of the aerosol product storage shall be clearly marked on the floor.
 - 2. The separation distance shall be not less than 25 feet and maintained clear of all materials with a commodity classification greater than Class III in accordance with Section 903.3.1.1.
- f. Separation areas shall only be permitted where approved.

E103.1.5 Surrounding conditions. Conditions such as other materials or processes in the area, type of construction of the structure, fire protection features (for example, *fire walls*, automatic sprinkler systems, alarms), occupancy (use) of adjoining areas, normal temperatures, exposure to weather, etc., must be taken into account in evaluating the hazard.

903.5 Inspection, ~~F~~ testing and maintenance. ~~Automatic~~ sprinkler systems shall be inspected, tested and maintained in accordance with Section 901.

2021 International Building Code

Revise as follows:

410.5.3.2 Exit access travel distance. The *exit access* travel distance shall be not greater than 300 feet (91 440 mm) for buildings without a n automatic sprinkler system and 400 feet (122 mm) for buildings equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1.

[F] 415.11.12.3 Automatic sprinkler locations. ~~Automatic sprinkler systems~~ shall be installed at 12-foot (3658 mm) intervals in horizontal ducts and at changes in direction. In vertical ducts, sprinklers shall be installed at the top and at alternate floor levels.

901.4 Threads. Threads provided for fire department connections to automatic sprinkler systems, standpipes, yard hydrants or any other fire hose connection shall be compatible with the connections used by the local fire department.

[F] 903.2.5.2 Group H-5 occupancies. An *automatic sprinkler system* shall be installed throughout buildings containing Group H-5 occupancies. The design of the automatic sprinkler system shall be not less than that required by this code for the occupancy hazard classifications in accordance with Table 903.2.5.2.

Where the design area of the automatic sprinkler system consists of a *corridor* protected by one row of sprinklers, the maximum number of sprinklers required to be calculated is 13.

TABLE 903.2.5.2
GROUP H-5 AUTOMATIC SPRINKLER SYSTEM DESIGN CRITERIA

LOCATION	OCCUPANCY HAZARD CLASSIFICATION
Fabrication areas	Ordinary Hazard Group 2
Service corridors	Ordinary Hazard Group 2
Storage rooms without dispensing	Ordinary Hazard Group 2
Storage rooms with dispensing	Extra Hazard Group 2
Corridors	Ordinary Hazard Group 2

**TABLE 903.2.11.6
ADDITIONAL REQUIRED PROTECTION SYSTEMS**

SECTION	SUBJECT
402.5, 402.6.2	Covered and open mall buildings
403.3	High-rise buildings
404.3	Atriums
405.3	Underground structures
407.7	Group I-2
410.6	Stages
411.3	Special amusement buildings
412.2.4	Airport traffic control towers
412.3.6, 412.3.6.1, 412.5.6	Aircraft hangars
415.11.11	Group H-5 HPM exhaust ducts
416.5	Flammable finishes
417.4	Drying rooms
424.3	Play structures
428	Buildings containing laboratory suites
507	Unlimited area buildings
508.5.7	Live/work units
509.4	Incidental uses
1030.6.2.3	<i>Smoke-protected assembly seating</i>
<i>IFC</i>	<i>Automatic sprinkler system requirements as set forth in Section 903.2.11.6 of the International Fire Code</i>

[F] 903.3.1 Standards. ~~Automatic s~~Automatic sprinkler systems shall be designed and installed in accordance with Section 903.3.1.1 unless otherwise permitted by Sections 903.3.1.2 and 903.3.1.3 and other chapters of this code, as applicable.

[F] 903.5 Testing and maintenance. ~~Automatic s~~Automatic sprinkler systems shall be inspected, tested, and maintained in accordance with the *International Fire Code*.

[F] 909.6.1 Minimum pressure difference. The 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 equipped throughout with automatic sprinkler systems.

In buildings permitted to be ~~other than fully sprinklered~~ not to be equipped throughout with automatic sprinkler systems, 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.

**TABLE 1006.2.1
SPACES WITH ONE EXIT OR EXIT ACCESS DOORWAY**

OCCUPANCY	MAXIMUM OCCUPANT LOAD OF SPACE	MAXIMUM COMMON PATH OF EGRESS TRAVEL DISTANCE (feet)		
		Without <u>Automatic</u> Sprinkler System (feet)		With <u>Automatic</u> Sprinkler System (feet)
		Occupant Load		
		OL ≤ 30	OL > 30	
A ^c , E, M	49	75	75	75 ^a
B	49	100	75	100 ^a
F	49	75	75	100 ^a
H-1, H-2, H-3	3	NP	NP	25 ^b
H-4, H-5	10	NP	NP	75 ^b
I-1, I-2 ^d , I-4	10	NP	NP	75 ^a
I-3	10	NP	NP	100 ^a
R-1	10	NP	NP	75 ^a
R-2	20	NP	NP	125 ^a
R-3 ^e	20	NP	NP	125 ^{a, g}
R-4 ^e	20	NP	NP	125 ^{a, g}
S ^f	29	100	75	100 ^a
U	49	100	75	75 ^a

For SI: 1 foot = 304.8 mm.

NP = Not Permitted.

- a. Buildings equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2. See Section 903 for occupancies where automatic sprinkler systems are permitted in accordance with Section 903.3.1.2.
- b. Group H occupancies equipped throughout with an *automatic sprinkler system* in accordance with Section 903.2.5.
- c. For a room or space used for assembly purposes having *fixed seating*, see Section 1030.8.
- d. For the travel distance limitations in Group I-2, see Section 407.4.
- e. The *common path of egress travel* distance shall only apply in a Group R-3 occupancy located in a mixed occupancy building.
- f. The length of *common path of egress travel* distance in a Group S-2 *open parking garage* shall be not more than 100 feet.
- g. For the travel distance limitations in Groups R-3 and R-4 equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.3, see Section 1006.2.2.6.

TABLE 1017.2
EXIT ACCESS TRAVEL DISTANCE^a

OCCUPANCY	WITHOUT <u>AUTOMATIC</u> SPRINKLER SYSTEM (feet)	WITH <u>AUTOMATIC</u> SPRINKLER SYSTEM (feet)
A, E, F-1, M, R, S-1	200 ^a	250 ^b
I-1	Not Permitted	250 ^b
B	200	300 ^c
F-2, S-2, U	300	400 ^c
H-1	Not Permitted	75 ^d
H-2	Not Permitted	100 ^d
H-3	Not Permitted	150 ^d
H-4	Not Permitted	175 ^d
H-5	Not Permitted	200 ^c
I-2, I-3	Not Permitted	200 ^c
I-4	150	200 ^c

For SI: 1 foot = 304.8 mm.

a. See the following sections for modifications to exit access travel distance requirements:

- Section 402.8 : For the distance limitation in malls
- Section 407.4: For the distance limitation in Group I-2.
- Sections 408.6.1 and 408.8.1: For the distance limitations in Group I-3.
- Section 411.2: For the distance limitation in special amusement areas.
- Section 412.6: For the distance limitations in aircraft manufacturing facilities.
- Section 1006.2.2.2: For the distance limitation in refrigeration machinery rooms.
- Section 1006.2.2.3: For the distance limitation in refrigerated rooms and spaces.
- Section 1006.3.4: For buildings with one exit.
- Section 1017.2.2: For increased distance limitation in Groups F-1 and S-1.
- Section 1030.7: For increased limitation in assembly seating.
- Section 3103.4: For temporary structures.
- Section 3104.9: For pedestrian walkways.

3007.2.2 Automatic Sprinkler system monitoring. The automatic sprinkler system shall have a sprinkler control valve supervisory switch and water-flow-initiating device provided for each floor that is monitored by the building's *fire alarm system*.

[BF] 1705.15 Sprayed fire-resistant materials. *Special inspections* and tests of sprayed fire-resistant materials applied to floor, roof and wall assemblies and structural members shall be performed in accordance with Sections 1705.15.1 through 1705.15.6. *Special inspections* shall be based on the fire-resistance design as designated in the *approved construction documents*. The tests set forth in this section shall be based on samplings from specific floor, roof and wall assemblies and structural members. *Special inspections* and tests shall be performed during construction with an additional visual inspection after the rough installation of electrical, *automatic sprinkler systems*, mechanical and plumbing systems and suspension systems for ceilings, and before concealment where applicable. The required sample size shall not exceed 110 percent of that specified by the referenced standards in Sections 1705.15.4.1 through 1705.15.4.9.

Reason Statement: Across the I codes there are varying ways to describe an automatic sprinkler system. his proposal correlates several of the I codes to use the defined term of automatic sprinkler system. This allows for a better understanding of the term and application. Other proposals have been submitted to make several sprinkler and fire protection correlations and improvements.

Each section noted in this proposal has been changed to clarify what type of system is installed. In many cases, it is a simple deletion of the word "fire" or an added "automatic" and changes are to refer to the italicized term of automatic sprinkler system as is defined.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
There are not technical changes in this proposal. It is for term correlation.

F75-21 Part II

IRC: P2904.1, P2904.3.4, P2904.4.2, P2904.7, P2904.8.1

Proponents: Andrew Bevis, National Fire Sprinkler Association, representing National Fire Sprinkler Association (bevis@nfsa.org); JEFFREY HUGO, National Fire Sprinkler Association, representing NFSA (hugo@nfsa.org)

2021 International Residential Code

Revise as follows:

P2904.1 General. The design and installation of ~~residential~~ automatic fire sprinkler systems shall be in accordance with NFPA 13D or Section P2904, which shall be considered to be equivalent to NFPA 13D. Partial ~~residential~~ automatic sprinkler systems shall be permitted to be installed only in buildings not required to be equipped with a ~~residential~~ automatic sprinkler system. Section P2904 shall apply to stand-alone and multipurpose wet-pipe sprinkler systems that do not include the use of antifreeze. A multipurpose ~~fire~~ automatic sprinkler system shall provide domestic water to both fire sprinklers and plumbing fixtures. A stand-alone automatic sprinkler system shall be separate and independent from the water distribution system. A backflow preventer shall not be required to separate a ~~n~~ automatic sprinkler system from the water distribution system, provided that the sprinkler system complies with all of the following:

1. The system complies with NFPA 13D or Section P2904.
2. The piping material complies with Section P2906.
3. The system does not contain antifreeze.
4. The system does not have a fire department connection.

P2904.3.4 Drain. A means to drain the automatic sprinkler system shall be provided on the system side of the water distribution shutoff valve.

P2904.4.2 System design flow rate. The design flow rate for the system shall be based on the following:

1. The design flow rate for a room having only one sprinkler shall be the flow rate required for that sprinkler, as determined by Section P2904.4.1.
2. The design flow rate for a room having two or more sprinklers shall be determined by identifying the sprinkler in that room with the highest required flow rate, based on Section P2904.4.1, and multiplying that flow rate by 2.
3. Where the sprinkler manufacturer specifies different criteria for ceiling configurations that are not smooth, flat and horizontal, the required flow rate for that room shall comply with the sprinkler manufacturer's instructions.
4. The design flow rate for the automatic sprinkler system shall be the flow required by the room with the largest flow rate, based on Items 1, 2 and 3.
5. For the purpose of this section, it shall be permissible to reduce the design flow rate for a room by subdividing the space into two or more rooms, where each room is evaluated separately with respect to the required design flow rate. Each room shall be bounded by walls and a ceiling. Openings in walls shall have a lintel not less than 8 inches (203 mm) in depth and each lintel shall form a solid barrier between the ceiling and the top of the opening.

P2904.7 Instructions and signs. An owner's manual for the ~~fire~~ automatic sprinkler system shall be provided to the *owner*. A sign or valve tag shall be installed at the main shutoff valve to the water distribution system stating, "Warning, the water system for this home supplies fire sprinklers that require certain flows and pressures to fight a fire. Devices that restrict the flow or decrease the pressure or automatically shut off the water to the fire sprinkler system, such as water softeners, filtration systems and automatic shutoff valves, shall not be added to this system without a review of the fire sprinkler system by a fire protection specialist. Do not remove this sign."

P2904.8.1 Preconcealment inspection. The following items shall be verified prior to the concealment of any automatic sprinkler system piping:

1. Sprinklers are installed in all areas as required by Section P2904.1.1.
2. Where sprinkler water spray patterns are obstructed by construction features, luminaires or ceiling fans, additional sprinklers are installed as required by Section P2904.2.4.2.
3. Sprinklers are the correct temperature rating and are installed at or beyond the required separation distances from heat sources as required by Sections P2904.2.1 and P2904.2.2.
4. The pipe size equals or exceeds the size used in applying Tables P2904.6.2(4) through P2904.6.2(9) or, if the piping system was hydraulically calculated in accordance with Section P2904.6.1, the size used in the hydraulic calculation.
5. The pipe length does not exceed the length permitted by Tables P2904.6.2(4) through P2904.6.2(9) or, if the piping system was hydraulically calculated in accordance with Section P2904.6.1, pipe lengths and fittings do not exceed those used in the hydraulic calculation.
6. Nonmetallic piping that conveys water to sprinklers is *listed* for use with fire sprinklers.
7. Piping is supported in accordance with the pipe manufacturer's and sprinkler manufacturer's installation instructions.

8. The piping system is tested in accordance with Section P2503.7.

Reason Statement: Across the I codes there are varying ways to describe an automatic sprinkler system. his proposal correlates several of the I codes to use the defined term of automatic sprinkler system. This allows for a better understanding of the term and application. Other proposals have been submitted to make several sprinkler and fire protection correlations and improvements. Each section noted in this proposal has been changed to clarify what type of system is installed. In many cases, it is a simple deletion of the word "fire" or an added "automatic" and changes are to refer to the italicized term of automatic sprinkler system as is defined.

Cost Impact: The code change proposal will not increase or decrease the cost of construction. There are no technical changes in this proposal. It is for term correlation.

F75-21 Part II

F76-21

IFC: 904.12 (New), NFPA Chapter 80 (New); IBC: [F] 904.12 (New), NFPA Chapter 35 (New)

Proponents: Kevin Kelly, representing Victaulic (kevin.kelly@victaulic.com)

2021 International Fire Code

Add new text as follows:

904.12 Hybrid Systems. Hybrid Fire Extinguishing Systems shall be installed, maintained, periodically inspected, and tested in accordance with NFPA 770. Records of inspection and testing shall be maintained.

Add new standard(s) as follows:

NFPA

National Fire Protection Association
1 Batterymarch Park
Quincy MA 02169-7471

NFPA 770-2021: Standard on Hybrid (Water and Inert Gas) Fire Extinguishing Systems

2021 International Building Code

Add new text as follows:

[F] 904.12 Hybrid Systems. Hybrid Fire Extinguishing Systems shall be installed, maintained, periodically inspected, and tested in accordance with NFPA 770. Records of inspection and testing shall be maintained.

Add new standard(s) as follows:

NFPA

National Fire Protection Association
1 Batterymarch Park
Quincy MA 02169-7471

NFPA 770-2021: Standard on Hybrid (Water and Inert Gas) Fire Extinguishing Systems

Staff Analysis: A review of the standard proposed for inclusion in the code, NFPA 770-2021: Standard on Hybrid (Water and Inert Gas) Fire Extinguishing Systems, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

Reason Statement: NFPA 770 is a new NFPA standard on Hybrid (Water and Inert Gas) Fire Extinguishing Systems. This new standard should be added to the list of Alternative Automatic Fire-Extinguishing Systems that could potentially be used for fire protection. NFPA 770 should also be added to the referenced document section.

Bibliography: NFPA 770, Standard on Hybrid (Water and Inert Gas) Fire Extinguishing Systems, 2021 Edition

Cost Impact: The code change proposal will not increase or decrease the cost of construction. This code change should not increase cost. It adds a new standard to the list of Alternative Automatic Fire-Extinguishing Systems that could potentially be used for fire protection.

F76-21

F77-21

IFC: 904.13.1; IBC: [F] 904.13.1

Proponents: Stephen DiGiovanni, representing Self (sdigiovanni@clarkcountynv.gov)

2021 International Fire Code

Revise as follows:

904.13.1 Manual system operation. A manual actuation device shall be located at or near a *means of egress* from the cooking area not less than 10 feet (3048 mm) and not more than 20 feet (6096 mm) from the kitchen exhaust system. The manual actuation device shall be installed not more than 48 inches (1200 mm) nor less than 42 inches (1067 mm) above the floor and shall clearly identify the hazard protected. The manual actuation shall require a maximum force of 40 pounds (178 N) and a maximum movement of 14 inches (356 mm) to actuate the fire suppression system.

Exceptions:

1. Automatic sprinkler systems shall not be required to be equipped with manual actuation means.
2. Where locating the manual actuation device between 10 feet (3048 mm) to 20 feet (6096 mm) from the cooking area is not feasible, the fire code official is permitted to accept a location at or near a means of egress from the cooking area, where the manual actuation device is unobstructed and in view from the means of egress.

2021 International Building Code

Revise as follows:

[F] 904.13.1 Manual system operation. A manual actuation device shall be located at or near a *means of egress* from the cooking area not less than 10 feet (3048 mm) and not more than 20 feet (6096 mm) from the kitchen exhaust system. The manual actuation device shall be installed not more than 48 inches (1200 mm) or less than 42 inches (1067 mm) above the floor and shall clearly identify the hazard protected. The manual actuation shall require a maximum force of 40 pounds (178 N) and a maximum movement of 14 inches (356 mm) to actuate the fire suppression system.

Exceptions:

1. Automatic sprinkler systems shall not be required to be equipped with manual actuation means.
2. Where locating the manual actuation device between 10 feet (3048 mm) to 20 feet (6096 mm) from the cooking area is not feasible, the fire code official is permitted to accept a location at or near a means of egress from the cooking area, where the manual actuation device is unobstructed and in view from the means of egress.

Reason Statement: The purpose of this proposal is to allow the fire code official to accept a location for the manual actuation device for the suppression system of commercial cooking appliances at a location that may be closer or further than the 10 feet to 20 feet range currently prescribed in the code. During recent reviews of large A-4 and A-5 facilities, it was apparent that strict conformance of these distances could not be readily achieved. In some instances, the cooking appliance is a self-contained device that is mobile and can be rolled around to various locations of a concourse. There appliances have built-in suppression systems, and the manual actuation device is mounted on the appliance. In other instances, the kitchens are so large that there is no available wall space within 20 feet of the cooking area for the mounting of the actuation device. It is useful to look at other code provisions that address protection for cooking appliances. First, there is an allowance for Class K extinguishers to be placed up to 30 feet from commercial cooking equipment (Section 906). It would be reasonable to assume that colocation of the Class K extinguisher with the manual actuation device of automatic suppression may be advantageous. Second, the 2017 edition of NFPA 96 was changed to entirely remove the distance range of 10 ft to 20 ft. Instead, the 2021 edition of NFPA 96, Section 10.5.1.1, reads as follows: "At least one manual actuation device shall be located in a means of egress or at a location acceptable to the authority having jurisdiction".

The intent of this proposal is to maintain the 10 feet to 20 feet range in the main code section, as this provides initial guidance to both the code user and the AHJ as to an acceptable location for installation of the manual actuation device, and provides good consistency with the many existing installations. As an AHJ, it is very useful to have the code provide that initial guidance, rather than entirely eliminating that guidance from the text. While there may be good justification to change the 20 feet limit to an upper limit of 30 feet to correlate with the location of the Class K extinguisher, this proposal does not include that change, and only references that difference to justify the potential for longer distance to the manual actuation device. The proposal is offered as an added exception, so that only where locating the device in the currently prescribed 10 feet to 20 feet range is not feasible, can a location outside of that range be accepted.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

This proposal does not change the required equipment that needs to be provided, so component and installation costs are expected to be essentially the same. There may be a cost benefit associated with a more lenient approach prescribing the location of the manual actuation device, however those savings are difficult to predict and thus are not relied on as justification for this proposal.

F78-21

IFC: 905.3; IBC: [F] 905.3

Proponents: Jeffrey Hugo, National Fire Sprinkler Association, representing NFSA (hugo@nfsa.org)

2021 International Fire Code

Revise as follows:

905.3 Required installations. Standpipe systems shall be installed where required by Sections 905.3.1 through 905.3.8. Standpipe systems are allowed to be combined with *automatic sprinkler systems*.

~~Exception~~ Exceptions:

1. Standpipe systems are not required in Group R-3 occupancies.
2. Standpipe systems are not required in Group R-2 townhouses.

2021 International Building Code

Revise as follows:

[F] 905.3 Required installations. Standpipe systems shall be installed where required by Sections 905.3.1 through 905.3.8. Standpipe systems are allowed to be combined with *automatic sprinkler systems*.

~~Exception~~ Exceptions:

1. Standpipe systems are not required in Group R-3 occupancies.
2. Standpipe systems are not required in Group R-2 townhouses.

Reason Statement: This proposal doesn't technically change the code, recognizing that there are no locations in a townhouse that would require hose connections in accordance with Sections 905.4, 905.5, or 905.6. Regardless of whether a standpipe is technically required by Section 905.3, you would not install such a system if hose connections are never required. Clearly, it is not the intent of the code to require standpipes in individual townhouse units, but there are cases where townhouses might exceed the story or height thresholds in Section 905.3.1, which introduces a conflict. This proposal fixes that issue and brings clarity to the code.

Cost Impact: The code change proposal will not increase or decrease the cost of construction. The proposal doesn't change how the code applies and is intended to simply bring clarity to the existing requirements. Accordingly, there is no cost impact.

F78-21

F79-21

IFC: 905.4; IBC: [F] 905.4

Proponents: Kevin Scott, representing KH Scott & Associates LLC (khscottassoc@gmail.com)

2021 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 and exterior exit stairway*, a hose connection shall be provided for each story above and below *grade plane*. Hose connections shall be located at the main floor landing 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 feet (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 and exterior 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 and exterior 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 4 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.

2021 International Building Code

Revise as follows:

[F] 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 and exterior exit stairway*, a hose connection shall be provided for each story above and below *grade plane*. Hose connections shall be located at the main floor landing 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 feet (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 and exterior 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 and exterior 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 4 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 Statement: This proposal is intended to fill a gap in standpipe hose connection requirements. Several editions back, when the definition for interior and exterior exit stairways were added to the code, a wide global revisions were made in the codes to include the new definitions. When that global change occurred, this item became limited to interior exit stairways. This revision will rectify the unintended exclusion of exterior exit stairways.

Section 1027 allows exterior exit stairways in buildings up to six stories in height, and standpipes are required at when the building is 4 stories in height or more. Therefore, the 6-story building must have a standpipe. Section 905.4 does not contain any guidance for exterior exit stairways; in fact, it is limited to "interior exit stairways". If a standpipe is required, and the required exit stairs are exterior exit stairways, there is no criteria for location of standpipe hose connections. The revision of Item 1 will now include both interior and exterior stairways.

The revision to Item 1 would now include both interior and exterior exit stairways. Therefore exceptions to Items 2 and 3 are revised to correlate with the revision in Item 1 and include both interior and exterior exit stairways.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

This proposal will not increase the cost provided the buildings were designed based on the intent of the code. This proposal clarifies the application of the section to exterior exit stairways.

F79-21

F80-21

IFC: 905.4; IBC: [F] 905.4

Proponents: Jeffrey S. Grove, P.E. FSFPE, Jensen Hughes, representing Jensen Hughes (jgrove@jensenhughes.com)

2021 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 the main floor landing 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 feet (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* on the side of the exit opening closest to the interior exit stairway.

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 4 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.

2021 International Building Code

Revise as follows:

[F] 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 the main floor landing 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 feet (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* on the side of the exit opening closest to the interior exit stairway.

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 4 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 Statement: As currently worded, the exception could be interpreted to allow elimination of the hose connections on both sides of the horizontal exit where floor areas adjacent to the horizontal exit are within 130 feet of the interior exit stairway hose connection. It has also been interpreted that this exception only allows for elimination of the hose connection on only one side of the horizontal exit. Clarification is needed to ensure consistent application of this exception.

The proposed language clarifies that the hose connection may be eliminated when it is located on the same side of the horizontal exit as the exit stairway having the hose connection within 130 feet of travel from the horizontal exit.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is a clarification for existing code language.

F80-21

F81-21

IFC: 905.4; IBC: [F] 905.4

Proponents: JEFFREY HUGO, National Fire Sprinkler Association, representing NFSA (hugo@nfsa.org)

2021 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 or exterior exit stairway*, a hose connection shall be provided for each story above and below *grade plane*. Hose connections shall be located at the main floor landing 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 feet (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 or exterior 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 or exterior 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 4 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.

2021 International Building Code

Revise as follows:

[F] 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 or exterior exit stairway*, a hose connection shall be provided for each story above and below *grade plane*. Hose connections shall be located at the main floor landing 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 feet (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 or exterior 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 or exterior 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 4 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 Statement: This proposal corrects an error that first appeared in the 2015 IFC. Proposal E2-12, submitted by ICC-CTC, went through the codes to separate "exit stairway" references into either "interior exit stairway" or "exterior exit stairway" wherever the term appeared. Unfortunately, the revision to Section 905.4, Item 1 mistakenly added "interior" but not "exterior." This resulted in an unintended and unjustified technical change; whereby, Class I hose connection locations were no longer specified for exterior exit stairways, even if a building exceeds the height thresholds requiring installation of a standpipe system. Although tall buildings don't often have exterior exit stairways, they sometimes do, and the code needs to be fixed to address these instances.

Cost Impact: The code change proposal will increase the cost of construction

From a literal perspective, this proposal might be viewed as increasing the cost of construction in that it technically adds a requirement for additional hose connections in buildings with exterior exit stairways and which require standpipes. However, the change to the 2015 edition that eliminated this requirement was done in error, with no disclosure or substantiation. The intent is to return the code to where it should have been all along.

F81-21

F82-21

IFC: 3208.3

Proponents: Elley Klausbruckner, Klausbruckner & Associates, Inc., representing Klausbruckner & Associates, Inc.

2021 International Fire Code

Revise as follows:

3208.3 Flue spaces. Rack storage areas protected with an *automatic sprinkler system* shall be provided with flue spaces in accordance with Table 3208.3. The space taken by rack uprights that is not obstructed by commodities or solid shelving is allowed to be included in the transverse flue space measurement. Required flue spaces shall be maintained.

Reason Statement: The issue of whether rack uprights can be included as part of the flue space measurement has come up for question more often in recent years. NFPA 13, 2019 Edition, Figures A.3.3.171(a) - (k) show that rack uprights can be included in the measurement of flue spaces.

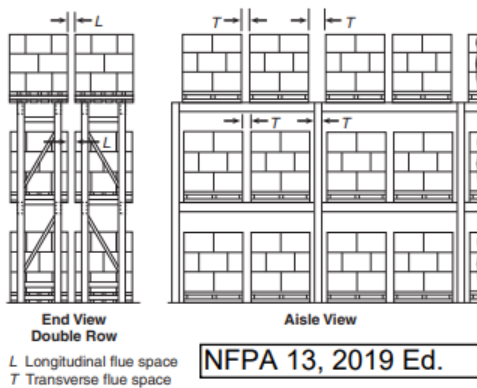


FIGURE A.3.3.171(a) Conventional Pallet Rack.

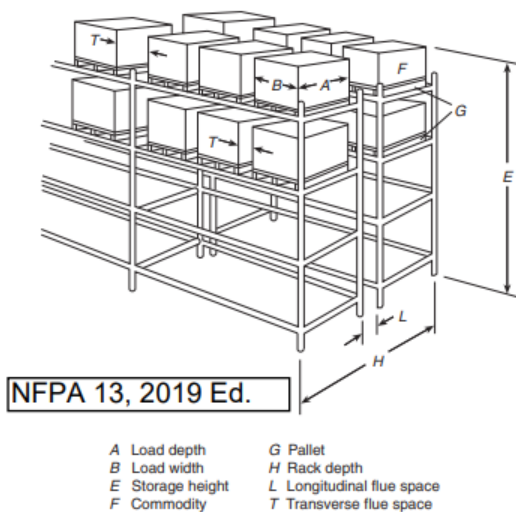


FIGURE A.3.3.171(b) Double-Row Racks Without Solid or Slatted Shelves.

Bibliography: NFPA 13, 2019 Edition, Figures A.3.3.171(a) - (k)

Cost Impact: The code change proposal will not increase or decrease the cost of construction

We believe that the proposed code change is only a clarification of flue spaces. However it may decrease the cost of construction depending on how it was interpreted by jurisdictions.

F83-21

IFC: 905.5.1; IBC: [F] 905.5.1

Proponents: William Conner, representing American Society of Theatre Consultants (bill@bcaworld.com)

2021 International Fire Code

Revise as follows:

905.5.1 Groups A-1 and A-2. In Group A-1 and A-2 occupancies with *occupant loads* of more than 1,000, hose connections shall be located on each side of any stage, on each side of the rear of the auditorium, and on each side of the balcony ~~and on each tier of dressing rooms~~.

2021 International Building Code

Revise as follows:

[F] 905.5.1 Groups A-1 and A-2. In Group A-1 and A-2 occupancies with occupant loads of more than 1,000, hose connections shall be located on each side of any stage, on each side of the rear of the auditorium, and on each side of the balcony ~~and on each tier of dressing rooms~~.

Reason Statement: Delete “each tier of dressing rooms” because the arrangement of dressing rooms in tiers at the sides of the stage was abandoned before World War II.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
No change - just deleting archaic requirement.

F83-21

F84-21

IFC: 906.1; IBC: [F] 906.1

Proponents: Dave Frable, representing Self (dave.frable@gsa.gov)

2021 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.

Exceptions:

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.
3. In storage areas of Group S occupancies where forklift, powered industrial truck or powered cart operators are the primary occupants, fixed extinguishers, as specified in NFPA 10, shall not be required where in accordance with all of the following:
 - 3.1. Use of vehicle-mounted extinguishers shall be *approved* by the *fire code official*.
 - 3.2. Each vehicle shall be equipped with a 10-pound, 40A:80B:C extinguisher affixed to the vehicle using a mounting bracket *approved* by the extinguisher manufacturer or the *fire code official* for vehicular use.
 - 3.3. Not less than two spare extinguishers of equal or greater rating shall be available on-site to replace a discharged extinguisher.
 - 3.4. Vehicle operators shall be trained in the proper operation, use and inspection of extinguishers.
 - 3.5. Inspections of vehicle-mounted extinguishers shall be performed daily.
4. In Group B occupancies protected throughout by an automatic sprinkler system designed and installed in accordance Section 903.3.1.1 utilizing quick-response sprinklers, portable fire extinguishers shall be required only in locations specified in Items 2 through 6.
2. Within 30 feet (9144 mm) distance of travel from commercial cooking equipment and from domestic cooking equipment in Group I-1; I-2, Condition 1; and R-2 college dormitory occupancies.
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 3316.1.
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*.

Exception: Portable fire extinguishers are not required at normally unmanned Group U occupancy buildings or structures where a portable fire extinguisher suitable to the hazard of the location is provided on the vehicle of visiting personnel.

2021 International Building Code

Revise as follows:

[F] 906.1 Where required. Portable fire extinguishers shall be installed in all of the following locations:

1. In Group A, B, E, F, H, I, M, R-1, R-2, R-4 and S occupancies.

Exceptions:

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.
 3. In storage areas of Group S Occupancies where forklift, powered industrial truck or powered cart operators are the primary occupants, fixed extinguishers, as specified in NFPA 10, shall not be required where in accordance with all of the following:
 - 3.1. Use of vehicle-mounted extinguishers shall be approved by the fire code official.
 - 3.2. Each vehicle shall be equipped with a 10-pound, 40A:80B:C extinguisher affixed to the vehicle using a mounting bracket approved by the extinguisher manufacturer or the fire code official for vehicular use.
 - 3.3. Not less than two spare extinguishers of equal or greater rating shall be available on site to replace a discharged extinguisher.
 - 3.4. Vehicle operators shall be trained in the proper operation, use and inspection of extinguishers.
 - 3.5. Inspections of vehicle-mounted extinguishers shall be performed daily.
 4. In Group B occupancies protected throughout by an automatic sprinkler system designed and installed in accordance Section 903.3.1.1 utilizing quick-response sprinklers, portable fire extinguishers shall be required only in locations specified in Items 2 through 6.
2. Within 30 feet (9144 mm) distance of travel from commercial cooking equipment and from domestic cooking equipment in Group I-1; I-2, Condition 1; and R-2 college *dormitory* occupancies.
 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 of the International Fire Code.
 5. Where required by the *International Fire Code* 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.

Exception: Portable fire extinguishers are not required at normally unmanned Group U occupancy buildings or structures where a portable fire extinguisher suitable to the hazard of the location is provided on the vehicle of visiting personnel.

Reason Statement: The intent of this code change proposal is to permit an exemption for installing portable fire extinguishers in common areas as well as tenant spaces in new and existing Group B occupancies if the Group B occupancy is protected throughout with an automatic sprinkler system designed and installed in accordance with NFPA 13 that utilizes quick response sprinklers. 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.

Please note that the typical evacuation strategy for Group B occupancies is for building 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.

It should be noted that the requirements in the IFC do not require building occupants to be assigned firefighting duties and be trained to know the locations and proper use of portable fire extinguishers. The IFC (Section 406.3.3) only requires the building owner's employees assigned firefighting responsibilities to be trained to know the locations and proper use of portable fire extinguishers and does not apply to the occupants of the building. In addition, fire department personnel typically will not use the 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 this type of manual extinguishing equipment throughout a Group B occupancy protected by an operational sprinkler system utilizing quick-response sprinklers is questionable and not justifiable. It should also be noted that the Occupational Safety and Health Administration (OSHA), 29 CFR 1910.157(g)(1), also addresses portable fire extinguishers by specifically stating: "Where the employer has provided portable fire

extinguishers for employee use in the workplace, the employer shall also provide an educational program to familiarize employees with the general principles of fire extinguisher use and the hazards involved with incipient stage firefighting.” Therefore, if portable fire extinguishers have been installed in a building and have been designated for occupant use and incorporated into the building’s fire safety plan, training would be required. However, if this protocol for occupants using portable fire extinguishers is not incorporated in the building’s fire safety plan, no training would be required. Hence, the occupants will not be properly trained to use the subject portable fire.

Fire is a rare event; however, should a fire occur in this occupancy, the probability that occupants are knowledgeable and have been trained proficiently in the use of portable fire extinguishers to effectively extinguish a fire is low. We also believe the cost associated with the installation of portable fire extinguishers in these occupancies is unjustified, taking into consideration maintaining the subject fire extinguishers for the life of the building. We also believe these costs savings would be better expended active fire detection and suppression systems. Some opponents of this code change may argue that fire extinguishers are still the first line of defense in many situations and therefore should not be removed in Group B occupancies since occupants should be able to use them if they choose to do so. However, if this is the case, the installation of portable fire extinguishers in Group B occupancies should be a choice and not a requirement. We believe that when a fire does occur in an office building, evacuation of the building should be the first action of the occupants; in lieu of delaying evacuation/relocation and having untrained occupants attempt to utilize a portable fire extinguisher to try to extinguish a fire.

Lastly, it should be noted that this exception was deleted from the Code in 2012 based on the concerns from fire code officials that it was inappropriate to place complete reliance on automatic fire sprinkler systems for the protection of Group A (Assembly) occupancies (not Group B occupancies) and a National Institute of Standards and Technology (NIST) investigation report of the Station Nightclub fire. In addition, the proposed exception for Group B occupancies does not eliminate portable fire extinguishers where the fire risk is a concern (e.g., special hazard areas, areas where flammable and combustible liquids are stored, used, dispensed, etc.). Therefore, we do not believe that the proposed exception for Group B occupancies will present an increased hazard to the safety of the occupants – evacuation of the building should be the first action of the occupants, not fighting the fire.

Therefore, we believe the installation of this type of manual extinguishing equipment throughout a Group B occupancy equipped with an operational sprinkler system utilizing quick-response sprinklers is questionable and not warranted or cost effective (e.g., installation costs, maintenance costs, etc.) over the life of a building.

Bibliography: N/A

Cost Impact: The code change proposal will not increase or decrease the cost of construction

This exception may decrease the initial costs of construction (installation of portable fire extinguisher cabinets) as well as decreasing the maintenance costs over the life of the building.

F85-21

IFC: TABLE 906.1; IBC: TABLE 906.1

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Fire Code

Revise as follows:

TABLE 906.1
ADDITIONAL REQUIRED PORTABLE FIRE EXTINGUISHERS

SECTION	SUBJECT
303.5	Asphalt kettles
307.5	Open burning
308.1.3	Open flames—torches
309.4	Powered industrial trucks
1204.10	Portable generators
2005.2	Aircraft towing vehicles
2005.3	Aircraft welding apparatus
2005.4	Aircraft fuel-servicing tank vehicles
2005.5	Aircraft hydrant fuel-servicing vehicles
2005.6	Aircraft fuel-dispensing stations
2007.7	Heliports and helistops
2108.4	Dry cleaning plants
2305.5	Motor fuel-dispensing facilities
2310.6.4	Marine motor fuel-dispensing facilities
2311.6	Repair garages
2404.4.1	Spray-finishing operations
2405.4.2	Dip-tank operations
2406.4.2	Powder-coating areas
2804.3	Lumberyards/woodworking facilities
2808.8	Recycling facilities
2809.5	Exterior lumber storage
2903.5	Organic-coating areas
3006.3	Industrial ovens
3107.9	Tents and membrane structures
3206.10	High-piled storage
3316.1	Buildings under construction or demolition
3318.3	Roofing operations
3408.2	Tire rebuilding/storage
3504.2.6	Welding and other hot work
3604.4	Marinas
3703.6	Combustible fibers
5703.2.1	Flammable and combustible liquids, general
5704.3.3.1	Indoor storage of flammable and combustible liquids
5704.3.7.5.2	Liquid storage rooms for flammable and combustible liquids
5705.4.9	Solvent distillation units
5706.2.7	Farms and construction sites—flammable and combustible liquids storage
5706.4.10.1	Bulk plants and terminals for flammable and combustible liquids
5706.5.4.5	Commercial, industrial, governmental or manufacturing establishments—fuel dispensing
5706.6.4	Tank vehicles for flammable and combustible liquids
<u>5707.5.4</u>	<u>On-demand mobile fueling</u>
5906.5.7	Flammable solids
6108.2	LP-gas

2021 International Building Code

Revise as follows:

[F] TABLE 906.1
ADDITIONAL REQUIRED PORTABLE FIRE EXTINGUISHERS IN THE INTERNATIONAL FIRE CODE

IFC SECTION	SUBJECT
303.5	Asphalt kettles
307.5	Open burning
308.1.3	Open flames—torches
309.4	Powered industrial trucks
1204.10	Portable Generators
2005.2	Aircraft towing vehicles
2005.3	Aircraft welding apparatus
2005.4	Aircraft fuel-servicing tank vehicles
2005.5	Aircraft hydrant fuel-servicing vehicles
2005.6	Aircraft fuel-dispensing stations
2007.7	Heliports and helistops
2108.4	Dry cleaning plants
2305.5	Motor fuel-dispensing facilities
2310.6.4	Marine motor fuel-dispensing facilities
2311.6	Repair garages
2404.4.1	Spray-finishing operations
2405.4.2	Dip-tank operations
2406.4.2	Powder-coating areas
2804.3	Lumberyards/woodworking facilities
2808.8	Recycling facilities
2809.5	Exterior lumber storage
2903.5	Organic-coating areas
3006.3	Industrial ovens
3107.9	Tents and membrane structures
3206.10	High-piled storage
3315.1	Buildings under construction or demolition
3318.3	Roofing operations
3408.2	Tire rebuilding/storage
3504.2.6	Welding and other hot work
3604.4	Marinas
3703.6	Combustible fibers
5703.2.1	Flammable and combustible liquids, general
5704.3.3.1	Indoor storage of flammable and combustible liquids
5704.3.7.5.2	Liquid storage rooms for flammable and combustible liquids
5705.4.9	Solvent distillation units
5706.2.7	Farms and construction sites—flammable and combustible liquids storage
5706.4.10.1	Bulk plants and terminals for flammable and combustible liquids
5706.5.4.5	Commercial, industrial, governmental or manufacturing establishments—fuel dispensing
5706.6.4	Tank vehicles for flammable and combustible liquids
<u>5707.5.4</u>	<u>On-demand mobile fueling</u>
5906.5.7	Flammable solids
6108.2	LP-gas

Reason Statement: This proposal introduces a missing reference to a portable extinguisher requirement for on-demand mobile fueling.

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 and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: <https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/>

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal merely inserts a missing cross reference.

F85-21

F86-21

IFC: 907.2.1; IBC: [F] 907.2.1

Proponents: Deborah Ohler, Ohio Board of Building Standards, representing Ohio Board of Building Standards, Staff Engineer
(dohler@com.state.oh.us)

2021 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 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.

Exceptions:

1. 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.
2. Manual fire alarm boxes and the associated occupant notification system or emergency voice/alarm communication system are not required for Group A-5 outdoor bleacher-type seating having an occupant load of greater than or equal to 300 and less than 15,000 occupants provided all of the following are met:
 - 2.1 A public address system with standby power is provided;
 - 2.2 Enclosed spaces attached to or within 5 ft (1.5 m) of the outdoor bleacher-type seating comprise, in the aggregate, a maximum of 10 percent or less of the overall area of the outdoor bleacher-type seating or 1000 ft² (92.9 m²), whichever is less;
 - 2.3 Enclosed accessory spaces under or attached to the outdoor bleacher-type seating shall be separated from the bleacher-type seating in accordance with Section 1030.1.1.1 of this code;
 - 2.4 All means of egress from the bleacher-type seating are open to the outside.
3. Manual fire alarm boxes and the associated occupant notification system or emergency voice/alarm communication system are not required for temporary Group A-5 outdoor bleacher-type seating provided all of the following are met:
 - 3.1 There are no enclosed spaces under or attached to the outdoor bleacher-type seating;
 - 3.2 The bleacher-type seating is erected for a period of less than 180 days; and
 - 3.3 Evacuation of the bleacher-type seating is included in an approved fire safety plan.

2021 International Building Code

Revise as follows:

[F] 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 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.

Exceptions:

1. 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.

2. Manual fire alarm boxes and the associated occupant notification system or emergency voice/alarm communication system are not required for Group A-5 outdoor bleacher-type seating having an occupant load of greater than or equal to 300 and less than 15,000 occupants provided all of the following are met:
 - 2.1. A public address system with standby power is provided;
 - 2.2. Enclosed spaces attached to or within 5 ft (1.5 m) of the outdoor bleacher-type seating comprise, in the aggregate, a maximum of 10 percent or less of the overall area of the outdoor bleacher-type seating or 1000 ft² (92.9 m²), whichever is less;
 - 2.3. Enclosed accessory spaces under or attached to the outdoor bleacher-type seating shall be separated from the bleacher-type seating in accordance with Section 1030.1.1.1 of this code;
 - 2.4. All means of egress from the bleacher-type seating are open to the outside.
3. Manual fire alarm boxes and the associated occupant notification system or emergency voice/alarm communication system are not required for temporary Group A-5 outdoor bleacher-type seating provided all of the following are met:
 - 3.1. There are no enclosed spaces under or attached to the outdoor bleacher-type seating;
 - 3.2. The bleacher-type seating is erected for a period of less than 180 days; and
 - 3.3. Evacuation of the bleacher-type seating is included in an approved fire safety plan.

Reason Statement: According to the IBC Section 303.6, outdoor bleacher-type seating is classified as Group A-5. Although not a typical building with walls and ceilings easily allowing for the installation of manual fire alarm boxes and occupant notification appliances, the outdoor bleacher-type seating structure, as a Group A-5 classification, results in a requirement for a manual fire alarm system with occupant notification appliances when the occupant load is 300 or more. According to Section 907.2.1.1, when the occupant load is 1000 or more, this triggers the initiation of an emergency voice/alarm communication system instead of the typical horn/strobe alarm notification appliances used for occupant notification. The IBC Section 907.4.2 requirements for manual fire alarm boxes do not fit very well when trying to apply the requirements to outdoor bleacher-type seating. For example, let's consider a typical high school football or track field with outdoor bleacher-type seating. According to the code, the manual fire alarm box shall be located not more than 5 feet from the entrance to each exit. In this case, where is the exit and where should the boxes be mounted. Additional structures would likely need to be constructed in order to mount the manual fire alarm boxes and they would need to be weather-resistant and tamper-proof. A similar problem occurs when trying to apply the IBC Section 907.5.2 code requirements for the occupant notification devices (audible and visual alarm notification appliances). The ambient noise level at a football game could possibly far exceed 105 dBA. If this happens, the IBC Section 907.5.2.1.2 would allow the elimination of the audible alarm notification appliances provided that visible alarm notification appliances are installed. Where should the visible notification devices be mounted so that those sitting in the bleachers could see them without having to create additional mounting structures that may block the view? Given that the events are outside and sometimes occur during the daylight, it would be possible that the visible notification appliances may not even be effective at alerting those in attendance. It seems to be a huge expense, without much guaranteed benefit, especially for small outdoor bleacher-type seating structures.

After discussing this with several architects and code officials, I discovered a lot of inconsistency in the design and enforcement of this requirement for a manual fire alarm system and notification appliances for bleachers. Many designers are not providing the system and many code officials are approving the structure without the fire alarm system.

After researching the NFPA standards 101 (Life Safety Code), 102 (Standard for Grandstands, Folding and Telescopic Seating, Tents, and Membrane Structures), and 5000 (Building Construction and Safety Code), I discovered that the requirement for a fire alarm system seems to be consistent. However, the NFPA standards offer an exception that allows an alternative to the visible alarm signals such as using the scoreboard, message board, or other electronic device as a notification means. There is no such exception in the IBC.

It wasn't until after reviewing the code forum blogs that I thought to look at the ICC standard 300 which is referenced from the IBC Chapter 10, Section 1030. Section 309.1 of the ICC 300 standard offers a few exceptions to the emergency voice/alarm communication systems. I fail to understand why this exception is hidden in the standard which is referenced only from the IBC means of egress chapter and it is not clear whether the exception was also intended to apply to the manual fire alarm system with notification appliances. I contacted the proponent of the ICC 300 Section 309.1, Gene Boecker, and the author of the public comment, Greg Nicholls, to get their input regarding the intent. Both told me that they believe the exception in the ICC 300 standard is intended to exempt the required fire alarm systems from the outdoor bleacher-type seating structures in addition to exempting the emergency voice/alarm communication system.

Therefore, I am proposing to bring the ICC 300 exceptions into the fire protection system chapter of the IBC and the IFC where it is more appropriately located and more likely to be seen. I have also proposed a few modifications to the ICC 300 exceptions to remove the subjectivity and add clarity.

Bibliography: 1. ICC 300 Standard on Bleachers, Folding and Telescopic Seating and Grandstands; 2017 edition, International Code Council (ICC), Washington, DC; Section 309.1
 2. NFPA 101 Life Safety Code, 2021 edition, National Fire Protection Association (NFPA), Quincy, MA, Sections 9.6 and 12.3.4

3. NFPA 102 Standard for Grandstands, Folding and Telescopic Seating, Tents, and Membrane Structures; 2016 edition; National Fire Protection Association (NFPA); Quincy, MA; Section 9.6.3.5

4. NFPA 5000 Building Construction Safety Code; 2021 edition; National Fire Protection Association (NFPA); Quincy, MA; Sections 16.3.4, 16.4.9, 32.7, and 55.2

Cost Impact: The code change proposal will decrease the cost of construction

This proposal is intended to bring into the IBC and the IFC a few exceptions for fire alarm systems and emergency voice alarm communication systems. These exceptions are buried in a standard that is not referenced from Chapter 9 of the IBC or the IFC. As a result, designers and code officials may not be aware that the exception already exists.

F86-21

F87-21

IFC: 907.2.1, 907.2.1.1 (New), 907.2.1.2 (New), 907.2.1.1, 907.2.1.2; IBC: [F] 907.2.1, [F] 907.2.1.1 (New), [F] 907.2.1.2 (New), [F] 907.2.1.1, [F] 907.2.1.2

Proponents: Nathan Ellis, SC Office of State Fire Marshal, representing self (nathan.ellis@lfr.sc.gov)

2021 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 any of the following exists:

1. In an A-1, A-3, A-4, or A-5 occupancy, where the *occupant load* due to the assembly occupancy is 300 or more ~~or~~
2. In an A-2 occupancy, where the *occupant load* due to the assembly occupancy is 100 or more.
3. 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.

Add new text as follows:

907.2.1.1 Non-separated Group A occupancies. 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.

907.2.1.2 Portions of Group E occupancies occupied for assembly purposes. Portions of Group E occupancies occupied for assembly purposes shall be provided with a fire alarm system as required for the Group E occupancy.

Revise as follows:

907.2.1.3 907.2.1.1 System initiation in Group A occupancies with an occupant load of 1,000 or more. Activation of the fire alarm in Group A occupancies with an *occupant load* of 1,000 or more shall initiate a signal using an emergency voice/alarm communications system in accordance with Section 907.5.2.2.

Exception: Where *approved*, the prerecorded announcement is allowed to be manually deactivated for a period of time, not to exceed 3 minutes, for the sole purpose of allowing a live voice announcement from an *approved*, constantly attended location.

907.2.1.4 907.2.1.2 Emergency voice/alarm communication system captions. Stadiums, arenas and *grandstands* required to caption audible public announcements shall be in accordance with Section 907.5.2.2.4.

2021 International Building Code

Revise as follows:

[F] 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 any of the following exists:

1. In an A-1, A-3, A-4, or A-5 occupancy, where the *occupant load* due to the assembly occupancy is 300 or more ~~or~~
2. In an A-2 occupancy, where the *occupant load* due to the assembly occupancy is 100 or more.
3. 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 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.

Add new text as follows:

[F] 907.2.1.1 Non-separated Group A occupancies. 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.

[F] 907.2.1.2 Portions of Group E occupancies occupied for assembly purposes. Portions of Group E occupancies occupied for assembly purposes shall be provided with a fire alarm system as required for the Group E occupancy.

Revise as follows:

[F] 907.2.1.3 ~~907.2.1.1~~ System initiation in Group A occupancies with an occupant load of 1,000 or more. Activation of the fire alarm in Group A occupancies with an *occupant load* of 1,000 or more shall initiate a signal using an emergency voice/alarm communications system in accordance with Section 907.5.2.2.

Exception: Where *approved*, the prerecorded announcement is allowed to be manually deactivated for a period of time, not to exceed 3 minutes, for the sole purpose of allowing a live voice announcement from an *approved, constantly attended location*.

[F] 907.2.1.4 ~~907.2.1.2~~ Emergency voice/alarm communication captions. Stadiums, arenas and *grandstands* required to caption audible public announcements shall be in accordance with Section 907.5.2.2.4.

Reason Statement: This code change simply reorganizes 907.2 and adds a requirement that a manual fire alarm with occupant notification be required for A-2 occupancies when the occupant load is 100 or more. The purpose of this change is that the situation currently exists where a restaurant (A-2) is required by section 903.2.1.2 to be equipped with a fire sprinkler system. The fire sprinkler system is required by 903.4 to be supervised and monitored for water flow by a listed fire alarm control unit (FACU). The FACU is required to be monitored by a supervising station. And an alarm on the exterior of the building is required to activate upon water flow. So the situation exists whereby a fire can occur that activates the water flow alarm, the fire department is dispatched by the supervising station, the water flow alarm is sounding on the exterior of the building, but the occupants of the building are never alerted to the fire. All of the components of the fire alarm system are required to exist except for the occupant notification devices that are required as a part of 907.2. The exception for the manual pull station when the building is sprinklered will still exist. The only new requirement that this creates is for occupant notification devices for A-2 with occupant load between 100 and 299.

Cost Impact: The code change proposal will increase the cost of construction. Because all of the components of the fire alarm system except for the occupant notification devices are already required by 903.4, the increased cost to add occupant notification will be minimum. The number of devices will depend on the size and floor plan of the space, but could be as few as 1 notification device. This requirement would only apply to new construction.

F87-21

F88-21

IFC: CHAPTER 9, SECTION 907, 907.1, 907.2.2, 907.2.2.2 (New), 907.2.4, 907.2.4.1 (New), 907.2.7 (New), 907.2.7, 907.2.7.1, 907.2.7.2 (New), 907.2.10 (New), 907.2.10, 907.2.10.2 (New); IBC: CHAPTER 9, SECTION 907, [F] 907.1, [F] 907.2.2, [F] 907.2.2.2 (New), [F] 907.2.4, [F] 907.2.4.1 (New), [F] 907.2.7 (New), [F] 907.2.7, [F] 907.2.7.1, [F] 907.2.7.2 (New), [F] 907.2.10 (New), [F] 907.2.10, [F] 907.2.10.2 (New)

Proponents: Robert J Davidson, Davidson Code Concepts, LLC, representing Tesla, USA (rjd@davidsoncodeconcepts.com)

2021 International Fire Code

CHAPTER 9 FIRE PROTECTION AND LIFE SAFETY SYSTEMS

SECTION 907 FIRE ALARM AND DETECTION SYSTEMS.

907.1 General. This section covers the application, installation, performance and maintenance of fire alarm systems and their components in new and existing buildings and structures. The requirements of Section 907.2 are applicable to new buildings and structures. The requirements of Section 907.9 are applicable to existing buildings and structures.

907.2.2 Group B. A manual fire alarm system, which activates the occupant notification system in accordance with Section 907.5, 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 an ambulatory care facility.

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.

Add new text as follows:

907.2.2.2 Laboratories; research and development or testing. A fire alarm system activated by an air sampling-type smoke detection system or a radiant energy-sensing detection system shall be installed throughout the entire fire area utilized for the research and development or testing of lithium-ion or lithium metal batteries.

907.2.4 Group F. A manual fire alarm system that activates the occupant notification system in accordance with Section 907.5 shall be installed in Group F occupancies where both of the following conditions exist:

1. The Group F occupancy is two or more stories in height.
2. The Group F occupancy has a combined *occupant load* of 500 or more above or below the lowest *level of exit discharge*.

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.

Add new text as follows:

907.2.4.1 Manufacturing involving lithium-ion or lithium metal batteries. A fire alarm system activated by an air sampling-type smoke detection system or a radiant energy-sensing detection system shall be installed throughout the entire fire area where lithium-ion or lithium metal batteries are manufactured; and where the manufacturer of vehicles, energy storage systems or equipment containing lithium-ion or lithium metal batteries where the batteries are installed as part of the manufacturing process.

907.2.7 Group M. Fire alarm systems shall be required in Group M occupancies in accordance with Sections 907.2.7.1 and 907.2.7.2:

Revise as follows:

907.2.7.1 ~~907.2.7 Group M~~ Occupant load. A manual fire alarm system that activates the occupant notification system in accordance with Section 907.5 shall be installed in Group M occupancies where one of the following conditions exists:

1. The combined Group M *occupant load* of all floors is 500 or more persons.
2. The Group M *occupant load* is more than 100 persons above or below the lowest *level of exit discharge*.

Exceptions:

1. A manual fire alarm system is not required in covered or open mall buildings complying with Section 402 of the International Building Code.
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 and the occupant notification appliances will automatically activate throughout the notification zones upon sprinkler water flow.

907.2.7.1.1 ~~907.2.7.1~~ Occupant notification. During times that the building is occupied, the initiation of a signal from a manual fire alarm box or from a waterflow switch shall not be required to activate the alarm notification appliances when an alarm signal is activated at a constantly attended location from which evacuation instructions shall be initiated over an emergency voice/alarm communication system installed in accordance with Section 907.5.2.2.

Add new text as follows:

907.2.7.2 Storage of lithium-ion or lithium metal batteries. A fire alarm system activated by an air sampling-type smoke detection system or a radiant energy-sensing detection system shall be installed in a room or space within a Group M occupancy where required for the storage of lithium-ion or lithium metal batteries by Section 321.

907.2.10 Group S. A fire alarm system shall be in a Group S occupancy as required by the following sections:

Revise as follows:

907.2.10.1 ~~907.2.10~~ Group S Public- and self storage occupancies. A manual fire alarm system that activates the occupant notification system in accordance with Section 907.5 shall be installed in Group S public- and self-storage occupancies three stories or greater in height for interior corridors and interior common areas. Visible notification appliances are not required within storage units.

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.

Add new text as follows:

907.2.10.2 Storage of lithium-ion or lithium metal batteries. A fire alarm system activated by an air sampling-type smoke detection system or a radiant energy-sensing detection system shall be installed throughout the entire fire area where required for the storage of lithium-ion batteries or lithium metal batteries By Section 321 of this code.

2021 International Building Code

CHAPTER 9 FIRE PROTECTION AND LIFE SAFETY SYSTEMS

SECTION 907 FIRE ALARM AND DETECTION SYSTEMS.

[F] 907.1 General. This section covers the application, installation, performance and maintenance of fire alarm systems and their components.

[F] 907.2.2 Group B. A manual fire alarm system, which activates the occupant notification system in accordance with Section 907.5, 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 an *ambulatory care facility*.

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.

Add new text as follows:

[F] 907.2.2.2 Laboratories; research and development or testing. A fire alarm system activated by an air sampling-type smoke detection system or a radiant energy-sensing detection system shall be installed throughout the entire fire area utilized for the research and development or testing of lithium-ion or lithium metal batteries.

[F] 907.2.4 Group F. A manual fire alarm system that activates the occupant notification system in accordance with Section 907.5 shall be installed in Group F occupancies where both of the following conditions exist:

1. The Group F occupancy is two or more *stories* in height.

2. The Group F occupancy has a combined *occupant load* of 500 or more above or below the lowest *level of exit discharge*.

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.

Add new text as follows:

[F] 907.2.4.1 Manufacturing involving lithium-ion or lithium metal batteries. A fire alarm system activated by an air sampling-type smoke detection system or a radiant energy-sensing detection system shall be installed throughout the entire fire area where lithium-ion or lithium metal batteries are manufactured; and where the manufacturer of vehicles, energy storage systems or equipment containing lithium-ion or lithium metal batteries when the batteries are installed as part of the manufacturing process.

[F] 907.2.7 Group M. A fire alarm system shall be in a Group M occupancy as required by the following sections:

Revise as follows:

[F] 907.2.7.1 ~~907.2.7 Group M Occupant load.~~ A manual fire alarm system that activates the occupant notification system in accordance with Section 907.5 shall be installed in Group M occupancies where one of the following conditions exists:

1. The combined Group M *occupant load* of all floors is 500 or more persons.
2. The Group M *occupant load* is more than 100 persons above or below the lowest *level of exit discharge*.

Exceptions:

1. A manual fire alarm system is not required in *covered or open mall buildings* complying with Section 402.
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 and the occupant notification appliances will automatically activate throughout the notification zones upon sprinkler water flow.

[F] 907.2.7.1.1 ~~907.2.7.1 Occupant notification.~~ During times that the building is occupied, the initiation of a signal from a manual fire alarm box or from a waterflow switch shall not be required to activate the alarm notification appliances when an *alarm signal* is activated at a *constantly attended location* from which evacuation instructions shall be initiated over an emergency voice/alarm communication system installed in accordance with Section 907.5.2.2.

Add new text as follows:

[F] 907.2.7.2 Storage of lithium-ion or lithium metal batteries. A fire alarm system activated by an air sampling-type smoke detection system or a radiant energy-sensing detection system shall be installed in a room or space within a Group M occupancy where required for the storage of lithium-ion or lithium metal batteries by Section 321.

[F] 907.2.10 Group S. A fire alarm system shall be in a Group S occupancy as required by the following sections:

Revise as follows:

[F] 907.2.10.1 ~~907.2.10 Group S Public- and self-storage occupancies.~~ A manual fire alarm system that activates the occupant notification system in accordance with Section 907.5 shall be installed in Group S public- and self-storage occupancies three stories or greater in height for interior corridors and interior common areas. Visible notification appliances are not required within storage units.

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.

Add new text as follows:

[F] 907.2.10.2 Storage of lithium-ion or lithium metal batteries. A fire alarm system activated by an air sampling-type smoke detection system or a radiant energy-sensing detection system shall be installed throughout the entire fire area where required for the storage of lithium-ion batteries or lithium metal batteries By Section 321 of the International Fire Code.

Staff Analysis: Note that several proposed sections refer to proposed Section 321 within proposal F21-21.

Reason Statement: Over the last few cycles there have been a series of proposals dealing with energy storage systems that have highlighted the fire potential presented by lithium-ion and lithium metal batteries. Systems as small as 20 kWh or less would require the installation of a detection system. However, we have yet to fill in the blanks concerning these batteries in other occupancies and activities where there is a similar or greater potential for a fire event. This cycle there are additional topics covered by submittals such as battery collection and storage, personal mobility

devices and emergency action plans.

To safely and effectively deal with the potential fire involving a thermal runaway involving a lithium-ion or lithium metal battery requires early detection, a mitigation plan and suppression. This proposal is to cover the detection side of the equation.

907.2.2.2 is intended to capture testing, research and development activities where there can be an increased risk of thermal runaway and where in some cases it is intentional caused.

907.2.4.1 captures the manufacture of the batteries; and also captures the manufacture of vehicles, ESS and equipment where the battery is installed as part of the manufacturing process.

907.2.7.2 is a coordinating pointer where an M Group occupancy would require detection. based upon proposed Section 321.

907.2.10.2 is a coordinating pointer where a S Group would require detection based upon proposed Section 321.

Cost Impact: The code change proposal will increase the cost of construction

On a straight forward analysis this series of changes increases the cost construction. However, the majority of the medium to large size facilities involved in these activities do have detection and any new construction of this nature includes detection. Balanced against the cost of a fire that can not be extinguished routinely the installation of the early detection is ultimately a savings.

F88-21

F89-21

IFC: 907.2.11, 907.2.11.3; IBC: [F] 907.2.11, [F] 907.2.11.3; IPMC: [F] 704.6, [F] 704.6.1.3

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Fire Code

Revise as follows:

907.2.11 Single- and multiple-station smoke alarms. *Listed* single- and multiple-station smoke alarms complying with UL 217 shall be installed in accordance with Sections 907.2.11.1 through 907.2.11.7, ~~and NFPA 72 and the manufacturer's published instructions.~~

907.2.11.3 Installation near cooking appliances. Smoke alarms shall ~~not~~ be installed a minimum of 10 ft (3.0 m) horizontally from a permanently installed cooking appliance. ~~in the following locations unless this would prevent placement of a smoke alarm in a location required by Section 907.2.11.1 or 907.2.11.2:~~

Exception: Smoke alarms shall be permitted to be installed between 6 ft. (1.8 m) and 10 ft. (3.0 m) horizontally from a permanently installed cooking appliance where necessary to comply with Section 907.2.11.1 or 907.2.11.2.

- ~~1. Ionization smoke alarms shall not be installed less than 20 feet (6096 mm) horizontally from a permanently installed cooking appliance.~~
- ~~2. Ionization smoke alarms with an alarm silencing switch shall not be installed less than 10 feet (3048 mm) horizontally from a permanently installed cooking appliance.~~
- ~~3. Photoelectric smoke alarms shall not be installed less than 6 feet (1829 mm) horizontally from a permanently installed cooking appliance.~~

2021 International Building Code

Revise as follows:

[F] 907.2.11 Single- and multiple-station smoke alarms. *Listed* single- and multiple-station smoke alarms complying with UL 217 shall be installed in accordance with Sections 907.2.11.1 through 907.2.11.7, ~~and NFPA 72 and the manufacturer's published instructions.~~

[F] 907.2.11.3 Installation near cooking appliances. Smoke alarms shall ~~not~~ be installed a minimum of 10 ft. (3.0 m) horizontally from a permanently installed cooking appliance. ~~in the following locations unless this would prevent placement of a smoke alarm in a location required by Section 907.2.11.1 or 907.2.11.2:~~

Exception: Smoke alarms shall be permitted to be installed between 6 ft. (1.8 m) and 10 ft. (3.0 m) horizontally from a permanently installed cooking appliance where necessary to comply with Section 907.2.11.1 or 907.2.11.2.

- ~~1. Ionization smoke alarms shall not be installed less than 20 feet (6096 mm) horizontally from a permanently installed cooking appliance.~~
- ~~2. Ionization smoke alarms with an alarm silencing switch shall not be installed less than 10 feet (3048 mm) horizontally from a permanently installed cooking appliance.~~
- ~~3. Photoelectric smoke alarms shall not be installed less than 6 feet (1829 mm) horizontally from a permanently installed cooking appliance.~~

2021 International Property Maintenance Code

[F] 704.6 Single- and multiple-station smoke alarms. Single- and multiple-station smoke alarms shall be installed in existing Group I-1 and R occupancies in accordance with Sections 704.6.1 through 704.6.3.

Revise as follows:

[F] 704.6.1.3 Installation near cooking appliances. Smoke alarms shall ~~not~~ be installed a minimum of 10 ft. (3.0 m) horizontally from a permanently installed cooking appliance ~~in the following locations unless this would prevent placement of a smoke alarm in a location required by Section 704.6.1.1 or 704.6.1.2.~~

Exception: Smoke alarms shall be permitted to be installed between 6 ft. (1.8 m) and 10 ft. (3.0 m) from a permanently installed cooking appliance where necessary to comply with Section 704.6.1 or 704.6.2.

- ~~1. Ionization smoke alarms shall not be installed less than 20 feet (6096 m) horizontally from a permanently installed cooking appliance.~~
- ~~2. Ionization smoke alarms with an alarm silencing switch shall not be installed less than 10 feet (3048 mm) horizontally from a permanently installed cooking appliance.~~
- ~~3. Photoelectric smoke alarms shall not be installed less than 6 feet (1829 mm) horizontally from a permanently installed cooking appliance.~~

Reason Statement: This proposal simply aligns the code requirements in IFC, IBC and IPMC with the current edition of NFPA 72 and the 8th Edition of UL 217. This proposal removes the outdated requirements related to specifying ionization or photoelectric smoke alarm technologies because all smoke alarms will be listed for resistance to common nuisance sources from cooking when the 2024 edition of the IFC, IBC and IPMC are published.

NFPA 72 Section 29.11.3.4(4)(2) requires smoke alarms to be listed for resistance to common nuisance sources from cooking in accordance with the 8th Edition of UL 217 or subsequent editions. The reason UL smoke alarm and detector standards have new performance tests is to reduce the frequency of unwanted alarm activation from normal cooking activities such as pan-frying, sauteing or baking. The new cooking resistance tests are necessary because normal cooking activities are the leading cause of unwanted alarm activations that result in homeowners removing or deactivating their smoke alarms. Therefore, the technology specific requirement for devices installed between 6 and 20 feet are now longer relevant.

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 and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: <https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/>

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal simply aligns the IBC and IFC with NFPA 72 and UL 217

F89-21

F90-21

IFC: 907.2.16; IBC: [F] 907.2.16

Proponents: William Koffel, representing Household and Commercial Products Association (wkoffel@koffel.com)

2021 International Fire Code

Revise as follows:

907.2.16 Aerosol storage uses. Aerosol product rooms and general-purpose warehouses containing aerosol products and plastic aerosol products shall be provided with an *approved* manual fire alarm system where required by this code.

2021 International Building Code

Revise as follows:

[F] 907.2.16 Aerosol storage uses. *Aerosol product* rooms and general-purpose warehouses containing aerosol products and plastic aerosol products shall be provided with an *approved* manual fire alarm system where required by the *International Fire Code*.

Reason Statement: Full scale fire tests are being conducted to determine the appropriate protection criteria for plastic aerosol 2 products and plastic aerosol cooking spray products.

This change is technical in nature and the requirements will be determined upon completion of the fire test program.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal adds requirements for plastic aerosol products that are not currently addressed by the IFC.

F90-21

F91-21

IFC: 907.2.24 (New); IBC: [F] 907.2.24 (New)

Proponents: Daniel Nichols, representing Metropolitan Transportation Authority, Construction and Development (dnichols@mnr.org)

2021 International Fire Code

Add new text as follows:

907.2.24 Mixed Use Buildings. Any structure that has an occupant load of 1000 or more shall initiate a signal using an emergency voice/alarm communications system in accordance with Section 907.5.2.2.

2021 International Building Code

Add new text as follows:

[F] 907.2.24 Mixed use buildings. Any structure that has an occupant load of 1000 or more shall initiate a signal using an emergency voice/alarm communications system in accordance with Section 907.5.2.2.

Reason Statement: Large area buildings create additional needs to adequately notify occupants of emergency events. With the extension of assembly occupancies into unlimited area buildings, as well as the broadening of the use of Group B for vocational training and other uses where occupants are not familiar with the building, it is important that the same level of notification is provided as if it was an assembly occupancy. The threshold of 1000 is the same as that for a Group A.

EVACS provides clear direction that is aligned with the fire safety, evacuation, and lockdown plan. With the addition of lockdown plans to IFC Chapter 4, the additional ability to communicate this information is essential. Additionally, the use of the EVACS voice system provides a reliable and supervised method to communication from a single point throughout large buildings.

Cost Impact: The code change proposal will increase the cost of construction
EVACS systems require additional wire and controls, when compared to horn/strobe arrangements.

F91-21

F92-21

IFC: 907.5.2.1.3, 907.5.2.1.3.1, 907.5.2.1.3.2; IBC: [F] 907.5.2.1.3, [F] 907.5.2.1.3.1, [F] 907.5.2.1.3.2

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Fire Code

Revise as follows:

907.5.2.1.3 Audible alarm signal frequency in Group R-1, and R-2, and I-1 sleeping rooms. Audible alarm signal frequency in Group R-1, and R-2, and I-1 occupancies shall be in accordance with Sections 907.5.2.1.3.1 and 907.5.2.1.3.2.

907.5.2.1.3.1 Fire alarm system audible signal. In sleeping rooms of Group R-1, and R-2, and I-1 occupancies, the audible alarm signal activated by a fire alarm system shall be a 520-Hz low-frequency signal complying with NFPA 72.

907.5.2.1.3.2 Smoke alarm signal in sleeping rooms. In sleeping rooms of Group R-1, and R-2, and I-1 occupancies that are required by Section 907.2.8 or 907.2.9 to have a fire alarm system, the audible alarm signal activated by single- or multiple-station smoke alarms in the *dwelling unit* or *sleeping unit* shall be a 520-Hz signal complying NFPA 72.

Where a sleeping room smoke alarm is unable to produce a 520-Hz signal, the 520-Hz alarm signal shall be provided by a *listed* notification appliance or a smoke detector with an integral 520-Hz sounder.

2021 International Building Code

Revise as follows:

[F] 907.5.2.1.3 Audible alarm signal frequency in Group R-1, and R-2, and I-1 sleeping rooms. Audible alarm signal frequency in Group R-1, and R-2, and I-1 occupancies shall be in accordance with Sections 907.5.2.1.3.1 and 907.5.2.1.3.2.

[F] 907.5.2.1.3.1 Fire alarm system audible signal. In sleeping rooms of Group R-1, and R-2, and I-1 occupancies, the audible alarm signal activated by a fire alarm system shall be a 520-Hz low-frequency signal complying with NFPA 72.

[F] 907.5.2.1.3.2 Smoke alarm signal in sleeping rooms. In sleeping rooms of Group R-1, and R-2, and I-1 occupancies that are required by Section 907.2.8 or 907.2.9 to have a fire alarm system, the audible alarm signal activated by single- or multiple-station smoke alarms in the *dwelling unit* or *sleeping unit* shall be a 520-Hz signal complying with NFPA 72. Where a sleeping room smoke alarm is unable to produce a 520-Hz signal, the 520-Hz alarm signal shall be provided by a *listed* notification appliance or a smoke detector with an integral 520-Hz sounder.

Reason Statement: This Proposal seeks to enhance the ability of residents in and I-1 Occupancies to be awakened by the fire alarm system or smoke alarm by requiring the 520 Hz low frequency audible alarm signal. This proposal is needed because residents in I-1 Occupancies do not rely on trained staff to wake them and they are able to self-evacuate the building. Another FPRF Report, Waking Effectiveness of Alarms for Adults Who Are Hard of Hearing, concludes the 520 Hz low frequency is six times more effective than the standard 3 KHz signal at waking high risk segments of the population (people over 65, people who are hard of hearing, school age children and people who are alcohol impaired). The standard 3 KHz audible alarm signal has been used in all fire alarm horns and smoke alarms for the past 30 years.

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 and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: <https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/>

Cost Impact: The code change proposal will increase the cost of construction

Cost Impact: The code change will increase cost of construction. The total installation cost will only increase in new R-1, R-2 and I-1 occupancies where a fire alarm system is required by Section 907 by requiring the use of the 520 Hz low frequency audible fire alarm signal in sleeping rooms of these occupancies. In accordance with the included cost analysis the "estimated" price increase is \$57 per sleeping room for occupancies that are not required to utilize an emergency voice alarm communication (EVAC) system for occupant notification and approximately \$107 per sleeping room for occupancies that are required to utilize an (EVAC) system for occupant notification.

For non-EVAC systems, the solution utilizes a currently available smoke detector with an integral low frequency sounder base instead of installing a smoke alarm and low frequency horn. For EVAC systems, the solution utilizes a currently available fire alarm system speaker and a smoke detector with an integral low frequency sounder base.

F93-21

IFC: 907.10, 907.10.1 (New), 907.10.2 (New); IPMC: [F] 704.7, 704.7.1 (New), 704.7.2 (New)

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Fire Code

Revise as follows:

907.10 Smoke alarm maintenance. Smoke alarms shall be tested and maintained in accordance with the manufacturer's published instructions and this code.

~~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 an earlier replacement is specified in the manufacturer's published instructions.~~

Add new text as follows:

907.10.1 Original construction. Smoke alarms installed in compliance with the adopted building code at the time of their installation shall be permitted in accordance with 907.10.2.

907.10.2 Replacement. Smoke alarms shall be replaced where any of the following apply:

1. The smoke alarm fails to respond to operability tests or does not function.
2. Where the smoke alarm exceeds 10 years from the date of manufacture marked on the unit, unless an earlier replacement is specified in the manufacturer's published instructions.
3. The smoke alarm end-of-life signal is sounded.
4. The smoke alarm date of manufacturer cannot be determined.

2021 International Property Maintenance Code

Revise as follows:

[F] 704.7 Single- and multiple-station smoke alarms. Single- and multiple-station smoke alarms shall be tested and maintained in accordance with the manufacturer's published instructions and this code. ~~Smoke alarms shall be replaced that do not function shall be replaced. Smoke alarms installed in one- and two-family dwellings shall be replaced not more than 10 years from the date of manufacture marked on the unit, or shall be replaced if the date of manufacture cannot be determined.~~

Add new text as follows:

704.7.1 Original construction. Single- and multiple-station smoke alarms installed in accordance with the adopted building code at the time of their installation shall be permitted in accordance with 704.7.2.

704.7.2 Replacement. Smoke alarms shall be replaced where any of the following apply:

1. The smoke alarm fails to respond to operability tests or does not function.
2. Where the smoke alarm exceeds 10 years from the date of manufacture marked on the unit, unless an earlier replacement is specified in the manufacturer's published instructions.
3. The smoke alarm end-of-life signal is sounded.
4. The smoke alarm date of manufacturer cannot be determined.

Reason Statement: This change does not add any new requirements. It simply matched the IFC and IPMC requirements and clarifies when smoke alarms must be replaced. The section is re-formatted with a list for ease in use of both the IFC and IPMC. The language below better describes how Section 907.10 has been revised and broken into several sections.

907.10 Smoke alarm maintenance. Smoke alarms shall be tested and maintained in accordance with the manufacturer's published instructions and this code.

907.10.1. Smoke alarms installed in compliance with the adopted building code at the time of their installation shall be permitted in accordance with 907.10.2.

907.10.2 Replacement . Smoke alarms shall be replaced where any of the following apply:

1. The smoke alarm fails ~~When they fail~~ to respond to operability tests or does not function
- 2, ~~or when they exceed~~ Where the smoke alarm exceeds 10 years from the date of manufacture marked on the unit, unless an earlier replacement is specified in the manufacturer's published instructions.
3. The smoke alarm end-of-life signal is sounded.
4. The smoke alarm date of manufacturer cannot be determined.

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 and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: <https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/>

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change is a simple correlation between IFC and IPMC and re-formatting.

F93-21

F94-21

IFC: 907.10.1 (New) ([F] IBC 907.10.1 (New)), 1103.8.3

Proponents: Thomas Daly, HSCG - representing the AH&LA, representing AH&LA (Thomas.Daly@myhscg.com)

2021 International Fire Code

Add new text as follows:

907.10.1 Replacement smoke alarms. Where the replacement of smoke alarms is required in accordance with Section 907.10, smoke alarms with a non-rechargeable, nonreplaceable primary battery capable of operating the device for at least 10 years in the normal condition, followed by 4 minutes of alarm, followed by 7 days of trouble shall be permitted.

Revise as follows:

1103.8.3 Power source. Single-station smoke alarms shall receive their primary power from the building wiring provided that such wiring is served from a commercial source and shall be equipped with a battery backup. Smoke alarms with integral strobes that are not equipped with battery backup shall be connected to an emergency electrical system. Smoke alarms shall emit a signal when the batteries are low. Wiring shall be permanent and without a disconnecting switch other than as required for overcurrent protection.

Exceptions:

1. Smoke alarms are permitted to be solely battery operated in existing buildings where construction is not taking place.
2. Smoke alarms are permitted to be solely battery operated in buildings that are not served from a commercial power source.
3. Smoke alarms are permitted to be solely battery operated in existing areas of buildings undergoing *alterations* or repairs that do not result in the removal of interior walls or ceiling finishes exposing the structure, unless there is an attic, crawl space or *basement* available that could provide access for building wiring without the removal of interior finishes.
4. Smoke alarms with a non-rechargeable, nonreplaceable primary battery capable of operating the device for at least 10 years in the normal condition, followed by 4 minutes of alarm, followed by 7 days of trouble shall be permitted.

Reason Statement: Starting with the 2021 edition of the IFC, smoke alarms must produce a 520hz signal, see Section 907.5.2.1.3.

Current versions of listed typical 120vac/9vdc powered smoke alarms, used in multiple Group R occupancies, cannot produce the 520hz signal on secondary power.

Presently, at least one manufacturer of smoke alarms (Siterwell) has a 10-year sealed battery powered smoke alarm that can produce the required 520hz signal.

NFPA 72 has permitted the use of 10-year sealed battery smoke alarms since the 2010 edition, see Sec. 29.9 in the 2019 edition and Sec. 29.6 in earlier editions. The FCAC's Work Group on Alarms has been tasked with aligning NFPA 72 requirements with the IFC.

Cost Impact: The code change proposal will decrease the cost of construction

This code change will decrease the cost of construction/operations in existing Group R occupancies.

The 2021 IFC (Sec. 907.10) requires the replacement of smoke alarms at 10 years of age regardless of operating condition.

Group R hotels, apartments and time shares and Group I-1 congregate living facilities historically have installed smoke alarms in 'sleeping units' therein per the requirements of the 2021 (and earlier editions) of the IFC at Sections 907.2.11 and 1103.8.1, with the power requirements (Sec. 907.2.11.6) of 120vac normal power and a 9vdc battery backup for secondary power.

The NEW requirement in the 2021 IFC at Sec. 907.5.2.1.3.2 now requires such smoke alarms to emit a 520hz signal. No currently listed 120vac powered smoke alarms can produce the 520hz signal on secondary power.

The alternative is to install a monitored (24vdc) smoke detector with a sounder base which can produce the 520hz signal on secondary power.

The marginal cost difference for a 120vac powered smoke alarm (~\$50 per unit installed or replaced) v. a 24vdc monitored smoke detector with a sounder base (~\$700 per unit installed including devices, new circuits, power supplies and points in the FACP) is \$650, assuming, for existing buildings, the building's fire alarm system is capable of supporting those additional smoke detectors (initiating devices).

-

The 2021 IFC impact on the Group R-1 hotel industry alone, with some 5.2 million hotel guest rooms and suites in the U.S., is therefore \$3.38 BILLION, unless a more cost effective alternative is provided. That number would increase by a factor of 10 when other impacted Group R and I occupancies (apartments, time-shares and congregate living facilities) are included.

The use of a 10 year sealed battery operated smoke alarm that can produce a 520hz signal in those sleeping units of Group R & I occupancies would cost about \$100 per unit installed (material, labor, taxes and shipping), resulting in a dramatic decrease in the cost of construction and operation. NFPA 72 allows for such 10 year sealed battery operated smoke alarms to protect those occupancies.

F94-21

F95-21

IFC: 909.8.1; IBC: [F] 909.8.1; IMC: [F] 513.8.1

Proponents: Raymond Grill, representing Self (ray@raygrillconsulting.com)

2021 International Fire Code

Revise as follows:

909.8.1 Smoke layer. The height of the lowest horizontal surface of the smoke layer interface shall be maintained not less than 6 feet (1829 mm) above a walking surface that forms a portion of a required egress system within the smoke zone. The smoke layer interface shall be maintained for 1.5 times the required safe egress time.

2021 International Building Code

Revise as follows:

[F] 909.8.1 Smoke layer. The height of the lowest horizontal surface of the smoke layer interface shall be maintained not less than 6 feet (1829 mm) above a walking surface that forms a portion of a required egress system within the smoke zone. The smoke layer interface shall be maintained for 1.5 times the required safe egress time.

2021 International Mechanical Code

Revise as follows:

[F] 513.8.1 Exhaust rate. The height of the lowest horizontal surface of the accumulating smoke layer shall be maintained not less than 6 feet (1829 mm) above any walking surface that forms a portion of a required egress system within the smoke zone. The smoke layer interface shall be maintained for 1.5 times the required safe egress time.

Reason Statement: The smoke layer interface analysis is specific to smoke control systems employing the exhaust method. The 20 minute minimum duration of operation provided in Section 904.5 of the Analysis section is often inappropriately interpreted as requiring the smoke layer interface in an exhaust method system to be maintained for a minimum of 20 minutes. For small areas near the top of an atrium, this can be a factor of 5 or more times the egress time.

The duration of operation requirement is applicable to all types of smoke control systems including pressurization method systems, airflow method systems, and exhaust method systems. requiring a minimum duration of operation is different than evaluating a smoke layer interface requirement.

This change clarifies the requirement for maintaining a smoke layer interface at an appropriate height for a specific duration to provide a safe egress environment in exhaust method systems. As noted in Section 909.8, the exhaust method is intended for large enclosed volumes such as atriums and malls.

Cost Impact: The code change proposal will decrease the cost of construction

Over design of a smoke control system can be very costly. This code change aims to clarify the intent of the code for exhaust systems.

F95-21

F96-21

IFC: 909.18.3; IBC: [F] 909.18.3

Proponents: William Koffel, representing Air Movement and Control Association (wkoffel@koffel.com)

2021 International Fire Code

Revise as follows:

909.18.3 Dampers. Dampers shall be tested for function in their installed condition in accordance with NFPA 80 and NFPA 105.

2021 International Building Code

Revise as follows:

[F] 909.18.3 Dampers. *Dampers* shall be tested for function in their installed condition in accordance with NFPA 80 and NFPA 105.

Reason Statement: Adding this reference to the appropriate NFPA standards for dampers clarifies and reinforces the applicable acceptance testing requirements. The statement as written in the 2021 IFC seems to omit some of the practices and requirements involved with damper acceptance testing. The clarification made by this proposal helps to detail these requirements.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

This proposal does not increase cost since it does not make technical changes to damper acceptance testing requirements, but rather clarifies and aligns this section with other damper requirements, such as in 2021 IFC Section 706, where NFPA 80 and NFPA 105 are already mentioned.

F96-21

F97-21

IFC: TABLE 911.1; IBC: TABLE 414.5.1

Proponents: Geoffrey Raifsnider, representing Self (graifsnider@globalfinishing.com)

2021 International Fire Code

Revise as follows:

**TABLE 911.1
EXPLOSION CONTROL REQUIREMENTS^f**

MATERIAL	CLASS	EXPLOSION CONTROL METHODS	
		Barricade construction	Explosion (deflagration) venting or explosion (deflagration) prevention systems
Hazard Category			
Combustible dusts ^a	—	Not required	Required
Cryogenic fluids	Flammable	Not required	Required
Explosives	Division 1.1	Required	Not required
	Division 1.2	Required	Not required
	Division 1.3	Not required	Required
	Division 1.4	Not required	Required
	Division 1.5	Required	Not required
	Division 1.6	Required	Not required
Flammable gas	Gaseous	Not required	Required
	Liquefied	Not required	Required
Flammable liquids	IA ^b	Not required	Required
	IB ^c	Not required	Required
Organic peroxides	Unclassified detonable	Required	Not permitted
	I	Required	Not permitted
Oxidizer liquids and solids	4	Required	Not permitted
Pyrophoric	Gases	Not required	Required
Unstable (reactive)	4	Required	Not permitted
	3 detonable	Required	Not permitted
	3 nondetonable	Not required	Required
Water-reactive liquids and solids	3	Not required	Required
	2 ^e	Not required	Required
Special Uses			
Acetylene generator rooms	—	Not required	Required
Electrochemical energy storage systems ^g	—	Not required	Required
Energy storage systems ^g	—	Not required	Required
Grain processing	—	Not required	Required
Liquefied petroleum gas distribution facilities	—	Not required	Required
Where explosion hazards exist ^d	Detonation	Required	Not permitted
	Deflagration	Not required	Required

- a. Combustible dusts 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 104.8.2. See definition of “Combustible dust” in Chapter 2.
- b. Storage or use.
- c. ~~In open use or dispensing~~ Where heated above its boiling point.
- d. Rooms containing dispensing and use of hazardous materials where an explosive environment can occur because of the characteristics or nature of the hazardous materials or as a result of the dispensing or use process.
- e. A method of explosion control shall be provided where Class 2 water-reactive materials can form potentially explosive mixtures.
- f. Explosion venting is not required for Group H-5 Fabrication Areas complying with Chapter 27 and the International Building Code.
- g. Where explosion control is required in Section 1207.6.3.

2021 International Building Code

Revise as follows:

[F] TABLE 414.5.1
EXPLOSION CONTROL REQUIREMENTS^{a, h}

MATERIAL	CLASS	EXPLOSION CONTROL METHODS	
		Barricade construction	Explosion (deflagration) venting or explosion (deflagration) prevention systems ^b
HAZARD CATEGORY			
Combustible dusts ^c	—	Not Required	Required
Cryogenic flammables	—	Not Required	Required
Explosives	Division 1.1	Required	Not Required
	Division 1.2	Required	Not Required
	Division 1.3	Not Required	Required
	Division 1.4	Not Required	Required
	Division 1.5	Required	Not Required
	Division 1.6	Required	Not Required
Flammable gas	Gaseous	Not Required	Required
	Liquefied	Not Required	Required
Flammable liquid	IA ^d	Not Required	Required
	IB ^e	Not Required	Required
Organic peroxides	U	Required	Not Permitted
	I	Required	Not Permitted
Oxidizer liquids and solids	4	Required	Not Permitted
Pyrophoric gas	—	Not Required	Required
Unstable (reactive)	4	Required	Not Permitted
	3 Detonable	Required	Not Permitted
	3 Nondetonable	Not Required	Required
Water-reactive liquids and solids	3	Not Required	Required
	2 ^g	Not Required	Required
SPECIAL USES			
Acetylene generator rooms	—	Not Required	Required
Electrochemical energy storage system ⁱ	—	Not Required	Required
Energy storage system ⁱ	—	Not Required	Required
Grain processing	—	Not Required	Required
Liquefied petroleum gas-distribution facilities	—	Not Required	Required
Where explosion hazards exist ^f	Detonation	Required	Not Permitted
	Deflagration	Not Required	Required

a. See Section 414.1.3.

b. See the *International Fire Code*.

c. Combustible dusts 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 104.8.2 of the *International Fire Code*. See definition of "Combustible dust" in Chapter 2.

d. Storage or use.

e. ~~In open use or dispensing.~~ Where heated above its boiling point.

f. Rooms containing dispensing and use of hazardous materials where an explosive environment can occur because of the characteristics or nature of the hazardous materials or as a result of the dispensing or use process.

- g. A method of explosion control shall be provided where Class 2 water-reactive materials can form potentially explosive mixtures.
- h. Explosion venting is not required for Group H-5 fabrication areas complying with Section 415.11.1 and the *International Fire Code*.
- i. Where explosion control is required in Section 1207 of the *International Fire Code*.

Reason Statement: This modification would only require explosion control for Class IB liquids heated above their boiling point. The 2021 Edition of NFPA 30 only requires explosion control for Class IA liquids stored in containers larger than 1 gallon. Including a requirement for explosion control methods for Class IB liquids heated above their boiling point in this code would address the potential explosion hazard due to a large release of flammable vapor during an abnormal operating condition or the failure of the distribution system to contain the materials.

This proposal does not change the applicable requirements for ventilation of enclosures that may contain Class IB liquids as identified in other sections of this code.

Requirements for Unstable (reactive) materials remain unchanged by this proposal.

Cost Impact: The code change proposal will decrease the cost of construction

Elimination of deflagration venting or deflagration prevention systems for enclosures intended for open use or dispensing of Class IB flammable liquids not heated above their boiling point will reduce the cost of construction.

F97-21

F98-21

IFC: TABLE 911.1, 3307.2.1; IBC: TABLE 414.5.1

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Fire Code

Revise as follows:

TABLE 911.1

EXPLOSION CONTROL REQUIREMENTS^f

Portions of table not shown remain unchanged.

MATERIAL	CLASS	EXPLOSION CONTROL METHODS	
		Barricade construction	Explosion (deflagration) venting or explosion (deflagration) prevention systems
Hazard Category			
Flammable gas	Gaseous	Not required	Required ^h
	Liquefied	Not required	Required ^h

h. Not required for Category 1B Flammable Gases having a burning velocity not exceeding 3.9 in/s (10 cm/s).

3307.2.1 Pipe cleaning and purging. The cleaning and purging of flammable gas piping systems, including cleaning new or existing piping systems, purging piping systems into service and purging piping systems out of service, shall comply with NFPA 56.

Exceptions:

1. Compressed gas piping systems other than fuel gas piping systems where in accordance with Chapter 53.
2. Piping systems regulated by the *International Fuel Gas Code*.
3. Liquefied petroleum gas systems in accordance with Chapter 61.
4. Cleaning and purging of refrigerant piping systems shall comply with the International Mechanical Code.

2021 International Building Code

Revise as follows:

[F] TABLE 414.5.1
EXPLOSION CONTROL REQUIREMENTS^{a, h}

MATERIAL	CLASS	EXPLOSION CONTROL METHODS	
		Barricade construction	Explosion (deflagration) venting or explosion (deflagration) prevention systems ^b
HAZARD CATEGORY			
Combustible dusts ^c	—	Not Required	Required
Cryogenic flammables	—	Not Required	Required
Explosives	Division 1.1	Required	Not Required
	Division 1.2	Required	Not Required
	Division 1.3	Not Required	Required
	Division 1.4	Not Required	Required
	Division 1.5	Required	Not Required
	Division 1.6	Required	Not Required
Flammable gas	Gaseous	Not Required	Required ^k
	Liquefied	Not Required	Required ^k
Flammable liquid	IA ^d	Not Required	Required
	IB ^e	Not Required	Required
Organic peroxides	U	Required	Not Permitted
	I	Required	Not Permitted
Oxidizer liquids and solids	4	Required	Not Permitted
Pyrophoric gas	—	Not Required	Required
Unstable (reactive)	4	Required	Not Permitted
	3 Detonable	Required	Not Permitted
	3 Nondetonable	Not Required	Required
Water-reactive liquids and solids	3	Not Required	Required
	2 ^g	Not Required	Required
SPECIAL USES			
Acetylene generator rooms	—	Not Required	Required
Electrochemical energy storage system ⁱ	—	Not Required	Required
Energy storage system ⁱ	—	Not Required	Required
Grain processing	—	Not Required	Required
Liquefied petroleum gas-distribution facilities	—	Not Required	Required
Where explosion hazards exist ^f	Detonation	Required	Not Permitted
	Deflagration	Not Required	Required

a. See Section 414.1.3.

b. See the *International Fire Code*.

c. Combustible dusts 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 104.8.2 of the *International Fire Code*. See definition of "Combustible dust" in Chapter 2.

d. Storage or use.

e. In open use or dispensing.

f. Rooms containing dispensing and use of hazardous materials where an explosive environment can occur because of the characteristics or nature of the hazardous materials or as a result of the dispensing or use process.

- g. A method of explosion control shall be provided where Class 2 water-reactive materials can form potentially explosive mixtures.
- h. Explosion venting is not required for Group H-5 fabrication areas complying with Section 415.11.1 and the *International Fire Code*.
- i. Where explosion control is required in Section 1207 of the *International Fire Code*.
- k. Not required for Category 1B Flammable Gases having a burning velocity not exceeding 3.9 in/s (10 cm/s).

Reason Statement: This change coordinates with the change in the definition of flammable gas. Explosive flammable gases do not include Category 1B flammable gases having a burning velocity of 3.9 in/s or less (Low BV). Table 911.1 has been modified accordingly. Category 1B low burning velocity flammable gases are excluded from the explosive flammable gas requirements. A reference to the International Mechanical Code has been added as an exception for the cleaning and purging of flammable gas piping systems requirements. Chapter 11 of the International Mechanical Code includes requirements for cleaning and purging using Category 1B low burning velocity flammable gases. 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 and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: <https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/>

Cost Impact: The code change proposal will not increase or decrease the cost of construction. This code change neither increased nor decreased in the cost of construction. The change clarifies that the requirements in these sections are applicable to Category 1A flammable gases.

F98-21

F99-21

IFC: 912.5, 912.5.1 (New), 912.5.2 (New), 912.5.3 (New), 912.5.4 (New); IBC: [F] 912.5, [F] 912.5.2 (New), [F] 912.5.3 (New), [F] 912.5.1 (New), [F] 912.5.4 (New)

Proponents: Andrew Bevis, National Fire Sprinkler Association, representing National Fire Sprinkler Association (bevis@nfsa.org); Jeffrey Hugo, representing NFSA (hugo@nfsa.org)

2021 International Fire Code

Revise as follows:

912.5 Signs. A metal sign with raised letters not less than 1 inch (25 mm) in size shall be mounted on all fire department connections serving automatic sprinklers, standpipes or fire pump connections. Such signs shall read: "AUTOMATIC SPRINKLERS" or "STANDPIPES" or "TEST CONNECTION," or "STANDPIPE AND AUTOSPKR or AUTOSPKR AND STANDPIPE," or a combination thereof as applicable. ~~Where the fire department connection does not serve the entire building, a sign shall be provided indicating the portions of the building served.~~

Add new text as follows:

912.5.1 Lettering. Each fire department connection (FDC) shall be designated by a sign with letters at least 1 in (25.4mm) in height. For manual standpipe systems, the sign shall also indicate that the system is manual and that it is either wet or dry.

912.5.2 Serving multiple buildings. Where a fire department connection (FDC) services multiple buildings, structures or location, a sign shall be provided indicating the building, structures or locations served. Where the fire department connection does not serve the entire building, a sign shall be provided indicating the portions of the building served.

912.5.3 Multiple or combined systems. Where combination or multiple systems types are supplied by the fire department connection, the sign or combination of signs shall indicate both designated services.

912.5.4 Indication of pressure. The sign also shall indicate the pressure required at the outlets to deliver the standpipe system demand.

Exception: The requirements of section 912.5.4 shall not be required where the pressure required is 150 psi (10.3 bar) or less.

2021 International Building Code

Revise as follows:

~~[F] 912.5 Signs.~~ A metal sign with raised letters not less than 1 inch (25 mm) in size shall be mounted on all fire department connections serving automatic sprinklers, standpipes or fire pump connections. Such signs shall read: "AUTOMATIC SPRINKLERS," "STANDPIPES," or "TEST CONNECTION," or "STANDPIPE AND AUTOSPKR or AUTOSPK AND STANDPIPE," or a combination thereof as applicable. ~~Where the fire department connection does not serve the entire building, a sign shall be provided indicating the portions of the building served.~~

Add new text as follows:

[F] 912.5.2 Serving Multiple Buildings. Where a fire department connection (FDC) services multiple buildings, structures or location, a sign shall be provided indicating the building, structures or locations served. Where the fire department connection does not serve the entire building, a sign shall be provided indicating the portions of the building served.

[F] 912.5.3 Multiple or combined systems. Where combination or multiple systems types are supplied by the fire department connection, the sign or combination of signs shall indicate both designated services.

[F] 912.5.1 Lettering. Each fire department connection (FDC) shall be designated by a sign with raised letters at least 1 inch (25.4mm) in height. For manual standpipe systems, the sign shall also indicate that the system is manual and that it is either wet or dry.

[F] 912.5.4 Indication of pressure. The sign also shall indicate the pressure required at the outlets to deliver the standpipe system demand.

Exception: The requirements of section 912.5.4 shall not be required where the pressure required is 150 psi (10.3 bar) or less.

Reason Statement: Currently both the IBC section 905.2 and IFC section 905.2 require the signage for fire department connection to meet the requirements found in NFPA 14 Standard for the Installation of Standpipes and Hose Systems. This amendment simply pulls those requirements into the IFC and IBC for quick identification.

Cost Impact: The code change proposal will not increase or decrease the cost of construction. This is already a requirement and is an editorial clarification.

F100-21

IFC: 915.5, 915.5.1, 915.5.2, 915.6, NFPA Chapter 80; IBC: [F] 915.5, [F] 915.5.2, [F] 915.5.1, NFPA Chapter 35; IPMC: [F] 705.2, NFPA Chapter 08

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Fire Code

915.5 Carbon monoxide detection systems. Carbon monoxide detection systems shall be an acceptable alternative to carbon monoxide alarms and shall comply with Sections 915.5.1 through 915.5.3.

Revise as follows:

915.5.1 General. Carbon monoxide detection systems shall comply with NFPA ~~72~~ 720. Carbon monoxide detectors shall be *listed* in accordance with UL 2075.

915.5.2 Locations. Carbon monoxide detectors shall be installed in the locations specified in Section 915.2. These locations supersede the locations specified in NFPA ~~72~~ 720.

915.6 Maintenance. Carbon monoxide alarms and carbon monoxide detection systems shall be maintained in accordance with NFPA ~~72~~ 720. Carbon monoxide alarms and carbon monoxide detectors that become inoperable or begin producing end-of-life signals shall be replaced.

Delete without substitution:

NFPA

National Fire Protection Association
1 Batterymarch Park
Quincy MA 02169-7471

~~720—15: Standard for the Installation of Carbon Monoxide (CO) Detection and Warning Equipment~~

2021 International Building Code

Revise as follows:

[F] 915.5 Carbon monoxide detection systems. Carbon monoxide detection systems shall be an acceptable alternative to carbon monoxide alarms and shall comply with Sections 915.5.1 through 915.5.3.

[F] 915.5.2 Locations. Carbon monoxide detectors shall be installed in the locations specified in Section 915.2. These locations supersede the locations specified in NFPA ~~720~~ 72.

[F] 915.5.1 General. Carbon monoxide detection systems shall comply with NFPA ~~720~~ 72. Carbon monoxide detectors shall be *listed* in accordance with UL 2075.

Delete without substitution:

NFPA

National Fire Protection Association
1 Batterymarch Park
Quincy MA 02169-7471

~~720—15: Standard for the Installation of Carbon Monoxide (CO) Detection and Warning Equipment~~

2021 International Property Maintenance Code

Revise as follows:

[F] 705.2 Carbon monoxide alarms and detectors. Carbon monoxide alarms and carbon monoxide detection systems shall be maintained in accordance with NFPA ~~72~~ 720. Carbon monoxide alarms and carbon monoxide detectors that become inoperable or begin producing end-of-life signals shall be replaced.

Delete without substitution:

NFPA

National Fire Protection Association
1 Batterymarch Park
Quincy MA 02169-7471

~~720—15: Standard for the Installation of Carbon Monoxide (CO) Detection and Warning Equipment~~

Reason Statement: In August 2015, the NFPA Standards Council voted to relocate the material in the 2015 edition of NFPA 720, *Standard for the*

Installation of Carbon Monoxide (CO) Detection and Warning Equipment, into the 2019 edition of NFPA 72, *National Fire Alarm and Signaling Code*. This Proposal replaces references to NFPA 720 with NFPA 72.

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 and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: <https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/>

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal only updates the standard.

F100-21

F101-21

IFC: 915.1; IBC: [F] 915.1

Proponents: Kyle Parag, representing Division of Fire Prevention & Control (Kyle.Parag@state.co.us)

2021 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.~~

2021 International Building Code

Revise as follows:

[F] 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 Chapter 11 of the International Fire Code.~~

Reason Statement: Purpose of original wording has been lost with the change to section 1103.9. Section 1103.9 now requires carbon monoxide detection to be installed in all existing buildings with matching occupancy groups as listed in 915.

Carbon monoxide detection is now required to be installed in all groups as shown in 915 and 1103.9 regardless of the construction status.

The separation of new buildings and existing buildings is no longer needed, and created confusion to begin with, as building officials could not require carbon monoxide in large alterations.

Removing this also carries over to the IBC, which give building officials the ability to require carbon monoxide detection to be installed in alterations of these occupancy types. No need to reference chapter 11 anymore, as chapter 9 relates to construction only, and chapter 11 is existing buildings.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

Change is to correct incomplete code amendment in the last cycle.

F101-21

F102-21

IFC: CHAPTER 9, SECTION 915, 915.1, 915.1.1, 915.1.2, 915.1.3, 915.1.4, 915.1.5, 915.1.6, 915.2, 915.2.1, 915.2.2, 915.2.3 (New), 915.2.34, 915.3, 915.4, 915.4.1, 915.4.2, 915.4.3, 915.4.4, 915.4.5 (New), 915.5, 915.5.1, 915.6, 915.5.2, 915.6.1, 915.5.3;

IBC: CHAPTER 9, SECTION 915 (All [F]), 915.1, 915.1.1, 915.1.2, 915.1.3, 915.1.4, 915.1.5, 915.1.6, 915.2, 915.2.1, 915.2.2, 915.2.3 (New), 915.2.34, 915.3, 915.4, 915.4.1, 915.4.2, 915.4.3, 915.4.4, 915.4.5 (New), 915.5, 915.5.1, 915.6, 915.5.2, 915.6.1, 915.5.3

Proponents: Kris Hauschildt, representing self (krishauschildt@yahoo.com)

2021 International Fire Code

CHAPTER 9 FIRE PROTECTION AND LIFE SAFETY SYSTEMS

SECTION 915 CARBON MONOXIDE DETECTION.

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.

Revise as follows:

915.1.1 Where required. Carbon monoxide detection shall be provided in Group A, B, E, F, H, I, M, ~~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 rooms, areas, dwelling units, sleeping units and classrooms in Group E occupancies that contain ~~a fuel-burning appliance or a fuel-burning fireplace.~~

915.1.3 Fuel-burning forced-air furnaces. Carbon monoxide detection shall be provided in ~~dwelling units, sleeping units and classrooms~~ the following locations served by a fuel-burning, forced-air furnace:

1. In a central or otherwise approved location in each HVAC zone on every floor level that is served by a fuel-burning forced air-furnace.
2. In dwelling units, sleeping units, classrooms in Group E occupancies and areas containing a swimming pool that are served by a fuel-burning forced-air furnace.

Exception: Carbon monoxide detection shall not be required to be installed in accordance with Section 915.1.3, Items 1 or 2, in dwelling units, sleeping units and classrooms where a carbon monoxide 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 onsite location or to an approved off-premises location in accordance with NFPA 72.

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 the following locations in buildings that contain fuel-burning appliances: ~~or fuel-burning fireplaces.~~

1. In rooms, areas, dwelling units, sleeping units and classrooms in Group E occupancies that contain a fuel-burning appliance.
2. In rooms, areas, dwelling units, sleeping units and classrooms in Group E occupancies that have communicating openings between the fuel-burning appliance and the room, area, dwelling unit, sleeping unit or classroom; or in an approved location between the fuel-burning appliance and the room, area dwelling unit, sleeping unit or classroom.
3. In dwelling units, sleeping units, classrooms in Group E occupancies, and areas containing a swimming pool.

Exceptions: Carbon monoxide detection shall not be required to be installed in accordance with Section 915.1.4, Item 3, where a carbon monoxide detector is provided in each room, area, dwelling unit, sleeping unit, or classroom in Group E occupancies that shares a common wall, ceiling or floor with the room or area containing the fuel-burning appliance, and the carbon monoxide alarm signals are automatically transmitted to an approved onsite location or to an off-premises location in accordance with NFPA 72.

1. Carbon monoxide detection shall not be required in ~~dwelling units, sleeping units and classrooms~~ without 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 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 rooms, areas, dwelling units, sleeping units and classrooms in Group E occupancies in buildings with attached private garages.

Exceptions:

1. Carbon monoxide detection shall not be required in rooms, areas, dwelling units, sleeping units and classrooms in Group E occupancies without communicating openings between the private garage and the room, area, dwelling unit, sleeping unit or classroom.
2. Carbon monoxide detection shall not be required in rooms, areas, dwelling units, sleeping units and classrooms in Group E occupancies 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 detector is provided in an *approved* location between openings to a private garage and rooms, areas, dwelling units, sleeping units or classrooms in Group E occupancies.

915.1.6 Exempt garages. For determining compliance with Section 915.1.5, an open parking garage complying with Section 406.5 of the International Building Code or an enclosed parking garage complying with Section 406.6 of the International Building Code shall not be considered a private garage.

Revise as follows:

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 915.2.34.

915.2.1 Dwelling units. Carbon monoxide detection shall be installed in *dwelling units* outside of each separate sleeping area in the immediate vicinity of the bedrooms. Where a fuel-burning appliance is located within a bedroom or its attached bathroom, carbon monoxide detection shall be installed within the bedroom.

915.2.2 Sleeping units. Carbon monoxide detection shall be installed in *sleeping units*.

Exception: Carbon monoxide detection shall be allowed to be installed outside of each separate sleeping area in the immediate vicinity of the *sleeping unit* where the *sleeping unit* or its attached bathroom does not contain a fuel-burning appliance and is not served by a forced-air furnace.

Revise as follows:

915.2.3 Areas containing a swimming pool. Carbon monoxide detection shall be installed in areas containing a swimming pool.

Exception: Where there is a conflict between the requirements of this code and the manufacturer's installation instructions, the manufacturer's installation instructions shall govern.

915.2.34 Group E occupancies. Carbon monoxide 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 Carbon monoxide detection. Carbon monoxide detection required by Sections 915.1 through 915.2.34 shall be provided by carbon monoxide alarms complying with Section 915.4 or carbon monoxide detection systems complying with Section 915.5.

915.4 Carbon monoxide alarms. Carbon monoxide alarms shall comply with Sections 915.4.1 through 915.4.45.

915.4.1 Power source. Carbon monoxide alarms shall receive their primary power from the building wiring where such wiring is served from a commercial source, and when primary power is interrupted, shall receive power from a battery. Wiring shall be permanent and without a disconnecting switch other than that required for overcurrent protection.

Exception:

Where installed in buildings without commercial power, ~~battery-powered~~ carbon monoxide alarms powered by a 10-year battery shall be an

acceptable alternative.

915.4.2 Listings. Carbon monoxide alarms shall be *listed* in accordance with UL 2034.

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.

915.4.4 Combination alarms. Combination carbon monoxide/smoke alarms shall be an acceptable alternative to carbon monoxide alarms. Combination carbon monoxide/smoke alarms shall be *listed* in accordance with UL 217 and UL 2034.

Revise as follows:

915.4.5 Installation requirements. Where required by Sections 915.1.1 through 915.5.3, carbon monoxide alarms shall be installed in accordance with Sections 915, NFPA 72, and the manufacturer's installation instructions. Where there is a conflict between the requirements of this code, NFPA 72, and the manufacturer's installation instructions, the manufacturer's installation instructions shall govern.

915.5 Carbon monoxide detection systems. Carbon monoxide detection systems shall be an acceptable alternative to carbon monoxide alarms and shall comply with Sections 915.5.1 through 915.5.3.

915.5.1 General. Carbon monoxide detection systems shall comply with NFPA 720. Carbon monoxide detectors shall be *listed* in accordance with UL 2075.

915.6 Maintenance. Carbon monoxide alarms and carbon monoxide detection systems shall be maintained in accordance with NFPA 720. Carbon monoxide alarms and carbon monoxide detectors that become inoperable or begin producing end-of-life signals shall be replaced.

915.5.2 Locations. Carbon monoxide detectors shall be installed in the locations specified in Section 915.2. These locations supersede the locations specified in NFPA 720.

915.6.1 Enclosed parking garages. Carbon monoxide and nitrogen dioxide detectors installed in enclosed parking garages in accordance with Section 404.1 of the International Mechanical Code 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.

915.5.3 Combination detectors. Combination carbon monoxide/smoke detectors installed in carbon monoxide detection systems shall be an acceptable alternative to carbon monoxide detectors, provided that they are *listed* in accordance with UL 268 and UL 2075.

Reason Statement: This proposal seeks to establish uniform baseline requirements for CO detection in all occupancies with permanently installed fuel-burning appliances, fuel-burning fireplaces or attached garages. CO poisoning incidents resulting in deaths and injuries continue to happen with alarming regularity in occupancies not covered by the current IFC as well as those that are, demonstrating that current code requirements are not adequately inclusive and are not effectively targeting problem areas within specific occupancies.

The suggested revisions contained in this proposal are based on "*Development of a Technical Basis for CO Detector Siting*," "*Diffusion of CO Through Gypsum Wallboard*," the New York State Fire Code which has required CO detection in all commercial occupancies since 2015, and data from individual case examples (see attachment and bibliography).

Requiring CO detection in all occupancies that contain known CO hazards will prevent an untold number of deaths and injuries.

Substantiation for Uniform Baseline Requirements for CO detection in All Occupancies

The lethality of CO is undisputed. The severity of poisoning injury depends not only on the level and duration of CO exposure, but also on the individual. Those most at risk from the effects of CO: infants and children, older people, pregnant women/unborn babies, and those with underlying health conditions. There is no formula that can accurately predict how CO will impact a particular person nor what level or duration of exposure can be tolerated without suffering prolonged harm, irreversible brain damage, or death. For many victims who survive a CO exposure, the effects do not end with the poisoning incident. They can be severe enough to cause death weeks to months later. They can also cause irreversible effects, including life-altering brain injury.

"In addition to the immediate onset effects of exposure, delayed-onset development of neuropsychiatric impairment typically occurs from several days to approximately 3–4 weeks after exposure, with symptoms including inappropriate euphoria, impaired judgment, poor concentration, memory loss, cognitive and personality changes, psychosis, and Parkinsonism. Symptoms of acute carbon monoxide poisoning in children are the same as those in adults. Acute carbon monoxide poisoning during pregnancy has been associated with spontaneous abortion and fetal death."

- Agency for Toxic Substances & Disease Registry, CDC

The lifesaving value of CO detection is undisputed. CO detection has been commercially available for at least 30 years and has proven reliability. There is no substitute for the early detection that these devices provide, alerting to danger before conditions escalate to a level of causing harm. In the absence of detection, it is the building occupants who are providing the alert to CO leaks, becoming ill or dying before building staff are even aware there is a problem. Some examples:

2013, North Carolina: My parents both died in a **hotel** room from a CO leak while they were on vacation. They lost consciousness and lay helpless all night, inhaling poison for over 14 hours until they died. No one in the building was even aware they were in danger. There was no CO detection onsite despite there being gas fireplaces in the guest rooms, a gas pool heater, gas dryers and gas water heaters. First responders (EMS, police, fire dept) suspected CO but thought it was more likely they both died of heart attacks so didn't bother to test the room, opting instead to wait weeks for autopsy toxicology results. The leak continued for another seven weeks, killing an 11-year-old boy and causing permanent injury to his mother in the same room before it was finally detected. Multiple people were ill at the hotel during those seven weeks, including guests and a repairman servicing the elevator which was located next to the leaking exhaust system.

2017, Michigan: A 13-year-old boy at a spring break swim party with his friends died on the deck of a **swimming pool** from CO leaking from a pool heater in an adjacent room. His friends suffered CO injury as well as head injuries when they lost consciousness and fell onto the concrete pool deck. An employee along with multiple firefighters suffered CO injuries responding to the incident.

** There is specific concern over the number of incidents in **indoor swimming pool areas** that have resulted in poisoning injuries to children. CO exposure in a pool also leads to an increased risk of drowning. These incidents are detailed on the attached spreadsheet.

2014, New York: A **restaurant** manager died from CO leaking from a fuel burning appliance in the room adjacent to his office. The assistant manager lost consciousness and suffered CO injury when she went looking for him. Multiple rescue personnel became injured as well when they rushed in to render aid, unaware they were entering a CO contaminated environment. 24 people were hospitalized including restaurant patrons. The manager had reportedly been ill for weeks prior, but neither he nor his doctors suspected it as being CO-related.

1995, California: A woman and her husband were poisoned in a **hotel** room, not found until 36 hours later – he died, she survived with permanent injury to her brain, so severe she was prevented from ever being able to work or live independently again. 25 years later, she lives in a specialized group home.

2006, Maryland: 20 **restaurant** workers suffered long term brain injury after being exposed to a CO leak that had gone unnoticed for weeks and progressed to a level of 700ppm in the dining area before problem was discovered.

2019, Ohio: CO leak at **correctional facility** caused poisoning injuries to 4 staff and 29 inmates

2019, Illinois: CO leak at a **dry cleaners**, 3 people taken to the hospital including a police officer

2019, Utah: 60 people were poisoned at a **church** from CO leaking from a boiler, having spent several hours breathing in CO levels measured at 200-500ppm. Many were projected to have long term health effects.

2021, Nebraska: 10 people poisoned at a **bowling alley**, 4 hospitalized.

According to NFIRS (National Fire Incident Reporting System) data, there were a total of 10,715 CO incidents in hotels/motels, churches, restaurants/cafeterias, bars/taverns, and K-12 schools between 1999 and 2018. This is a minimum number. Participation in the NFIRS system is voluntary and not all fire departments participate.

Further, deaths and injuries are occurring even in buildings equipped with CO detection, demonstrating the need for occupancy specific focus for future improvements beyond a baseline requirement:

2017, Texas: A couple was poisoned and found unconscious in their hotel room from CO leaking from a pool heater. The hotel was equipped with unmonitored CO detection. A couple staying a few doors down had removed the batteries from the CO alarm in their room after it had gone off multiple times during the night. The couple found unconscious later died of their CO related injuries.

2018, Tennessee: Several people were poisoned in a hotel exercise room, located on a floor with a pool but no guest rooms. The hotel reportedly had CO detection, but only on floors with guest rooms.

2019, Illinois: A couple was poisoned in their hotel room equipped with a CO alarm that was alarming, but a hotel maintenance worker told them to disregard the alarm. They ended up calling the fire department themselves and were treated at a hospital for CO poisoning.

As a homeowner it is a reasonable expectation to be aware of the hazards of CO and take responsibility to install CO detection to protect yourself. However, as an occupant of a building that is under someone else's charge, there is no way to know of equivalent hazards nor whether action has been taken to install safeguards. Combined with no human ability to detect CO, this leaves occupants critically vulnerable during any type of CO exposure incident. Their life safety is entirely at the mercy of circumstances they have no knowledge of and no control over, assuming a risk they did not choose to take.

Building and business owners rely on guidance from this code to provide basic life safety provisions for occupants. States rely on guidance from this code to pass safety legislation. People rely on this code to stay safe and keep their families safe from preventable death and harm. Emergency responders rely on this code to keep them safe from unnecessary risk in performing their already hazardous jobs.

Please act to protect people from unnecessary death and injury by approving this proposal to provide a baseline level of safety from carbon monoxide danger in all occupancies.

2021 IFC – Chapter 1 Scope and Administration

101.3 Intent.

The purpose of this code is to establish the minimum requirements consistent with nationally recognized good practice for providing a reasonable level of life safety and property protection from the hazards of fire, explosion, or dangerous conditions in new and existing buildings, structures and premises, and to provide a reasonable level of safety to fire fighters and emergency responders during emergency operations.

Bibliography: SUPPORT DOCUMENTS FOUND AT THE FOLLOWING LINK

- <https://thejenkinsfoundation.com/category/ifc-2024-proposal-support-documents/>

- Swimming Pool CO Incident Log
- Toxicological Profile for Carbon Monoxide - Agency for Toxic Substances & Disease Registry, CDC
- Development of a Technical Basis for Carbon Monoxide Detector Siting, NFPA Fire Protection Research Foundation, 2007
- 2020 Fire Code New York State
- Diffusion of Carbon Monoxide Through Gypsum Wallboard, Neil Hampson, MD
- Carbon Monoxide Poisoning, Lindell Weaver, MD, 2020
- Hotel/Motel CO Incident Log 1967-to date, Jenkins Foundation
- Commercial Building CO Incidents, Jenkins Foundation
- CO Detection and Alarm Requirements: Literature Review, NFPA Fire Protection Research Foundation, 2021
- Cost of Accidental Carbon Monoxide Poisoning: A Preventable Expense, Preventive Medicine Reports, 2016
- CO Incidents - NFIRS (National Fire Incident Reporting System) Data - REM Risk
- Carbon Monoxide Poisonings in Hotels and Motels: The Problem Silently Continues, Prev. Medicine Reports, 2019

- Carbon Monoxide Poisoning at Hotels, Motels and Resorts, Amer. Journal of Prev. Medicine, 2007
- NEMA - Life Fire Safety - Carbon Monoxide

Cost Impact: The code change proposal will increase the cost of construction

This code change proposal will increase the cost of construction but is crucial for life safety.

F102-21

F103-21

IFC: 202 (New), 915.2.2 (New); IBC: (New), [F] 915.2.2

Proponents: Thomas Daly, HSCG - representing the HSCG, representing HSCG (thomas.daly@myhscg.com)

2021 International Fire Code

Add new definition as follows:

LIVING AREA. Spaces in Group R-1 occupancies and R-2 dormitories that are contiguous to one or more sleeping units that include provisions for eating and living and can include furnishings for sleeping purposes. Bathrooms, toilet rooms, closets, halls, storage or utility spaces and similar areas are not considered living spaces.

Revise as follows:

915.2.2 Sleeping units. Carbon monoxide detection shall be installed in *sleeping units*, including within their contiguous living area(s).

Exception: Carbon monoxide detection shall be allowed to be installed outside of each separate sleeping area in the immediate vicinity of the *sleeping unit* where the *sleeping unit* or its attached bathroom does not contain a fuel-burning appliance and is not served by a forced-air furnace.

2021 International Building Code

Add new definition as follows:

LIVING AREA. Spaces in Group R-1 occupancies and R-2 dormitories that are contiguous to one or more sleeping units that include provisions for eating and living and can include furnishings for sleeping purposes. Bathrooms, toilet rooms, closets, halls, storage or utility spaces and similar areas are not considered living spaces.

Revise as follows:

[F] 915.2.2 Sleeping units. Carbon monoxide detection shall be installed in *sleeping units*, including within their contiguous living area(s).

Exception: Carbon monoxide detection shall be allowed to be installed outside of each separate sleeping area in the immediate vicinity of the *sleeping unit* where the *sleeping unit* or its attached bathroom does not contain a fuel-burning appliance and is not served by a forced air furnace.

Reason Statement: Then intent of the Proposal is to provide occupants of Group R-1 hotels and Group R-2 Dormitories with the same level of protection from exposure to carbon monoxide as they do from the dangers of fire. The Proposal requires carbon monoxide detection in spaces intended to be used for sleeping purposes such as living rooms of hotel guestrooms and suites and multi-room dormitories. The IFC, NFPA 101 and NFPA 72 currently require smoke detection in the bedroom and living room. The same requirements are needed for carbon monoxide detection. The Proposal is needed to because many system designers and code authorities are unclear if carbon monoxide detection is required in non-bedroom areas that are used for sleeping. The Proposal provides clear language that all sleeping spaces within shall be provided with the carbon monoxide detection.

In typical Group R-1 all-suite hotels, occupants of the bedroom must exit thru the living area to reach the exit corridor. Non-fire CO exposures from within or without the guest suite can and have produced harmful levels of CO with the occupants not warned as the living area is normally separated from the bedroom by a closed door.

Cost Impact: The code change proposal will increase the cost of construction

The cost impact, where it occurs, is estimated at \$50 per unit installed. Note however that provisions of the 2021 IFC Sec. 915.1.4 Exception 2 obviates the need for CO detection in dwelling and sleeping units where such detection is provided in rooms and spaces with fuel-fired appliances.

F103-21

F104-21

IFC: 915.5, 915.5.1, 915.5.2, 915.5.3, 915.5.4 (New); IBC: [F] 915.5, [F] 915.5.1, [F] 915.5.2, [F] 915.5.3, [F] 915.5.4 (New)

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Fire Code

Revise as follows:

915.5 Carbon monoxide detection systems. Carbon monoxide detection systems shall be an acceptable alternative to carbon monoxide alarms and shall comply with Sections 915.5.1 through ~~915.5.3~~ 915.5.4.

915.5.1 General. Carbon monoxide detection systems shall comply with NFPA 720. Carbon monoxide detectors shall be *listed* in accordance with UL 2075.

915.5.2 Locations. Carbon monoxide detectors shall be installed in the locations specified in Section 915.2. These locations supersede the locations specified in NFPA 720.

915.5.3 Combination detectors. Combination carbon monoxide/smoke detectors installed in carbon monoxide detection systems shall be an acceptable alternative to carbon monoxide detectors, provided that they are *listed* in accordance with UL 268 and UL 2075.

Add new text as follows:

915.5.4 Duct detection. Carbon monoxide detectors placed in environmental air ducts or plenums shall not be used as a substitute for the required protection in Section 915 of the Code.

2021 International Building Code

Revise as follows:

[F] 915.5 Carbon monoxide detection systems. Carbon monoxide detection systems shall be an acceptable alternative to carbon monoxide alarms and shall comply with Sections 915.5.1 through ~~915.5.3~~ 915.5.4.

[F] 915.5.1 General. Carbon monoxide detection systems shall comply with NFPA 720. Carbon monoxide detectors shall be *listed* in accordance with UL 2075.

[F] 915.5.2 Locations. Carbon monoxide detectors shall be installed in the locations specified in Section 915.2. These locations supersede the locations specified in NFPA 720.

[F] 915.5.3 Combination detectors. Combination carbon monoxide/smoke detectors installed in carbon monoxide detection systems shall be an acceptable alternative to carbon monoxide detectors, provided that they are listed in accordance with UL 268 and UL 2075.

Add new text as follows:

[F] 915.5.4 Duct detection. Carbon monoxide detectors placed in environmental air ducts or plenums shall not be used as a substitute for the required protection in Section 915 of the Code.

Reason Statement: This Proposal seeks to prevent a potential life safety issue by prohibiting duct mounted carbon monoxide (CO) detectors from being installed in lieu of "open area" CO detectors or alarms. This change is needed for the following reasons:

1. Duct mounted CO detectors are commercially available, but we are not aware of any that are listed to UL 2075 or UL 2034, or that can comply with those standards.
2. Duct mounted CO detectors have been proposed for use in applications where CO detection is needed, which has created confusion for designers and code officials.
3. When the HVAC system is not moving significant quantities of air duct mounted CO detectors cannot accurately detect potentially hazardous levels of CO in the rooms served by the HVAC system.
4. This proposal should remove confusion about duct mounted CO detectors being used as the required means of providing code mandated 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 and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: <https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/>

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal just restricts the use of a technology not covered by referenced standards such as UL 2075/UL 2034.

F104-21

F105-21

IFC: 917.1, 917.2 (New); IBC: [F] 917.1, [F] 917.2 (New)

Proponents: Richard Roberts, representing Automatic Fire Alarm Association (AFAA) (richard.roberts@systemsensor.com)

2021 International Fire Code

Revise as follows:

917.1 College and university campuses. Prior to construction of a new building requiring a fire alarm system on a multiple-building college or university campus having a cumulative building *occupant load* of 1,000 or more, a mass notification risk analysis shall be conducted in accordance with NFPA 72. Where the risk analysis determines a need for mass notification, an *approved* mass notification system shall be provided in accordance with the findings of the risk analysis.

Add new text as follows:

917.2 Group E Occupancies. Prior to construction of a new building containing a Group E occupancy requiring a fire alarm system having an occupant load of 500 or more, a mass notification risk analysis shall be conducted in accordance with NFPA 72. Where the risk analysis determines a need for mass notification, an approved mass notification system shall be provided in accordance with the findings of the risk analysis.

2021 International Building Code

Revise as follows:

[F] 917.1 College and university campuses. Prior to construction of a new building requiring a fire alarm system on a multiple-building college or university campus having a cumulative building *occupant load* of 1,000 or more, a mass notification risk analysis shall be conducted in accordance with NFPA 72. Where the risk analysis determines a need for mass notification, an *approved* mass notification system shall be provided in accordance with the findings of the risk analysis.

Add new text as follows:

[F] 917.2 Group E Occupancies. Prior to construction of a new building containing a Group E occupancy requiring a fire alarm system having an occupant load of 500 or more, a mass notification risk analysis shall be conducted in accordance with NFPA 72. Where the risk analysis determines a need for mass notification, an approved mass notification system shall be provided in accordance with the findings of the risk analysis.

Reason Statement: Reason:

This proposal seeks to reduce the number of injuries and fatalities in new schools from all types of emergencies including but not limited to fire, human-caused events (accidental and intentional), other dangerous situations, accidents, and natural disasters. This proposal is needed to enhance public life safety in Group E occupancies from all emergencies, but most importantly from a significant increase in human-caused incidents in recent years. According to a FBI Report, titled that details the active shooter incidents from 2000 to 2018, 171 people killed in education occupancies. Another FBI Report provides a list of incidents during the 2000-2018 time period showing other incidents. The Proposal is **only** requiring a mass notification risk analysis to be performed. If, and only if the findings of the risk analysis conclude a mass notification system is needed, then a mass notification system shall be provided.

Every facility is unique and has specific risks. A risk analysis is a process to determine the likelihood, vulnerability, and magnitude of all potential emergencies. The complexity of the risk analysis should be commensurate to the complexity of the building(s) and hazards being considered. The risk analysis will determine if a mass notification system is needed and the type of a mass notification system that best meets the specific needs of the building. This is important because mass notification is defined as "a technology capable of sending different layers of messaging that provides real-time information to groups of individuals within buildings, campus settings, geographic regions, or entire nations by using one or a combination of the following technologies:

Layer 1:

- Voice messages
- Visible notification appliances
- Digital signage

Layer 2:

- Wide-area outdoor mass notification systems

Layer 3:

- Text messages
- Emails
- Tactile devices
- Computer pop-ups

Layer 4:

- Social networks
- Radio broadcast
- Television broadcast
- Weather radios

Moreover, the key to determine if a mass notification system is required is to review Fire Safety and Evacuation Plan in-conjunction with the mass notification risk analysis. The risk analysis may identify hazards that are facility specific that lead to specific response plans with specific communication system requirements for that facility.

It should be noted that an in-building fire alarm emergency voice alarm communication (EVAC) system is one type of a mass notification system that provides on-way voice messages to people inside buildings. The IFC currently requires a fire alarm system that uses EVAC speakers for occupant notification instead of horns to be installed in new schools with an occupant load greater than 100. If the risk analysis determines a mass notification system is needed, there may be no additional cost for the control unit because many EVAC systems are listed for mass notification in accordance with UL 2572, *Standard for Mass Notification Systems*.

However, most mass notification systems do not support all the technologies listed under Layers 1-4. For example, in a school for the deaf, a risk analysis would tend to identify a greater than usual risk for occupants due to a higher than average deaf population, leading to emergency response plans requiring digital signage. EVAC systems or MNS systems that did not support digital signage capabilities should not be approved for this facility.

Requiring a risk analysis will result in a more comprehensive emergency response plan that is customized for the specific hazards and risks associated with the building or campus. The risk analysis and emergency response plan can be as elaborate or as basic as the Fire Code Official and building owner determines it needs to be. In some cases, other types of one-way communications may be needed to provide effective protection. Section 403 of the Code requires a Fire Safety and Evacuation Plan be developed for educational occupancies and Section 404 requires that when a Lockdown Plan is developed, it must be approved by the Fire Code Official. These sections require communication of the emergency to the building occupants be included in the plan. This Proposal **only** emphasizes the need to document how communicating with the occupants of the building and possibly occupants that are outside the building will be accomplished. It will encourage the use of the EVAC system that is already required as a part of the fire alarm construction.

This proposal **is not automatically** requiring the installation of any mass notification systems. Rather, it **only** requires a risk analysis be conducted for a new building containing a Group E occupancy having an occupant load of 500 or more. Furthermore, the risk analysis for a new building that is part of a campus with existing buildings may determine the existing buildings are not required to be upgraded with a mass notification system. The responsibility for the risk analysis rests on the building owner who may employ the necessary professionals to satisfy the requirements.

Bibliography: FBI Reports

- Active Shooter Incidents: Topical One-Pagers, 2000 - 2018
- 2000 to 2018 Active Shooter Incidents

Cost Impact: The code change proposal will increase the cost of construction

The cost of the risk analysis will be based on the complexity of the facility, and in many cases, there will be no additional costs as the emergency planning is already required. In extreme cases, the risk analysis may cost thousands of dollars to produce an expansive report of risks and strategies to mitigate those risks. When the EVAC system is identified as the only means of mass communication needed, there will be no increased cost of construction. If the conclusion of the risk analysis identifies the need for messages beyond one-way EVAC systems such as visible, digital, or text messages there will be some additional expense for those systems. It must be noted an EVAC system is already required by the Code for Group E occupancies and many EVAC systems are listed for mass notification in accordance with UL 2572, *Standard for Mass Notification Systems*.

F106-21

IFC: [BE] 1104.16.7, [BE] 1104.16.5.1, 1032.2.1.1, 1032.2.2.1 (New), 1032.2.2.2 (New)

Proponents: Kevin Scott, representing KH Scott & Associates LLC (khscottassoc@gmail.com)

2021 International Fire Code

Delete without substitution:

~~[BE] 1104.16.7 Maintenance. Fire escape stairways shall be kept clear and unobstructed at all times and shall be maintained in good working order.~~

~~[BE] 1104.16.5.1 Examination. Fire escape stairways and balconies shall be examined for structural adequacy and safety in accordance with Section 1104.16.5 by a registered design professional or others acceptable to the fire code official every 5 years, or as required by the fire code official. An inspection report shall be submitted to the fire code official after such examination.~~

Revise as follows:

~~1032.2.1.1~~ **1032.2.2 Fire escapes.** Security enclosures, fences or screening for fire escape stairways shall be approved by the fire code official and shall be constructed such that they do not impede egress to the public way. Means shall be provided for emergency personnel to access the fire escape stair from the exterior of the enclosure.

Add new text as follows:

1032.2.2.1 Maintenance. Fire escape stairways and balconies shall be kept clear and unobstructed at all times and shall be maintained in good working order.

1032.2.2.2 Examination. Fire escape stairways and balconies shall be examined for structural adequacy and safety by a registered design professional or other person acceptable to the fire code official every 5 years. The examination shall determine whether the fire escape stairways and balconies can support the dead load plus a live load of not less than 100 pounds per square foot (4.78 kN/m²). An inspection report shall be submitted to the fire code official after such examination.

Reason Statement: As stated in Section 1101.2, IFC Chapter 11 contains construction requirements for existing buildings to provide a minimum level of safety. Chapter 11 is not intended to contain maintenance or administrative requirements. Sections 1104.16.7 and 1104.16.5.1 are clearly maintenance requirements. This code change will relocate the fire escape maintenance requirements to Section 1032 which cover maintenance of means of egress. Therefore, the sections in Chapter 11 are deleted.

Section 1032.2.1.1 already contains some fire escape maintenance provisions, so the maintenance requirements from Chapter 11 are relocated here. This places all the maintenance requirements for fire escapes in one location.

Additionally, some jurisdictions do not adopt Chapter 11. Placing the maintenance requirements in Section 1032, will allow them to be applicable and enforceable for existing fire escapes even when Chapter 11 is not adopted.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This simply relocates requirements from one chapter to another.

F106-21

F107-21 Part I

PART I IFC: 1032.4.1 (New), 1032.4.1.1 (New), 1032.4.1.2 (New), 1032.4.2 (New), 1032.4.2.1 (New)

PART II IFC: [BE] 1032.4

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

THIS IS A TWO PART CODE CHANGE. PART I OF THIS PROPOSAL WILL BE HEARD BY THE FIRE CODE COMMITTEE AND PART 2 OF THIS PROPOSAL WILL BE HEARD BY THE BUILDING CODE MEANS OF EGRESS CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Fire Code

Add new text as follows:

1032.4.1 Internally illuminated exit signs. Electrically powered, self-luminous and photoluminescent exist signs shall be maintained in accordance with Sections 1032.4.1.1 and 1032.4.1.2.

1032.4.1.1 Testing. Testing of internally illuminated exit signs shall be on a monthly basis. The test shall be performed manually or by an automated self-testing and self-diagnostic routine. Where testing is performed by self-testing or self-diagnostics, a visual inspection of the exit sign equipment shall also be conducted to identify any equipment displaying a trouble indicator or that has become damaged or otherwise impaired. Signs are to be immediately discernable from the route of egress.

1032.4.1.2 Record Keeping. Records shall be maintained documenting monthly testing and maintenance for exit signs. Records shall be maintained on site for a period of not less than three years.

1032.4.2 Externally illuminated exit signs. Externally illuminated exit signs shall be inspected on a monthly basis. The function of the external illumination shall be verified and the sign inspected for damage or other impairment. Signs are to be immediately discernable from the route of egress.

1032.4.2.1 Record Keeping. Records shall be maintained documenting monthly testing and maintenance for exit signs. Records shall be maintained on site for a period of not less than three years.

F107-21 Part I

F107-21 Part II

IFC: [BE] 1032.4

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Fire Code

Revise as follows:

[BE] 1032.4 Exit signs. Exit signs shall be installed and maintained in accordance with the building code that was in effect at the time of construction and the applicable provisions in Section 1104. Decorations, furnishings, equipment or adjacent signage that impairs the visibility of exit signs, creates confusion or prevents identification of the *exit* shall not be allowed. Regardless of type, all exit signs shall be immediately discernable to indicate the route of egress.

Reason Statement: The code currently lacks provisions for the regular maintenance, testing, and record keeping for arguably one of the most common fire code violations an inspector may come across. The added language in 1032.4 mirrors language already in the code for other exit appurtenances [ie: emergency lighting]. Clearly ascertainable exits are paramount in an emergency situation. There shall be no ambiguity how to quickly and safely egress from a building in a time of critical need.

Section 1032.4.1.1, this section addresses a pervasive problem the working group has tried to address in photoluminescent exit signs.

Photoluminescence is a process whereby luminescence is induced by the absorption of visible light. The use of photoluminescent exit signage in a low light areas [ie: movie theatres] has presented a problem where minimal or no ambient light is available to recharge the sign. The code lacks adequate means to address photoluminescent exit signs.

Section 1032.4.2.1, accounts for future technology and automated smart building advances. There is no additional financial impact for administering this 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 and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: <https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/>

Cost Impact: The code change proposal will not increase or decrease the cost of construction

This proposal is related to the testing, inspection and maintenance of existing systems and is within the intent of the code to be addressed.

F107-21 Part II

F108-21

IFC: 1032.8, 1032.8.1 (New)

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Fire Code

Revise as follows:

1032.8 Inspection, testing and maintenance. ~~Two-way communication systems shall be inspected and tested on a yearly basis to verify that all components are operational. Where required, the tests shall be conducted in the presence of the fire code official. Records of inspection, testing and maintenance shall be maintained.~~

The inspection, testing and maintenance for two-way communication systems shall be in accordance with this code and NFPA 72, and shall not be conducted less than annually or more frequently where required by the fire code official.

Add new text as follows:

1032.8.1 Records. Records of inspections, testing and maintenance shall be maintained on site in an approved cabinet at the command center or a location approved by the fire code official.

Reason Statement: The code currently lacks provisions for the regular maintenance, testing, and record keeping for 2-way communication systems for Areas of Refuge. These systems are critical to safe evacuation of occupants with limited mobility. The on-going inspection, testing and maintenance are critical should meet the requirements of nationally recognized standards.

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 and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: <https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/>

Cost Impact: The code change proposal will not increase or decrease the cost of construction

This section is related to ongoing inspection, testing and maintenance of existing systems and does not affect the cost of construction.

F108-21

F109-21

IFC: 1032.11 (New)

Proponents: China Clarke, representing New York State Dept of State (china.clarke@dos.ny.gov); Kevin Duerr-Clark, representing New York State Department of State (kevin.duerr-clark@dos.ny.gov)

2021 International Fire Code

Add new text as follows:

1032.11 Posting of occupant load. Every room or space that is an assembly occupancy shall have the occupant load posted in accordance with Section 1004.9.

Reason Statement: Provisions for occupant load posting are located in Section 1004.9. However, Section 1004.9 does not apply to existing buildings or structures (Section 1001.1). Therefore, the provisions are not required in existing buildings. For clarity we propose the addition of Section 1032.11 indicating that the Provisions for occupant load posting are also applicable to existing construction.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The intention of this proposal is to add clarification to provisions that already exist, it should not impact cost.

F109-21

F110-21

IFC: 1032.12 (New)

Proponents: China Clarke, representing New York State Dept of State (china.clarke@dos.ny.gov); Kevin Duerr-Clark, representing New York State Department of State (kevin.duerr-clark@dos.ny.gov)

2021 International Fire Code

Add new text as follows:

1032.12 Capacity of means of egress. The occupant load of buildings or portions thereof shall not exceed the approved capacity of the means of egress.

Reason Statement: We are proposing this addition to the 2021 IFC to make it clear that the occupant load of an existing building is prohibited from exceeding the approved capacity of the means of egress. Other Sections of the 2021 IFC, including but not limited to Section 1004.5.1, provide that the occupant load is allowed to be increased from the values of Table 1004.5. This may mislead code users to believe that the load is permitted to be increased without regard to the approved capacity of the means of egress. This change will make the intent explicitly clear.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The intention of this proposal is to add clarification to provisions that already exist, it should not impact cost.

F110-21

F111-21

IFC: CHAPTER 11, SECTION 1101, 1101.2, 1101.1, 1101.3, 1101.4, 1101.4.1 (New), 1101.4.2 (New), 1101.4.1, 1101.4.2, 1101.4.3

Proponents: John Catlett, J.D. Catlett Consulting, LLC, representing BOMA International (catlettcodeconsulting@gmail.com); Dan Buuck, National Association of Home Builders, representing National Association of Home Builders (dbuuck@nahb.org)

2021 International Fire Code

CHAPTER 11 CONSTRUCTION REQUIREMENTS FOR EXISTING BUILDINGS

SECTION 1101 GENERAL.

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*.

1101.1 Scope. The provisions of this chapter shall apply to existing buildings constructed prior to the adoption of this code.

1101.3 Permits. Permits shall be required as set forth in Sections 105.5 and 105.6 and the *International Building Code*.

Revise as follows:

1101.4 Owner notification. When a building is found to be in noncompliance with this chapter, the *fire code official* shall duly notify the *owner* of the building. ~~Upon receipt of such notice, the owner shall, subject to the following time limits, take necessary actions to comply with the provisions of this chapter.~~

Add new text as follows:

1101.4.1 Owners responsibility. Upon receiving notice as required in Section 1101.4, the building owner is required to provide a systematic plan of correction and documentation to support a compliance path based on the provisions of section 1101.4.2 within a timeframe established by the fire code official. The fire code official is authorized to request additional documentation to support owner's proposed schedule.

1101.4.2 Establishing a systematic plan of correction. Upon receipt of such notice, the owner shall take necessary actions to establish a systematic plan of correction to comply with the provisions of this chapter. The fire code official shall evaluate the plan submitted and provide approval of the plan if the fire code official finds the terms acceptable. When developing the plan, the fire code official and building owner shall agree to a compliance path based on all of the following:

1. The number of provisions of Chapter 11 of this code the owner has been cited to comply with.
2. Any planned alterations within the building where work required to comply with the provisions of Chapter 11 of this code and the *International Existing Building Code* where work can be incorporated into the compliance path schedule.
3. Any disruption of business operations that occurs within the building during construction required to comply with Chapter 11 of this code that must be addressed that will lengthen time for completion or cause work to be performed outside of normal business operations.
4. The number of buildings under the owner's control that have to comply with provisions of Chapter 11 of this code.
5. The owner's availability to have funding available to complete the work.
6. Availability of necessary design professionals and contractors to design and conduct the work.

Revise as follows:

~~**1101.4.1**~~ **1101.4.3 Construction documents.** Construction documents necessary to comply with this chapter shall be completed and submitted within a time schedule in accordance with systematic plan of correction approved by the fire code official.

~~**1101.4.2**~~ **1101.4.4 Completion of work.** Work necessary to comply with this chapter shall be completed within a time schedule in accordance with the systematic plan of correction approved by the fire code official.

~~**1101.4.3**~~ **1101.4.5 Extension of time.** The fire code official is authorized to grant necessary extensions of time where it can be shown that the specified time periods are not physically practical or pose an undue hardship and the owner has shown a good faith effort to comply with the approved systematic plan of correction. The granting of an extension of time for compliance shall be based on the showing of good cause and subject to the filing of an a revised acceptable systematic plan of correction that is approved by with the fire code official.

Reason Statement: This code proposal is intended to address the lack of direction to fire code officials regarding seeking compliance with chapter 11 of the IFC. The code has been silent in addressing the realities and difficulties that retrofitting requirement compliance place on building owners. Unlike new construction, change of use, or alterations where regulatory compliance can be factored into project budgets, retrofitting is not part of a building's maintenance and operations budget and can create a hardship. Building owners are often confronted with violation notices for compliance with Chapter 11 items from field inspectors who treat the requirements the same as a routine violation like exit light maintenance, replacing a

noncompliant lock, or unblocking an exit. We can provide examples of where this has already occurred. The lack of realization that many of the items have significant cost associated with them, the lack of available designers and contractors needed to meet demand to do the work necessary to comply with a notice, and sometimes the inability to comply safely without disruption of business operations, is not recognized with short time period notices.

BOMA fully supported the 2021 code change that required a fire sprinkler retrofit for existing high-rise structures because it contained a very acceptable one year to submit a plan for compliance and a ten year from that point to complete the work. This allowed the process of applying the IEBC through alterations and change of use projects to comply with retrofit provisions over a period of time and then completing remaining areas.

Why this is important:

Building owners are normally considered cash cows that are sitting on massive reserves of funds. This is far from the truth. Even small ownership entities have business plans that have to take in staffing cost, overhead from taxes and utilities, disruptions of normal business activities such as what occurred with the Covid pandemic, and both budgeted and unbudgeted maintenance cost. They operate on a cash flow based on occupancy rates of space. Receiving a short compliance period for very expensive safety enhancements without funding from grants, tax deductions or credits can be financially difficult, many times requiring the diversion of intended preventative maintenance funds, reserves for unintended maintenance cost, or actually being required to take loans to accomplish the work. This, in turn adds cost to the end user in the form of higher rents and places the building owner in a very precarious situation of keeping rents in line with regional rental rates.

We need to understand that these buildings are not inherently unsafe. If they were, they would be subject the unsafe building provisions of both the fire and property maintenance codes. Many of the buildings were built under building codes in effect at the time of construction that have been enhanced over time. In no way should chapter 11 be applied as if an emergency, unsafe condition or event has occurred. To be palatable, chapter 11 should be applied as a partnership between the building owner and the fire official.

The proposed code change attempts to accomplish this. It brings forth the elements that need to be considered from the building owner's perspective when issued a notice of violation to comply with Chapter 11. In addition, it recognizes code changes to the brought into the 21' IEBC that makes specific reference to compliance with IFC Chapter 11.

We floated this to various entities that may have interest in this proposal. We received very good feedback and suggestions of methods to accomplish the intent. One proposed that the administrative portion of the code be modified to address the concern. This still is an option, but Chapter 11 is the only section of the code unique by requiring retrofitting and also containing its own administrative provisions for application. Others recommended establishing a chart with minimum compliance thresholds which has merit. However, no size fits all. For example, two years to change out non self-illuminating, back-up power emergency lighting and exit signs for a single five story building may be palatable. But having to do it in five, thirty story towers may be a strain.

We feel it best that the fire code official remains the ultimate decider, but by working with the building owner to understand their needs when developing a plan to make the building compliant. This takes time. Time to secure contractors and designers to develop plans, get cost estimates, and secure funding without disruption of cash flow. Especially during busy construction cycles when new buildings reduce the capabilities to access these professionals that are working on much larger projects.

Compliance sometimes requires the additional cost of having work performed when buildings are closed from daily operations. Drilling and sounds generated from construction, contractors needing access to occupied spaces, and the potential to create unsafe construction related issues (Blocked corridors and stairways, etc.) occurs when buildings are occupied. This adds expense to any project as contractors add to cost estimates the real cost of working outside of a normal day.

Some offered that we may need a companion code change to establish a definition of the term "systematic plan of correction". However, this term has already been used in section 1101.4.3 of Chapter 11 in previous codes. We note that this is the only place in the code where it occurs. This proposal only expands what appears to be a term understood by users in previous code cycles into other provisions of Chapter 11.

Building owners face uncertain times. Demand for office space is anticipated to decline at least for the short term as companies are reducing cost by shedding office space. Although this is anticipated to reverse in coming years, it may be the new norm as companies resistant to remote working were forced into it by the pandemic. Now that it has proven effective and remote meeting technology has improved, this could be more than a trend.

In addition, building owners are facing unprecedented pressure to shoulder the burden of energy efficiency beyond what they can expect as a return on investment. States and localities are moving legislation that will require retrofitting of existing HVAC equipment that currently use fossil fuels to higher efficiency electric or renewable energy equipment. The combination of energy compliance, IFC chapter 11 compliance, and the reduced need for office space has a potential to be disastrous to the office building and multi-family residential rental market. This code proposal allows for the continuous movement toward *safer* buildings while realizing the associate cost, hurdles, and disruption compliance can entail.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

The proposal does not increase or decrease the cost of compliance. It will allow building owners to prepare for the cost.

F112-21

IFC: 1101.4

Proponents: Timothy Stacy, representing Southern Oregon Fire Code Officials

2021 International Fire Code

Revise as follows:

1101.4 ~~Owner~~ Notification and compliance. When a building is found to be in noncompliance with this chapter, the *fire code official* shall provide notification in accordance with Section 112.3.2 ~~duly notify the owner of the building.~~ Upon receipt of such notice, ~~the owner shall, subject to the following time limits, take necessary actions to comply~~ compliance with the provisions of this chapter ~~shall be in accordance with Section 112.3.2 and this section.~~

Reason Statement: This revision provides consistency with notification and compliance language already established in the code (e.g. sec. 112). The current language infers that fire code official may only work with the owner to resolve violations. The owner, or even property managers, are often not the party responsible for creating and/or addressing violations.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is a clarifying code proposal.

F112-21

F113-21

IFC: 1103.3.2

Proponents: Jonathan Roberts, representing UL LLC (jonathan.roberts@ul.com)

2021 International Fire Code

Revise as follows:

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 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 CASE OF FIRE EMERGENCY, DO NOT USE ELEVATOR. ELEVATORS ARE OUT OF SERVICE. USE EXIT STAIRS 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.

Staff Analysis: Note that Section 604.4 of the IFC is being revised to be consistent with the IBC as follows through an errata.

[BE]–[BG] 604.4 Emergency signs.

An approved pictorial sign of a standardized design shall be posted adjacent to each elevator call station on all floors instructing occupants to use the exit stairways and not to use the elevators in case of fire. The sign shall read: "IN CASE OF FIRE EMERGENCY, ELEVATORS ARE OUT OF SERVICE ~~DO NOT USE ELEVATOR~~. USE EXIT STAIRS."

Exceptions:

1. The emergency sign shall not be required for elevators that are part of an accessible means of egress complying with Section 1009.4.
2. The emergency sign shall not be required for elevators that are used for occupant self-evacuation in accordance with Section 3008 of the International Building Code.

Reason Statement: The IFC and IBC currently have slightly different wording for this elevator signage. Section 604.4 is being revised through errata to match the IBC. However Section 1103.3.2 of the IFC also should be consistent with the IBC. This will avoid signage approved per the IBC being in conflict with the IFC. This proposal will ensure consistency and reduce confusion by the public as to elevators being out of service during a fire emergency and directing evacuation by the stairs.

Current IBC Language: IN CASE OF FIRE, ELEVATORS ARE OUT OF SERVICE, USE EXIT STAIRS

The Committee may wish to add additional text to address the compliance of existing signs by including additional text "or equivalent"

Cost Impact: The code change proposal will not increase or decrease the cost of construction

This proposal simply harmonizes existing code requirements

F113-21

F114-21

IFC: 1103.8.3

Proponents: Margo Thompson, representing National Multifamily Housing Council (mthompson@newportventures.net)

2021 International Fire Code

Revise as follows:

1103.8.3 Power source. Single-station smoke alarms shall receive their primary power from the building wiring provided that such wiring is served from a commercial source and shall be equipped with a battery backup. Smoke alarms with integral strobes that are not equipped with battery backup shall be connected to an emergency electrical system. Smoke alarms shall emit a signal when the batteries are low. Wiring shall be permanent and without a disconnecting switch other than as required for overcurrent protection.

Exceptions:

1. Smoke alarms are permitted to be solely battery operated in existing buildings where construction is not taking place.
2. Smoke alarms are permitted to be solely battery operated in buildings that are not served from a commercial power source.
3. Smoke alarms are permitted to be solely battery operated in existing areas of buildings undergoing *alterations* or repairs that do not result in the removal of interior walls or ceiling finishes exposing the structure, unless there is an attic, crawl space or *basement* available that could provide access for building wiring without the removal of interior finishes.
4. Smoke alarms are not required to receive their primary power from building wiring served from a commercial source in existing Group-R2 Occupancies where they are able to be interconnected wirelessly and can be battery operated.

Reason Statement: An amendment to Section 1103.8.3 is necessary to provide a clear explanation of fire protection and life safety system requirements for existing Group-R2 buildings. Hard-wiring is appropriate for new construction, but existing structures can be more efficiently and cost-effectively accommodated when owners have the option to replace single-station smoke alarms with wirelessly interconnected, battery powered alarms.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal will not impact the cost of construction as it provides greater flexibility for smoke alarm options in existing Group-R2 buildings.

F114-21

F115-21

IFC: CHAPTER 11, SECTION 1103, 1103.8, 1103.8.3, 1103.8.3.1 (New); IPMC: [F] 704.6.3, 704.6.3.1 (New)

Proponents: Nadja Tremblay, Carrier, representing Carrier (naja.tremblay@carrier.com)

2021 International Fire Code

CHAPTER 11 CONSTRUCTION REQUIREMENTS FOR EXISTING BUILDINGS

SECTION 1103 FIRE SAFETY REQUIREMENTS FOR EXISTING BUILDINGS.

1103.8 Single- and multiple-station smoke alarms. Single- and multiple-station smoke alarms shall be installed in existing Group I-1 and R occupancies in accordance with Sections 1103.8.1 through 1103.8.3.

1103.8.3 Power source. Single-station smoke alarms shall receive their primary power from the building wiring provided that such wiring is served from a commercial source and shall be equipped with a battery backup. Smoke alarms with integral strobes that are not equipped with battery backup shall be connected to an emergency electrical system. Smoke alarms shall emit a signal when the batteries are low. Wiring shall be permanent and without a disconnecting switch other than as required for overcurrent protection.

Exceptions:

1. Smoke alarms are permitted to be solely battery operated in existing buildings where construction is not taking place.
2. Smoke alarms are permitted to be solely battery operated in buildings that are not served from a commercial power source.
3. Smoke alarms are permitted to be solely battery operated in existing areas of buildings undergoing *alterations* or repairs that do not result in the removal of interior walls or ceiling finishes exposing the structure, unless there is an attic, crawl space or *basement* available that could provide access for building wiring without the removal of interior finishes.

Add new text as follows:

1103.8.3.1 Battery operated smoke alarms. Smoke alarms that are solely battery operated shall contain a sealed, tamperproof battery capable of powering the alarm for at least ten years.

2021 International Property Maintenance Code

[F] 704.6.3 Power source. Single-station smoke alarms shall receive their primary power from the building wiring provided that such wiring is served from a commercial source and shall be equipped with a battery backup. Smoke alarms with integral strobes that are not equipped with battery backup shall be connected to an emergency electrical system. Smoke alarms shall emit a signal when the batteries are low. Wiring shall be permanent and without a disconnecting switch other than as required for overcurrent protection.

Exceptions:

1. Smoke alarms are permitted to be solely battery operated in existing buildings where construction is not taking place.
2. Smoke alarms are permitted to be solely battery operated in buildings that are not served from a commercial power source.
3. Smoke alarms are permitted to be solely battery operated in existing areas of buildings undergoing *alterations* or repairs that do not result in the removal of interior walls or ceiling finishes exposing the structure, unless there is an attic, crawl space or *basement* available that could provide access for building wiring without the removal of interior finishes.

Add new text as follows:

704.6.3.1 Smoke Alarms. Smoke alarms that are solely battery operated shall contain a sealed, tamperproof battery capable of powering the alarm for at least ten years

Reason Statement: The National Fire Protection Association (NFPA) reports fire departments responded to an estimated 1,291,500 fires in 2019. Of these fires, 361,500 occurred in home structures resulting in 2,870 civilian fire deaths and 12,700 civilian fire injuries. Additionally, NFPA reports “almost three out of five home fire deaths in 2012-2016 were caused by fires in properties with no smoke alarms (40%) or smoke alarms that failed to operate (17%). The risk of dying in reported home structure fires is 54% lower in homes with working smoke alarms than in homes with no alarms or none that worked.”

Tamperproof smoke alarms that contain a 10-year sealed battery eliminate the need to replace batteries and prevent individuals from disabling the alarm. By requiring these smoke alarms in older multifamily properties that are not currently serviced by hardwired smoke alarms, we eliminate the need for the resident to replace the batteries on a regular basis, increasing convenience and life safety.

[1] Fire Loss in the United State During 2019; Aherns, Marty & Evarts, Ben; National Fire Protection Association (October 2019) <https://www.nfpa.org/-/media/Files/News-and-Research/Fire-statistics-and-reports/US-Fire-Problem/osFireLoss.pdf>

[2] Smoke Alarms in US Homes; Ahrens, Marty; National Fire Protection Association (January 2019) <https://www.nfpa.org/-/media/Files/News-and-Research/Fire-statistics-and-reports/Detection-and-signaling/ossmokealarms.pdf>

Bibliography: [1] Fire Loss in the United State During 2019; Aherns, Marty & Evarts, Ben; National Fire Protection Association (October 2019) <https://www.nfpa.org/-/media/Files/News-and-Research/Fire-statistics-and-reports/US-Fire-Problem/osFireLoss.pdf>

[1] Smoke Alarms in US Homes; Ahrens, Marty; National Fire Protection Association (January 2019) <https://www.nfpa.org/-/media/Files/News-and-Research/Fire-statistics-and-reports/Detection-and-signaling/ossmokealarms.pdf>

Cost Impact: The code change proposal will not increase or decrease the cost of construction

10-year tamperproof smoke cost approximately \$10 more than smoke alarms powered by replaceable batteries.

10-year sealed batteries last the life of the device, resulting in a savings of \$20-30 per alarm over ten years.

F115-21

F116-21

IFC: 1103.9

Proponents: Kris Hauschildt, representing self (krishauschildt@yahoo.com)

2021 International Fire Code

Revise as follows:

1103.9 Carbon monoxide detection. Carbon monoxide detection shall be installed in existing Group ~~A, B, E, F, H, I, M +1, +2, +4~~ and R occupancies ~~in accordance with Section 915, and in classrooms in Group E occupancies where those units include any of the conditions identified in Sections 915.1.2 through 915.1.6. The carbon monoxide alarms shall be installed in the locations specified in Section 915.2 and the installation shall be 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 Statement: This proposal seeks to establish uniform baseline requirements for CO detection in all occupancies with permanently installed fuel-burning appliances, fuel-burning fireplaces or attached garages. CO poisoning incidents resulting in deaths and injuries continue to happen with alarming regularity in occupancies not covered by the current IFC as well as those that are, demonstrating that current code requirements are not adequately inclusive and are not effectively targeting problem areas within specific occupancies.

The suggested revisions contained in this proposal are based on "Development of a Technical Basis for CO Detector Siting," "Diffusion of CO Through Gypsum Wallboard," the New York State Fire Code which has required CO detection in all commercial occupancies since 2015, and data from individual case examples (see attachments and bibliography).

Requiring CO detection in all occupancies that contain known CO hazards will prevent an untold number of deaths and injuries.

Substantiation for Uniform Baseline Requirements for CO detection in All Occupancies

The lethality of CO is undisputed. The severity of poisoning injury depends not only on the level and duration of CO exposure, but also on the individual. Those most at risk from the effects of CO: infants and children, older people, pregnant women/unborn babies, and those with underlying health conditions. There is no formula that can accurately predict how CO will impact a particular person nor what level or duration of exposure can be tolerated without suffering prolonged harm, irreversible brain damage, or death. For many victims who survive a CO exposure, the effects do not end with the poisoning incident. They can be severe enough to cause death weeks to months later. They can also cause irreversible effects, including life-altering brain injury.

"In addition to the immediate onset effects of exposure, delayed-onset development of neuropsychiatric impairment typically occurs from several days to approximately 3–4 weeks after exposure, with symptoms including inappropriate euphoria, impaired judgment, poor concentration, memory loss, cognitive and personality changes, psychosis, and Parkinsonism. Symptoms of acute carbon monoxide poisoning in children are the same as those in adults. Acute carbon monoxide poisoning during pregnancy has been associated with spontaneous abortion and fetal death."

- Agency for Toxic Substances & Disease Registry, CDC

The lifesaving value of CO detection is undisputed. CO detection has been commercially available for at least 30 years and has proven reliability. There is no substitute for the early detection that these devices provide, alerting to danger before conditions escalate to a level of causing harm. In the absence of detection, it is the building occupants who are providing the alert to CO leaks, becoming ill or dying before building staff are even aware there is a problem. Some examples:

2013, North Carolina: My parents both died in a **hotel** room from a CO leak while they were on vacation. They lost consciousness and lay helpless all night, inhaling poison for over 14 hours until they died. No one in the building was even aware they were in danger. There was no CO detection onsite despite there being gas fireplaces in the guest rooms, a gas pool heater, gas dryers and gas water heaters. First responders (EMS, police, fire dept) suspected CO but thought it was more likely they both died of heart attacks so didn't bother to test the room, opting instead to wait weeks for autopsy toxicology results. The leak continued for another seven weeks, killing an 11-year-old boy and causing permanent injury to his mother in the same room before it was finally detected. Multiple people were ill at the hotel during those seven weeks, including guests and a repairman servicing the elevator which was located next to the leaking exhaust system.

2017, Michigan: A 13-year-old boy at a spring break swim party with his friends died on the deck of a **swimming pool** from CO leaking from a pool

heater in an adjacent room. His friends suffered CO injury as well as head injuries when they lost consciousness and fell onto the concrete pool deck. An employee along with multiple firefighters suffered CO injuries responding to the incident.

****** There is specific concern over the number of incidents in **indoor swimming pool areas** that have resulted in poisoning injuries to children. CO exposure in a pool also leads to an increased risk of drowning. These incidents are detailed on the attached spreadsheet.

2014, New York: A **restaurant** manager died from CO leaking from a fuel burning appliance in the room adjacent to his office. The assistant manager lost consciousness and suffered CO injury when she went looking for him. Multiple rescue personnel became injured as well when they rushed in to render aid, unaware they were entering a CO contaminated environment. 24 people were hospitalized including restaurant patrons. The manager had reportedly been ill for weeks prior, but neither he nor his doctors suspected it as being CO-related.

1995, California: A woman and her husband were poisoned in a **hotel** room, not found until 36 hours later – he died, she survived with permanent injury to her brain, so severe she was prevented from ever being able to work or live independently again. 25 years later, she lives in a specialized group home.

2006, Maryland: 20 **restaurant** workers suffered long term brain injury after being exposed to a CO leak that had gone unnoticed for weeks and progressed to a level of 700ppm in the dining area before problem was discovered.

2019, Ohio: CO leak at **correctional facility** caused poisoning injuries to 4 staff and 29 inmates

2019, Illinois: CO leak at a **dry cleaners**, 3 people taken to the hospital including a police officer

2019, Utah: 60 people were poisoned at a **church** from CO leaking from a boiler, having spent several hours breathing in CO levels measured at 200-500ppm. Many were projected to have long term health effects.

2021, Nebraska: 10 people poisoned at a **bowling alley**, 4 hospitalized.

According to NFIRS (National Fire Incident Reporting System) data, there were a total of 10,715 CO incidents in hotels/motels, churches, restaurants/cafeterias, bars/taverns, and K-12 schools between 1999 and 2018. This is a minimum number. Participation in the NFIRS system is voluntary and not all fire departments participate.

Further, deaths and injuries are occurring even in buildings equipped with CO detection, demonstrating the need for occupancy specific focus for future improvements beyond a baseline requirement:

2017, Texas: A couple was poisoned and found unconscious in their hotel room from CO leaking from a pool heater. The hotel was equipped with unmonitored CO detection. A couple staying a few doors down had removed the batteries from the CO alarm in their room after it had gone off multiple times during the night. The couple found unconscious later died of their CO related injuries.

2018, Tennessee: Several people were poisoned in a hotel exercise room, located on a floor with a pool but no guest rooms. The hotel reportedly had CO detection, but only on floors with guest rooms.

2019, Illinois: A couple was poisoned in their hotel room equipped with a CO alarm that was alarming, but a hotel maintenance worker told them to disregard the alarm. They ended up calling the fire department themselves and were treated at a hospital for CO poisoning.

As a homeowner it is a reasonable expectation to be aware of the hazards of CO and take responsibility to install CO detection to protect yourself. However, as an occupant of a building that is under someone else's charge, there is no way to know of equivalent hazards nor whether action has been taken to install safeguards. Combined with no human ability to detect CO, this leaves occupants critically vulnerable during any type of CO exposure incident. Their life safety is entirely at the mercy of circumstances they have no knowledge of and no control over, assuming a risk they did not choose to take.

Building and business owners rely on guidance from this code to provide basic life safety provisions for occupants. States rely on guidance from this code to pass safety legislation. People rely on this code to stay safe and keep their families safe from preventable death and harm. Emergency responders rely on this code to keep them safe from unnecessary risk in performing their already hazardous jobs.

Please act to protect people from unnecessary death and injury by approving this proposal to provide a baseline level of safety from carbon monoxide danger in all occupancies.

2021 IFC – Chapter 1 Scope and Administration

101.3 Intent.

The purpose of this code is to establish the minimum requirements consistent with nationally recognized good practice for providing a reasonable level of life safety and property protection from the hazards of fire, explosion, or dangerous conditions in new and existing buildings, structures and premises, and to provide a reasonable level of safety to fire fighters and emergency responders during emergency operations.

Bibliography: SUPPORT DOCUMENTS FOUND AT THE FOLLOWING LINK

- <https://thejenkinsfoundation.com/category/ifc-2024-proposal-support-documents/>

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- Diffusion of Carbon Monoxide Through Gypsum Wallboard, Neil Hampson, MD
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- Cost of Accidental Carbon Monoxide Poisoning: A Preventable Expense, Preventive Medicine Reports, 2016
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- Carbon Monoxide Poisonings in Hotels and Motels: The Problem Silently Continues, Prev. Medicine Reports, 2019
- Carbon Monoxide Poisoning at Hotels, Motels and Resorts, Amer. Journal of Prev. Medicine, 2007
- NEMA - Life Fire Safety - Carbon Monoxide

Cost Impact: The code change proposal will increase the cost of construction

This code change proposal will increase the cost of construction, but it is crucial for life safety.

F116-21

F117-21 Part I

PART I IFC: 1104.6, 1104.6.1

PART II IPMC: 307.1

Proponents: Cole Graveen, Structural Engineer, representing Self

THIS IS A TWO PART CODE CHANGE. PART 1 OF THIS PROPOSAL WILL BE HEARD BY THE FIRE CODE COMMITTEE AND PART II OF THIS PROPOSAL WILL BE HEARD BY THE PROPERTY MAINTENANCE & ZONING CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Fire Code

1104.6 Guards. Guards complying with this section shall be provided at the open sides of *means of egress* that are more than 30 inches (762 mm) above the floor or grade below.

Revise as follows:

1104.6.1 Height of guards. Guards shall form a protective barrier not less than 42 inches (1067 mm) high.

Exceptions:

1. Existing guards shall not be required to be higher than required by the adopted building code.
1. 2. Existing guards on the open side of exit access and exit stairways and ramps shall be not less than 30 inches (760 mm) high.
2. 3. Existing guards within dwelling units shall be not less than 36 inches (910 mm) high.
3. 4. Existing guards in assembly seating areas.

1104.6 Guards. Guards complying with this section shall be provided at the open sides of *means of egress* that are more than 30 inches (762 mm) above the floor or grade below.

Revise as follows:

1104.6.1 Height of guards. Guards shall form a protective barrier not less than 42 inches (1067 mm) high.

Exceptions:

1. Existing guards shall not be required to be higher than required by the adopted building code.
1. 2. Existing guards on the open side of exit access and exit stairways and ramps shall be not less than 30 inches (760 mm) high.
2. 3. Existing guards within dwelling units shall be not less than 36 inches (910 mm) high.
3. 4. Existing guards in assembly seating areas.

Reason Statement: This is the second of two proposals being submitted on the topic of existing guards. There are requirements for existing guards in both the IFC and the IPMC. The intent of these proposals is to A) Increase the coordination between the IFC and the IPMC on this topic, and B) Increase the coordination between the IFC and the IPMC with the IBC and the IRC.

In general, there are editorial differences between the IFC, IPMC, and the IBC which include the use of different terms and phrases as well as different organization, which can lead to confusion. There are also technical differences between the IFC and IPMC which creates a conflict when both codes are adopted by a jurisdiction.

This second proposal adds an exception to the required guard height in both the IFC and the IPMC. As a note to the ICC code committee reviewing this proposal, if both proposals are approved, the intent is for 307.1, Exception 2, to be placed as an exception to new section 307.2.1 as 307.2.1 addresses the guard height. This proposal adds a logical exception to the required existing guard height in both the IFC and the IPMC. Existing guards should not be retroactively required to be higher than the guard height permitted for new construction per the IBC or the IRC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

This proposal clarifies the required height for existing guards. It may decrease costs in jurisdictions that retroactively require an increase in guard heights, but most likely it does not impact the cost of construction.

F117-21 Part II

IPMC: SECTION 307, 307.1

Proponents: Cole Graveen, Structural Engineer, representing Self

2021 International Property Maintenance Code

SECTION 307 HANDRAILS AND GUARDRAILS.

Revise as follows:

307.1 General. Every exterior and interior flight of stairs having more than four risers shall have a handrail on one side of the stair and every open portion of a stair, landing, balcony, porch, deck, ramp or other walking surface that is more than 30 inches (762 mm) above the floor or grade below shall have *guards*. Handrails shall be not less than 30 inches (762 mm) in height or more than 42 inches (1067 mm) in height measured vertically above the nosing of the tread or above the finished floor of the landing or walking surfaces. *Guards* shall be not less than 30 inches (762 mm) in height above the floor of the landing, balcony, porch, deck, or ramp or other walking surface.

Exceptions:

1. *Guards* shall not be required where exempted by the adopted building code.
2. Existing *guards* shall not be required to be higher than required by the adopted building code.

Reason Statement: This is the second of two proposals being submitted on the topic of existing guards. There are requirements for existing guards in both the IFC and the IPMC. The intent of these proposals is to A) Increase the coordination between the IFC and the IPMC on this topic, and B) Increase the coordination between the IFC and the IPMC with the IBC and the IRC.

In general, there are editorial differences between the IFC, IPMC, and the IBC which include the use of different terms and phrases as well as different organization, which can lead to confusion. There are also technical differences between the IFC and IPMC which creates a conflict when both codes are adopted by a jurisdiction.

This second proposal adds an exception to the required guard height in both the IFC and the IPMC. As a note to the ICC code committee reviewing this proposal, if both proposals are approved, the intent is for 307.1, Exception 2, to be placed as an exception to new section 307.2.1 as 307.2.1 addresses the guard height. This proposal adds a logical exception to the required existing guard height in both the IFC and the IPMC. Existing guards should not be retroactively required to be higher than the guard height permitted for new construction per the IBC or the IRC.

Cost Impact:

This proposal clarifies the required height for existing guards. It may decrease costs in jurisdictions that retroactively require an increase in guard heights, but most likely it does not impact the cost of construction.

F117-21 Part II

F118-21 Part I

PART I IFC: 1104.6, 1104.6.1

PART II IPMC: SECTION 307, 307.1, 307.1.1 (NEW), 307.2 (NEW), 307.2.1 (NEW)

Proponents: Cole Graveen, Structural Engineer, representing Self

THIS IS A TWO PART CODE CHANGE. PART 1 OF THIS PROPOSAL WILL BE HEARD BY THE FIRE CODE COMMITTEE AND PART 2 OF THIS PROPOSAL WILL BE HEARD BY THE PROPERTY MAINTENANCE & ZONING COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Fire Code

Revise as follows:

1104.6 Guards. ~~Guards~~ Guards complying with this section shall be provided along open-sided walking surfaces ~~at the open sides of means of egress~~ that are more than 30 inches (762 mm) above the floor or grade below.

Exception: Guards shall not be required where exempted by the adopted building code.

1104.6.1 Height of guards. ~~Guards~~ Guards shall ~~be form a protective barrier~~ not less than 42 inches (1067 mm) high.

Exceptions:

1. Existing ~~guards~~ guards on the open side of *exit access* and *exit stairways* and *ramps* shall be not less than 30 inches (760 mm) high.
2. Existing *guards* within *dwelling units* shall be not less than 36 inches (910 mm) high.
3. Existing *guards* in assembly seating areas.

1104.6 Guards. ~~Guards~~ Guards complying with this section shall be provided along open-sided walking surfaces ~~at the open sides of means of egress~~ that are more than 30 inches (762 mm) above the floor or grade below.

Exception: Guards shall not be required where exempted by the adopted building code.

1104.6.1 Height of guards. ~~Guards~~ Guards shall ~~be form a protective barrier~~ not less than 42 inches (1067 mm) high.

Exceptions:

1. Existing ~~guards~~ guards on the open side of *exit access* and *exit stairways* and *ramps* shall be not less than 30 inches (760 mm) high.
2. Existing *guards* within *dwelling units* shall be not less than 36 inches (910 mm) high.
3. Existing *guards* in assembly seating areas.

F118-21 Part I

F118-21 Part II

IPMC: SECTION 307, 307.1, 307.1.1 (New), 307.2 (New), 307.2.1 (New)

Proponents: Cole Graveen, Structural Engineer, representing Self

2021 International Property Maintenance Code

SECTION 307 HANDRAILS AND GUARDRAILS.

Revise as follows:

307.1 General Handrails. ~~Every exterior and interior flight of stairs. Stairs having more than four risers shall have a handrail on one side of the stair and every open portion of a stair, landing, balcony, porch, deck, ramp or other walking surface that is more than 30 inches (762 mm) above the floor or grade below shall have guards. Handrails shall be not less than 30 inches (762 mm) in height or more than 42 inches (1067 mm) in height measured vertically above the nosing of the tread or above the finished floor of the landing or walking surfaces. Guards shall be not less than 30 inches (762 mm) in height above the floor of the landing, balcony, porch, deck, or ramp or other walking surface.~~

~~**Exception:** Guards shall not be required where exempted by the adopted building code.~~

Add new text as follows:

307.1.1 Height. Handrails shall be not less than 30 inches (762 mm) in height or more than 42 inches (1067 mm) in height measured vertically above the nosing of the tread or above the finished floor of the landing or walking surfaces.

Revise as follows:

307.2 Guards. Guards shall be provided along open-sided walking surfaces, including balconies, porches, decks, stairs, ramps, and landings, that are more than 30 inches (762 mm) above the floor or grade below.

Exception:

Guards shall not be required where exempted by the adopted building code.

307.2.1 Height. Guards shall be not less than 30 inches (762 mm) high.

Reason Statement: This is the first of two proposals being submitted on the topic of existing guards. There are requirements for existing guards in both the IFC and the IPMC. The intent of these proposals is to A) Increase the coordination between the IFC and the IPMC on this topic, and B) Increase the coordination between the IFC and the IPMC with the IBC and the IRC.

In general, there are editorial differences between the IFC, IPMC, and the IBC which include the use of different terms and phrases as well as different organization, which can lead to confusion. There are also technical differences between the IFC and IPMC which creates a conflict when both codes are adopted by a jurisdiction.

This first proposal primarily addresses the editorial differences, however it does address one technical difference.

IFC Changes

The text in 1104.6 is editorially changed to A) remove the "complying with this section" phrase as it is unnecessary and B) to use the phrase "along open-sided walking surfaces" to match the phrase used in the IBC, Section 1105.2, and the IRC, Section R312.1.

The text in 1104.6.1 is editorially changed to remove the phrase "form a protective barrier" as it is unnecessary and potentially confusing. Section 1104.6.1 addresses the required guard height, not the purpose of a guard. Guard is a defined term in the IFC and the definition includes its purpose. There is no need to rehash the purpose in this section. In addition, the phrase "form a protective barrier" is not part of the definition and could be interpreted by some as an additional requirement for guards in the IFC.

The technical change in this proposal is to add a new exception to Section 1104.6. Adding this exception coordinates the IFC with the IPMC, which already includes this exception. It also logically aligns the requirements for when an existing guard is required with the requirements for when a guard is required for new construction. The IBC has 7 exceptions to the requirement for when guards are to be installed. Locations that are not required to have guards for new construction per the IBC should not retroactively be required to have guards per the IFC (or the IPMC).

IPMC Changes

The requirements for handrails and guards are split into separate sections to match how the requirements are provided in the IFC, the IBC, and the IRC. Using separate sections more clearly indicates the requirements.

The handrail text is modified to delete reference to "exterior and interior" stairs as this text is not needed and is not used in the IFC. Simply using the term "stairs" is sufficient and will require all stairs covered by the code to comply.

The phrase “along open-sided walking surfaces” is added to the Guard section to coordinate with the IBC and the IRC. The list of items, balconies, etc., is left in place even though it is not necessary as it was considered that some may object to removing the list.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is primarily editorial to reorganize and clarify the provisions. It is not expected to impact the cost of construction.

F119-21 Part I

PART I IFC: 1105.12 (NEW)

PART II IBC: 2701.1.1 (NEW)

Proponents: John Williams, Chair, representing Healthcare Committee (ahc@iccsafe.org)

THIS IS A TWO PART CODE CHANGE. PART 1 WILL BE HEARD BY THE FIRE CODE COMMITTEE. PART 2 WILL BE HEARD BY THE BUILDING CODE GENERAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Fire Code

Add new text as follows:

1105.12 Group I-2 Electrical Systems. Existing electrical systems shall comply with the requirements for existing electrical systems in NFPA 99.

F119-21 Part I

F119-21 Part II

IBC: 2701.1.1 (New)

Proponents: John Williams, Chair, representing Healthcare Committee (ahc@iccsafe.org)

2021 International Building Code

Add new text as follows:

2701.1.1 Group I-2 Electrical Systems. Electrical systems shall be installed in accordance with NFPA 99 and Article 517 of NFPA 70.

Reason Statement: In order to meet federal conditions of participation health care facilities must comply with system and equipment according to the requirements listed in NFPA 99, Health Care Facilities Code (K912). NFPA 99 is a risk based approach to system design and maintenance of key building systems. It is based upon risk to patients, visitor or staff in the healthcare facility regardless of occupancy classification. It does cover items such as routine testing of both normal and emergency power, testing of electrical systems, defining surgery operating rooms as wet locations unless approved risk assessment determines otherwise. Cover plates on life safety and critical branch receptacles are a distinct color. Requiring tamperproof receptacles in designated pediatric locations. These items are required in both new and existing healthcare facilities depending upon services and risk. These practices improve safety and reliability of electrical systems in locations at risk.

This proposal is submitted by the ICC Committee on Healthcare (CHC). The CHC was established by the ICC Board to evaluate and assess contemporary code issues relating to 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 2020 the CHC held several virtual meeting, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Information on the CHC, including: meeting agendas; minutes; reports; resource documents; presentations; and all other materials developed in conjunction with the CHC effort can be downloaded from the CHC website at CHC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change aligns with existing federal requirements for the healthcare industry.

F119-21 Part II

F120-21

IFC: 1104.7, 1104.8, 1104.8.1 (New), 1104.8.2 (New)

Proponents: John Woestman, Kellen Company, representing Builders Hardware Manufacturers Assoc. (BHMA)
(jwoestman@kellencompany.com)

2021 International Fire Code

Revise as follows:

1104.7 Size of doors. The required capacity of each door opening shall be sufficient for the *occupant load* thereof and shall provide a minimum clear opening width of 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 clear opening width of 28 inches (711 mm). The minimum clear opening height of doorways shall be 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 Group 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 m²) in area shall not be limited by the minimum clear opening width.
3. The width of door leaves in revolving doors that comply with Section 1010.3.1 shall not be limited.
4. The maximum width of door leaves in power-operated doors that comply with Section 1010.3.2 shall not be limited.
5. Door openings within a *dwelling unit* shall have a minimum clear opening height of 78 inches (1981 mm).
6. In *dwelling* and *sleeping units* that are not required to be Accessible units, Type A units or Type B units, exterior door openings, other than the required exit door, shall have a minimum clear opening height of 76 inches (1930 mm).
7. *Exit access* doors serving a room not larger than 70 square feet (6.5 m²) shall have a minimum door leaf width of 24 inches (610 mm).
8. The minimum clear opening width shall not apply to doors for nonaccessible showers or sauna compartments.
9. The minimum clear opening width shall not apply to the doors for nonaccessible toilet stalls.
10. ~~Door closers and door stops shall be permitted to be 78 inches (1980 mm) minimum above the floor.~~ Door closers, overhead door stops, frame stops, power door operators, and electromagnetic door locks shall be permitted to project into the door opening height not lower than 78 inches (1980 mm) minimum above the floor.

1104.8 Opening force for doors. ~~Forces to unlatch and open doors.~~ The opening force for interior side-swinging doors without closers shall not exceed a 5-pound (22 N) force. The opening forces do not apply to the force required to retract latch bolts or disengage other devices that hold the door in a closed position. For other side-swinging, sliding and folding doors, the door latch shall release when subjected to a force of not more than 15 pounds (66 N). The door shall be set in motion when subjected to a force not exceeding 30 pounds (133 N). The door shall swing to a full-open position when subjected to a force of not more than 50 pounds (222 N). ~~Forces shall be applied to the latch side.~~ Forces required to unlatch and open doors shall be in accordance with Sections 1104.8.1 and 1104.8.2.

Add new text as follows:

1104.8.1 Unlatching doors. The forces to unlatch doors shall comply with the following:

1. Where door hardware operates by push or pull, the operational force to unlatch the door shall not exceed 15 pounds (66.7N).
2. Where door hardware operates by rotation, the operational force to unlatch the door shall not exceed 28 inch-pounds (315 N-cm).

1104.8.2 Opening doors. The forces to open doors shall comply with the following:

1. For interior swinging egress doors that are manually operated, other than doors required to be fire rated, the force for pushing or pulling open the door shall not exceed 5 pounds (22 N).
2. For other swinging doors, sliding doors, or folding doors, and doors required to be fire-rated, the door shall require not more than a 30-pound (133 N) force to be set in motion and shall move to a full-open position when subjected to not more than a 15-pound (67 N) force.

Reason Statement: This proposal updates these sections of the IFC for existing buildings to be consistent with similar sections in the IBC and IFC for new construction.

Item 10 of Section 1104.7 is revised to be consistent with proposed revisions for the 2024 IBC, and IFC Chapter 10.

Section 1104.8 is revised to be consistent with the 2021 and 2021 IBC and IFC Chapter 10.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This revision is consistent with A117.1 requirements, and consistent with common practices for several decades.

F120-21

F121-21

IFC: SECTION 1107 (New), 1107.1 (New), 1107.1.1 (New), 1107.1.2 (New)

Proponents: Robert J Davidson, Davidson Code Concepts, LLC, representing Tesla, USA (rjd@davidsoncodeconcepts.com); Paul Rogers, Energy Response Safety Group, representing International Association Firefighters (paul.rogers@energyresponsegroup.com)

2021 International Fire Code

Add new text as follows:

SECTION 1107

ENERGY STORAGE SYSTEMS

.

1107.1 Lithium-ion technology energy storage systems. The owner of an energy storage system (ESS) utilizing lithium-ion battery technology having capacities exceeding the values in Table 1207.1.1 and that was installed prior to the jurisdiction's adoption of the 2018 or later edition of the International Fire Code shall provide the fire code official a failure modes and effects analysis (FMEA) or other approved hazard mitigation analysis in accordance with Section 104.8.2 for review and approval.

Exception: Detached one- and two-family dwellings and townhouses

1107.1.1 Early detection. In addition to the requirements of Section 1207.1.4.1 and 1207.1.4.2, the analysis shall include an assessment of the ability of the installed protection systems to provide for early detection and notification of a thermal runaway event in relation to the ability of emergency responders to safely mitigate the size and impact of a thermal runaway event.

1107.1.2 Corrective action plan. Where hazards are identified by the analysis, a plan that includes a timetable for corrective action shall be submitted to the fire code official for review and approval. The plan shall include actions and system improvements necessary for eliminating or mitigating any identified hazards, including listed methods for early detection and notification of a thermal runaway event.

Reason Statement: The 2018 International Fire Code and 2018 International Building Code were updated with significantly enhanced protections for energy storage systems including those based upon lithium-ion technologies. the reason statement for those changes included:

"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 of watt-hours of stored energy systems can be installed with little if any building or fire official oversight."

This lack of necessary protection levels was due to a lack of knowledge of the potential hazards should a thermal runaway event occur. One of the reasons for this lack was how the topic of lithium-ion batteries was presented to a previous fire code committee leading up to the 2006 edition when the proposal was submitted and testified to for adding lithium-ion battery technology to the existing stationary battery storage requirements. The proposal included the following in the reason statement:

"This battery technology has no caps and it is literally maintenance free. It is not prone to thermal runaway. Spill control is not required since the batteries are not flooded technology. Similarly, neutralization is not required. Ventilation is not required, since there are no caps and no off-gassing. Signage, seismic control, and detection are required, and treated similarly to the other battery technologies."

Though both the 2018 International Fire Code, 2018 NFPA 1 Fire Code received significant enhancements to provide necessary protection levels which were improved further with the provisions of the 2020 NFPA 855 Energy Storage Systems, the 2021 International Fire Code and the 2021 NFPA 1 Fire Code, there are numerous installations that do not meet the new and necessary safety requirements. Even after the printing of the 2018 International Fire Code installers continued to install systems that did not meet the new standard of care, taking advantage of earlier editions of the codes that were still being enforced locally. A glaring example of a system that did not meet the requirements of the 2018 or 2021 editions of the International Fire Code was located in Surprise, Arizona where a thermal runaway event seriously injured 4 members of the fire service.

The purpose of this proposal is to start to address potential protection shortcomings in the design, installation and maintenance of existing energy storage systems employing lithium-ion technology by requiring that a hazard analysis conforming to the requirements of Sections 1207.1.4.1 and 1207.1.4.2 of the current ESS requirements.

Proposed Section 1107.1 sets the scoping to those systems installed prior to the local adoption of the 2018 IFC or later that exceed the thresholds in Table 1207.1.1 which is the trigger for new installations. It utilizes similar language for the hazard analysis as currently exists for new systems at 1207.1.4 for consistency in application. An exception for one- and two-family dwellings and townhouses is included.

Proposed Section 1107.1.1, in addition to the requirements of Sections 1207.1.4.1 and 1207.1.4.2, requires the inclusion of an assessment of the ability of the installed protection to provide an early warning of a thermal runaway event and to provide notification of that event in relation to the ability of responders to safely mitigate the event. Early detection of a thermal runaway utilizing listed methods of early detection, such as sensing cell off-gassing or other compliant methods, is essential to mitigation efforts and the safety of responders.

Proposed Section 1107.1.2 requires the submission of a corrective action plan for the review and approval of the fire code official that includes actions and system improvements necessary for eliminating or mitigating identified hazards.

This retro active provision is consistent with activities for a similar requirement during the current cycle of NFPA 855 Energy Storage Systems.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

The proposed language does not address new construction. It addresses the safety of existing systems. Though there will not be a construction increase, there will be an increased operational cost to have the analysis conducted, and a cost to remedy and existing safety hazards typical of any other identified safety issue in a regulated occupancy.

F121-21

F122-21

IFC: 1201.1

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Fire Code

Revise as follows:

1201.1 Scope. The provisions of this chapter shall apply to the installation, operation, maintenance, repair, retrofitting, testing, commissioning and decommissioning of energy systems used for generating or storing energy including but not limited to energy storage systems under the exclusive control of an electric utility or lawfully designated agency. 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.

Reason Statement: This proposal clarifies that Chapter 12 applies to ESS at installations under the exclusive control of an electric utility, such as the ESS installation involved in an incident in Surprise, AZ. This is consistent with several requirements in Section 1207 that specifically reference ESS used at electric utility facilities.

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 and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: <https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/>

Cost Impact: The code change proposal will not increase or decrease the cost of construction

This proposal will not increase the cost of construction. It just clarifies that Chapter 12 does cover electric utility ESS installations.

F122-21

F123-21

IFC: 1201.1, NFPA Chapter 80 (New)

Proponents: sharon bonesteel, salt river project, representing salt river project (sharon.bonesteel@srpnet.com)

2021 International Fire Code

Revise as follows:

1201.1 Scope. The provisions of this chapter shall apply to the installation, operation, maintenance, repair, retrofitting, testing, commissioning and decommissioning 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.

Exception: ESS approved and installed in compliance with NFPA 855.

Add new standard(s) as follows:

NFPA

National Fire Protection Association
1 Batterymarch Park
Quincy MA 02169-7471

855-2020: Standard for the Installation of Stationary Energy Storage Systems

Staff Analysis: A review of the standard proposed for inclusion in the code, NFPA 855-2020: Standard for the Installation of Stationary Energy Storage Systems, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

Reason Statement: The NFPA 855 Standard for the Installation of Stationary Energy Storage Systems is a comprehensive standard that provides the minimum requirements for mitigating the hazards associated with ESS. Due to the nature of the fast changing ESS market, the NFPA 855 Standard, which is under continual maintenance process, will be able to address new technologies promptly. It is an appropriate standard to use in lieu of the requirements of Ch.12 of the IFC.

Bibliography: NFPA® 855 Standard for the Installation of Stationary Energy Storage Systems, 2020 Edition, prepared by the Technical Committee on Energy Storage Systems and acted on by the NFPA at its Association Technical Meeting held June 17-20,2019, in San Antonio, TX. It was issued by the Standards Council on August 5, 2019, with an effective date of August25, 2019. This edition of NFPA 855 was approved as an American National Standard on August 25, 2019.

The next edition will be submitted as the reference standard upon completion.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The use of NFPA® 855 as an equivalent standard to Ch.12 of the IFC will not increase or decrease the cost of construction.

F123-21

F124-21

IFC: 1201.1, IEEE (New), IEEE C2-2017 (New)

Proponents: Sharon Bonesteel, representing salt river project (sharon.bonesteel@srpnet.com)

2021 International Fire Code

Revise as follows:

1201.1 Scope. The provisions of this chapter shall apply to the installation, operation, maintenance, repair, retrofitting, testing, commissioning and decommissioning 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.

Exception: Lead-acid and nickel-cadmium battery systems that are designed in accordance with IEEE C2 , used for dc power for control of substations and control or safe shutdown of generating stations under the exclusive control of the electric utility, and located outdoors or in building spaces used exclusively for such installations.

Add new standard(s) as follows:

IEEE

Institute of Electrical and Electronics
Engineers Standards Association
445 Hoe Lane
Piscataway NJ 08854
USA

IEEE C2-2017 National Electrical Safety Code(R) (NESC(R)).

Staff Analysis: A review of the standard proposed for inclusion in the code, IEEE C2-2017, National Electrical Safety Code(R) (NESC(R)), with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

Reason Statement: These emergency back up systems should not be treated as energy storage systems. They have been functioning safely for years, providing back up in substations and other utility facilities. They are used for emergency power for pumps, for switch gear, and other equipment necessary for the safe operation and maintenance of utility facilities. Their installation and use has been safely governed by the IEEE C2 and the additional cost of conflicts in complying with Ch.12 will result in additional costs to the average utility customer, without additional safety being gained.

Cost Impact: The code change proposal will decrease the cost of construction

The additional requirements of Ch.12 for ESS are an additional expense for these systems that are emergency back up power for substations and other utility facilities.

F124-21

F125-21

IFC: SECTION 1201, 1201.1, 1201.2 (New), 1201.2.1 (New), 1201.2.2 (New), 1201.2.3 (New), 1201.2.4 (New), 1201.2.5 (New), IEEE (New), IEEE C2-2017 (New), NFPA Chapter 80 (New), NEMA Chapter 80 (New)

Proponents: sharon bonesteel, salt river project, representing salt river project (sharon.bonesteel@srpnet.com)

2021 International Fire Code

SECTION 1201 GENERAL.

Revise as follows:

1201.1 Scope. The provisions of this chapter shall apply to the installation, operation, maintenance, repair, retrofitting, testing, commissioning and decommissioning 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.

Exception: ESS in front of the meter, under the exclusive control of an electric utility or lawfully designated agency in accordance with Section 1201.2 shall not be required to comply with Chapter 12. Utility Scope Energy Storage Systems. behind the meter installations shall comply with Ch.12 and this code.

Add new text as follows:

1201.2 Utility Scope Energy Storage Systems. ESS installations located in front of the meter, under the exclusive control of an electric utility or lawfully designated agency, that are designed in accordance with NFPA 855 and IEEE C2 and providing documentation and coordination with the fire code official in accordance with Sections 1201.2.1 through 1201.2.5 shall not be required to comply with Chapter 12.

1201.2.1 Pre-Incident Plan (PIP). A PIP shall be developed and shall comply with NFPA 1620.

1201.2.2 Emergency Response Plan (ERP). The ERP shall indicate all actions to be provided by the utility in the event of an incident, and provide information necessary for emergency responder incident operations planning, including the following:

1. Site Layout.
2. Electrical Disconnecting procedure to be performed by utility staff remotely.
3. Electrical Disconnecting procedure to be performed by first responders.
4. Safety Data Sheets.
5. Ventilation System and Gas Detection System information.
6. Deflagration venting calculations and descriptions.
7. Details on the detection & suppression systems, their controls and locations.
8. Recommended Suppression Agents.
9. Occupancy Indicators shall be provided if the ESS space is capable of holding a person and shall indicate from 100 feet away if the ESS is occupied.
10. Contact numbers for responsible personnel.

1201.2.3 Training. The utility or lawfully designated agency shall provide on-site first responder training to review the PIP and ERP. This shall include a site overview, a description of the hazards, a review of the occupancy indicators, hazards and associated response tactics necessary to support mitigation and personal safety.

1201.2.4 Quick Reference Card (QRC). A QRC shall be provided for use at the command post during an incident. The QRC shall provide the ERP in a one-page document.

1201.2.5 Signage. Signage in compliance with ANSI Z535 shall be provided at the door to an ESS room, or on the barrier where exterior installations are secured from public access, and shall indicate the following:

1. "Energy Storage Systems" with symbol of lightning bolt in a triangle.
2. Type of technology associated with the ESS.
3. Special hazards.
4. Type of suppression systems installed in the area of the ESS.
5. Emergency contact information.

Add new standard(s) as follows:

IEEE

Institute of Electrical and Electronics
Engineers Standards Association
445 Hoe Lane
Piscataway NJ 08854
USA

IEEE C2-2017 National Electrical Safety Code(R) (NESC(R)).

NFPA

National Fire Protection Association
1 Batterymarch Park
Quincy MA 02169-7471

NFPA 855-2020: Standard for the Installation of Stationary Energy Storage Systems

NFPA 1620-2020: Standard for Pre-incident planning

NEMA

National Electrical Manufacturer's
Association
1300 North 17th Street Suite 900
Arlington VA 22209

Z535-2017: ANSI/NEMA Color Chart

Staff Analysis: A review of the following standards proposed for inclusion in the code, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

- IEEE C2-2017, National Electrical Safety Code(R) (NESC(R))
- NFPA 855-2020, Standard for the Installation of Stationary Energy Storage Systems
- NFPA 1620-2020, Standard for Pre-incident Planning

Note that NEMA Z535-2017 is already referenced in the International Swimming Pool and Spa Code.

Reason Statement: This proposal seeks to add an exemption for utility installations designed in accordance with NFPA 855 and IEEE C2, while adding necessary requirements to assure first responder safety. Through the benefits outlined in this proposal utilities can partner with first responders to create safe and cost effective energy storage installations.

The IFC has traditionally applied to only the load side or *behind the meter* installations. As the use of ESS expands, First Responders may find themselves responding to a battery fire on the utility side or *front of the meter*. These installations have traditionally been the jurisdiction of the National Electric Safety Code. Utilities are rapidly accepting the value to be gained from incorporating the best practices found in NFPA 855. Adding a third layer of code with Chapter 12 of the IFC will only lead to conflicts and confusion.

This proposal incorporates the most critical aspects of coordination with the local Fire Officials, including requirements for providing Pre-Incident Plan, Emergency Response Plan, First Responder Training, an Emergency Response Plan Quick Reference Card and appropriate signage.

Bibliography: NFPA® 855 Standard for the Installation of Stationary Energy Storage Systems, 2020 Edition, prepared by the Technical Committee on Energy Storage Systems and acted on by the NFPA at its Association Technical Meeting held June 17-20, 2019, in San Antonio, TX. It was issued by the Standards Council on August 5, 2019, with an effective date of August 25, 2019. This edition of NFPA 855 was approved as an American National Standard on August 25, 2019.

The next edition will be submitted as the reference standard upon completion.

Cost Impact: The code change proposal will increase the cost of construction

Clarifying that only NFPA 855 and IEEE C2 apply will reduce the costs from conflicts between three governing codes. However the additional benefits from First Responder on site training will add costs.

F125-21

F126-21

IFC: 1201.3

Proponents: Gregory Benton, NYS DOS Division of Building Standards and Codes, representing NYS DOS Division of Building Standards and Codes (gregory.benton@dos.ny.gov); Emma Gonzalez-Laders, representing NYS DOS Division of Building Standards and Codes (emma.gonzalez-laders@dos.ny.gov)

2021 International Fire Code

Revise as follows:

1201.3 Mixed system installation. Where mixed systems are approved, the aggregate nameplate kWh energy of all energy storage systems 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 104.8.2 to evaluate any potential adverse interaction between the various energy systems and technologies.

Reason Statement: The original wording of the code provision is confusing because it begins with "Where *approved*,..." and later in the same sentence states "shall not...", which could be mistakenly interpreted to mean the approval pertains to exceeding the aggregate energy storage limits rather than solely pertaining to allowing the existence of a mixed system in a *fire area*. By including the clarification of "where mixed systems are *approved*" it reduces the likelihood of this mistaken interpretation.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal solely clarifies wording in the code and will not affect cost.

F126-21

F127-21

IFC: 1204.5, 1204.5.1 (New), NFPA Chapter 80 (New)

Proponents: Marcelo Hirschler, GBH International, representing self (mmh@gbhint.com)

2021 International Fire Code

Revise as follows:

1204.5 Operating locations. Portable generators shall be operated only outdoors a minimum of 5 feet (1524 mm) from any structure with a combustible wall of from any building openings such as windows and doors or air intakes. Portable generators shall not be operated within buildings or enclosed areas. Additional separation shall be provided for tents, membrane structures and outdoor assembly events as specified in Chapter 31.

Add new text as follows:

1204.5.1 Generators located at less than 5 feet. Portable generators shall be permitted to be installed at a distance of less than 5 feet (1524 mm) from a combustible wall, as permitted by NFPA 37, where one of the following applies:

1. The generator has undergone a full scale fire test in accordance with NFPA 37, demonstrating that complete consumption of the combustibles in the generator, including its housing and fuel tank, will not ignite combustible structures.
2. The combustible wall exhibits a fire-resistance rating of at least one hour.

Add new standard(s) as follows:

NFPA

National Fire Protection Association
1 Batterymarch Park
Quincy MA 02169-7471

NFPA 37-2021: Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines

Staff Analysis: A review of the standard proposed for inclusion in the code, NFPA 37-2021, Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

Reason Statement: The IFC contains a requirement that generators should be placed no closer than 5 feet from openings. That is absolutely excellent. However, NFPA 37 (Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines) also requires that they be placed no closer than 5 feet from combustible walls, with some exceptions. NFPA 37 has now been revised so that the 2021 edition contains a full scale fire test which is used to demonstrate whether a generator can be safely installed at a distance of less than 5 feet, which is actually quite common, in practice, especially in urban environments and with the increased use of generators as backup power. Experience has shown that fires starting at generators can cause severe destruction in buildings placed in the vicinity, which is why the required minimum distance of 5 feet is a good idea.

The changes to NFPA 37 reflect research that showed that it is possible to forecast whether a generator (which is called an engine in NFPA 37) placed closer than 5 feet can still be installed safely.

NFPA 37 provides three options for safe installation:

1. The nearby wall has a fire resistance rating of at least 1 hour.
2. The generator (engine) and its weatherproof housing (as well as any fuel tank) has undergone a full scale fire test that requires complete consumption of all the combustibles in the generator, and shows that any fire originating in the generator will not ignite the nearby building (with a margin of error added to the distance).
3. Calculations performed under engineering supervision demonstrate that a fire originating at the engine or within its weatherproof housing will not ignite combustible structures.

The annex of NFPA 37 provides guidance for the engineering calculation, using NFPA 555 as the basis for the engineering analysis.

NFPA 37 is already referenced in the IMC and the IFGC. It has been issued by a consensus standards organization (NFPA) and complies with CP 28.

The language in the present (2021) edition of NFPA 37 reads as follows (with the changes from the earlier edition shown in legislative format):

4.1.4 Engines Located Outdoors.

4.1.4.1 Engines and, if provided, their weatherproof housings that are installed outdoors shall be located at least 1.5 m (5 ft) from any openings in the walls of structures.

4.1.4.2 Engines and, if provided, their weatherproof housings that are installed outdoors shall be located at least 1.5 m (5 ft) from structures having combustible walls except as provided in 4.1.4.2.1 ~~or~~ through 4.1.4.2.4.

4.1.4.2.1 A clearance less than 1.5 m (5 ft) shall be permitted where all portions of structures that are closer than 1.5 m (5 ft) from the engine enclosure have a fire resistance rating of at least 1 hour.

4.1.4.2.2* A clearance less than 1.5 m (5 ft) shall be permitted where ~~it has been demonstrated through methods acceptable to the authority having jurisdiction that a fire within the enclosure a fire test involving consumption of the available combustibles, within the engine or, if provided, its weatherproof housing demonstrates that a fire originating at the engine or its weatherproof housing will not ignite combustible structures.~~

4.1.4.2.3 If an engine assembly includes a nonrated fuel tank, the testing in 4.1.4.2.2 shall include the fuel tank.

4.1.4.2.4 A clearance less than 1.5 m (5 ft) shall be permitted where calculations performed under engineering supervision demonstrate that a fire originating at the engine or within its weatherproof housing will not ignite combustible structures.

Cost Impact: The code change proposal will increase the cost of construction

The proposal adds a prohibition for generators to be placed near a combustible wall and adds, as an exception, a requirement that, if generators are placed close to a combustible wall they must be fire tested. The IFC has no requirements associated with generators and combustible walls.

F127-21

F128-21

IFC: 1205.2.3, 1205.2, UL Chapter 80 (New)

Proponents: Michael O'Brian, Chair, representing FCAC (fcac@iccsafe.org)

2021 International Fire Code

Revise as follows:

1205.2.3 Building-integrated photovoltaic (BIPV) systems. Where building-integrated photovoltaic (BIPV) systems are installed in a manner that creates areas with electrical hazards to be hidden from view, markings shall be provided to identify the hazardous areas to avoid. The markings shall be reflective and be visible from grade.

Exception: BIPV systems *listed* in accordance with UL 3741 ~~Section 690.12(B)(2) of NFPA 70~~, where the removal or cutting away of portions of the BIPV system during fire-fighting operations have been determined to not expose a fire fighter to electrical shock hazards.

1205.2 Access and pathways. Roof access, pathways and spacing requirements shall be provided in accordance with Sections 1205.2.1 through 1205.3.3. 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 code official* has determined that rooftop operations will not be employed.
3. Building-integrated photovoltaic (BIPV) systems where the BIPV systems are *approved*, integrated into the finished roof surface and are *listed* in accordance with UL 3741 ~~a national test standard developed to address Section 690.12(B)(2) of NFPA 70~~. The removal or cutting away of portions of the BIPV system during fire-fighting operations shall not expose a fire fighter to electrical shock hazards.

Add new text as follows:

UL

Underwriters Laboratories LLC
333 Pfingsten Road
Northbrook IL 60062

UL 3741-2020: Photovoltaic Hazard Control

Staff Analysis: A review of the standard proposed for inclusion in the code, UL 3741-2020: Photovoltaic Hazard Control, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

Reason Statement: UL 3741 is the national test standard developed to address Section 690.12(B)(2) of NFPA 70. It is a consensus standard developed specifically for the evaluation and testing of rapid shutdown systems and equipment. This proposal will provide clarity on the specific requirements to be used for listing these systems and equipment, and provide the performance anticipated by rapid shutdown operations. 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 and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: <https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/>

Cost Impact: The code change proposal will not increase or decrease the cost of construction. This is identifying the standard already referred to indirectly within the code.

F128-21

F129-21

IFC: 1205.2.3, UL Chapter 80 (New)

Proponents: Joseph H. Cain, P.E., Solar Energy Industries Association (SEIA), representing SEIA (JoeCainPE@gmail.com)

2021 International Fire Code

Revise as follows:

1205.2.3 Building-integrated photovoltaic (BIPV) systems. Where building-integrated photovoltaic (BIPV) systems are installed in a manner that creates areas with electrical hazards to be hidden from view, markings shall be provided to identify the hazardous areas to avoid for ladder placement. The markings shall be reflective and be visible from grade beneath the eaves or other location approved by the fire code official.

Exception: BIPV systems *listed* in accordance with ~~Section 690.12(B)(2) of NFPA 70~~ UL 3741, where the removal or cutting away of portions of the BIPV system during fire-fighting operations have been determined to not expose a fire fighter to electrical shock hazards.

Add new standard(s) as follows:

UL

Underwriters Laboratories LLC
333 Pfingsten Road
Northbrook IL 60062

3741-2020: Photovoltaic Hazard Control

Staff Analysis: A review of the standard proposed for inclusion in the code, UL 3741-2020: Photovoltaic Hazard Control, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

Reason Statement: The requirements in 2021 IFC 1205.2.3 are in their first generation and not yet in effect. The technical requirements are in need of clarification. Some readers of this section have inquired about acceptable locations for reflective markings, and have asked whether the BIPV roof products themselves are required to be reflectorized wherever they occur on the roof of a residence or other building.

Speaking with representatives from the fire service provided clarify about the original intent of this requirement. The original intent is for reflective marking that could be under an eave and visible from grade, or could be in some other location visible from grade, such that the reflective marking identifies locations where a ladder should not be placed. The BIPV roof covering products themselves do not all need to be reflectorized.

For the exception, the reference has been changed to UL 3741, as the original language is imprecise, and the UL 3741 is the correct reference.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal only clarifies the technical requirements based on the original intent.

F129-21

F130-21

IFC: 1205.5.1

Proponents: Joseph H. Cain, P.E., Solar Energy Industries Association (SEIA), representing SEIA (JoeCainPE@gmail.com)

2021 International Fire Code

Revise as follows:

1205.5.1 Vegetation control. A clear, brush-free area of 10 feet (3048 mm) shall be required around the perimeter of the ground-mounted photovoltaic arrays. A noncombustible base of gravel or a maintained vegetative surface ~~or a noncombustible base, approved by the fire code official,~~ shall be installed and maintained under the photovoltaic arrays and associated electrical equipment installations.

Reason Statement: This proposal is editorial only. It removes some unintended redundant language.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is editorial only. It does not create nor modify any technical requirements.

F130-21

F131-21

IFC: CHAPTER 12, SECTION 1206, 1206.1, 1206.5, 1206.6, 1206.13, 1206.13.1, 1206.14

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Fire Code

CHAPTER 12 ENERGY SYSTEMS

SECTION 1206 STATIONARY FUEL CELL POWER SYSTEMS.

Revise as follows:

1206.1 General. *Stationary fuel cell power systems* in new and existing occupancies shall comply with this section.

Exception: The temporary use of a fuel cell-powered electric vehicle to power a Group R-3 or R-4 building while parked shall comply with Section ~~1206.13~~ ~~+206.14~~.

1206.5 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.

Exception: The temporary use of a fuel cell-powered electric vehicle to power a Group R-3 or R-4 building while parked shall comply with Section ~~+206.14~~ 1206.13.

1206.6 Indoor installations. *Stationary fuel cell power systems* installed in indoor locations shall comply with Sections 1206.6 through 1206.6.2. For purposes of this section, an indoor location includes a roof and 50 percent or greater enclosing walls.

Revise as follows:

~~+206.13~~ **1206.6.3 Gas detection systems.** *Stationary 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).

~~+206.13.1~~ **1206.6.3.1 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.

~~+206.14~~ **1206.13 Group R-3 and R-4 fuel cell vehicle energy storage system use.** The temporary use of the *dwelling unit owner* or occupant's fuel cell-powered electric vehicle to power a Group R-3 or R-4 dwelling while parked in an attached or detached garage or outside shall comply with the vehicle manufacturer's instructions and NFPA 70.

Reason Statement: This proposal corrects an error made when the new fuel cell language was added to the 2018 edition of the IFC. The intent was to provide core requirements and guidance that is correlated to the existing standards which had been inexplicably left out of the IFC when added to the IMC and IFGC. With combination systems becoming more popular, (battery storage and fuel cell), it was important to add the language to the IFC to ensure comprehensive design and installation approaches matching what was done with NFPA 855 for ESS. Unfortunately, an error occurred in the formatting of the new language when the detection requirement was taken from NFPA 853. That requirement applies to "Indoor installations" in NFPA 853 and the reason statement points to NFPA 853, but where added in the IFC it is being applied to indoor and outdoor installations which causes practical difficulties.

This proposal simply relocates the language to the "Indoor installation" requirements to correct the misapplication.

Original proposal adding the language:

F111-16

105.7.9 (New), 202 (New), 602.1, 612 (New), Chapter 80

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

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 – Gas detection system requirements include detection locations from NFPA 853 and activation criteria that are consistent with IFC requirements.

NFPA 853-2020 edition

(No change from 2015 edition)

Chapter 8 Fire Protection

8.1 Fire Protection and Detection.

8.1.5 Indoor Installation.

8.1.5.4* Combustible gas detector(s) shall be installed in the fuel cell power system enclosure, the exhaust system, or the room that encloses the fuel cell power system installation in accordance with the detector manufacturer's instructions and local regulation.

A.8.1.5.4 A fuel cell power system that includes an internal combustible gas detector meets this requirement if it is supported by a separate safety analysis.

8.1.5.5* A combustible gas detector that meets the requirements of 8.1.5.4 shall be provided for all indoor or separately enclosed fuel gas compressors (fuel gas boosters).

A.8.1.5.5 Fuel gas boosters (within the fuel cell enclosure containing fuel) containing members are addressed in ANSI/CSA FC 1, Fuel cell technologies — Part 3-100: Stationary fuel cell power systems — Safety, as part of the leak detection and mitigation strategy.

8.1.5.6 When gaseous or liquefied hydrogen is piped into the room or area from outside, hydrogen detector(s) shall be installed in accordance with 8.1.5.7.

8.1.5.7 The following criteria for combustible gas detection systems, including detection specific to hydrogen, shall be met:

(1) The location of the detection device(s) shall be based on leakage sources and fuel type.

(2) The combustible gas detection system shall be arranged to alarm at 25 percent of the lower flammable limit (LFL) and be interlocked to shut down the power system fuel supply at 60 percent LFL.

(3) The LFL used shall be the lowest flammability limit of the gas or gas mixture.

Chapter 9 Fuel Cell Power Systems 50 kW or Less

9.1 Chapter Scope. This chapter identifies additional requirements or modifications to Chapters 1 through 8 as they relate directly to fuel cell power systems 50 kW or less.

9.5 Fire Protection. The requirements of Chapter 8 shall not apply to 50 kW or smaller systems except as modified in 9.5.1 and 9.5.2.

9.5.1 Combustible gas detection shall be installed in accordance with 8.1.5.4 through 8.1.5.6 except where the fuel gas system is listed for indoor use and the fuel is odorized natural gas or LP-Gas.

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 and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: <https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/>

Cost Impact: The code change proposal will not increase or decrease the cost of construction

This section was not intended to apply to outdoor installations so would not have been applicable. In cases where this was being enforced this may decrease the cost of construction.

F131-21

F132-21

IFC: 1207.1.1 (New), 1207.1.2 (New), TABLE 1207.1.1

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Fire Code

Add new text as follows:

1207.1.1 Utilities and Industrial applications. This section shall not apply to capacitors and capacitor equipment for electric utilities and industrial facilities used in applications such as flexible ac transmission (FACTS) devices, filter capacitor banks, power factor correction, and standalone capacitor banks for voltage correction and stabilization.

1207.1.2 Mobile ESS. Mobile ESS deployed at an electric utility substation or generation facility for 90 days or less shall not add to the threshold values in Table 1207.1 for the stationary ESS installation if both of the following conditions apply:

1. The mobile ESS complies with Section 1207.10.
2. The mobile ESS is only being used during periods in which the facility's stationary ESS is being tested, repaired, retrofitted or replaced.

Revise as follows:

**TABLE 1207.1.1
ENERGY STORAGE SYSTEM (ESS) THRESHOLD QUANTITIES**

TECHNOLOGY	ENERGY CAPACITY ^a
Capacitor ESS	3 kWh
Flow batteries ^b	20 kWh
<u>ESS in one- and two-family dwellings and townhouse units</u>	<u>1 kWh</u>
Lead-acid batteries, all types	70 kWh ^c
Lithium-ion batteries	20 kWh
<u>Sodium nickel chloride batteries, Nickel metal hydride (Ni-MH)</u>	70 kWh
Nickel-cadmium batteries (Ni-Cd), <u>Nickel Metal Hydride (Ni-MH)</u> , and <u>Nickel Zinc (Ni-Zn) batteries</u>	70 kWh
<u>Non-electrochemical ESS^d</u>	<u>70 kWh</u>
Other battery technologies	10 kWh
Other electrochemical ESS technologies	3 kWh
<u>Zinc manganese dioxide batteries (Zn-MnO₂)</u>	<u>70 kWh</u>

For SI: 1 kilowatt hour = 3.6 megajoules.

- a. Energy capacity is the total energy capable of being stored (nameplate rating), not the usable energy rating. For units rated in amp-hours, kWh shall equal rated voltage times amp-hour rating divided by 1,000.
- b. Shall include vanadium, zinc-bromine, polysulfide-bromide and other flowing electrolyte-type technologies.
- c. Fifty gallons of lead-acid battery electrolyte shall be considered equivalent to 70 kWh.
- d. ~~Section 1207 shall not apply to capacitors and capacitor equipment for electric utilities and industrial facilities used in applications such as flexible ac transmission (FACTS), filter capacitor banks, power factor correction, and stand-alone capacitor banks for voltage correction and stabilization.~~
- d. Covers nonelectrochemical technologies such as flywheel and thermal ESS

Reason Statement: The proposed new Section 1207.1.1 is consistent with NFPA 855 Section 10.1.4. The changes to Table 1207.1.1 are consistent with NFPA 855 Table 1.3. Data has been provided previously to address addition of nickel zinc (Ni-Zn), zinc manganese dioxide (Zn-MnO₂) and sodium nickel chloride batteries to the table. The table now also covers non-electrochemical ESS, consistent with how it is treated in NFPA 855.

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 and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: <https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/>

Cost Impact: The code change proposal will not increase or decrease the cost of construction

This has the potential to lower costs since it recognizes new electrochemical ESS technologies, which are no longer classified under the more stringent "other" technology provisions.

F132-21

F133-21

IFC: 1207.1.3

Proponents: Emma Gonzalez-Laders, NYS DOS Division of Building Standards and Codes, representing NYS DOS Division of Building Standards and Codes (emma.gonzalez-laders@dos.ny.gov); Gregory Benton, representing NYS DOS Division of Building Standards and Codes (gregory.benton@dos.ny.gov); Chad Sievers, representing NYS Dept. of State (chad.sievers@dos.ny.gov); Jeffrey Hinderliter, City of Oswego, representing City of Oswego (jhinderliter@oswegony.org)

2021 International Fire Code

Revise as follows:

1207.1.3 Construction documents. The following information shall be provided with the permit application:

1. Location and layout diagram of the room or area in which the ESS is to be installed.
2. Details on the hourly *fire-resistance ratings* of assemblies enclosing the ESS.
3. The quantities and types of ESS to be installed.
4. Manufacturer's specifications, ratings and listings of each ESS.
5. Description of energy (battery) management systems and their operation.
6. Location and content of required signage.
7. Details on fire suppression, smoke or fire detection, thermal management, ventilation, exhaust and *deflagration* venting systems, if provided.
8. Support arrangement associated with the installation, including any required seismic restraint.
9. A commissioning plan complying with Section 1207.2.1.
10. A decommissioning plan complying with Section 1207.2.3.
11. An emergency response plan, developed in conjunction with the fire code official, that includes adequate guidance for mitigating fire, thermal runaway, and explosion hazards.

Reason Statement: The actions taken in the initial minutes of an emergency are critical. A call for help to emergency services that provides full and accurate information helps the dispatcher send the right responders and equipment.[1] When it comes to energy storage systems (ESS), as a relatively new technology, emergency responders have limited knowledge and experience developing mitigation plans and anticipating the hazards they might encounter when responding to an emergency.

The document titled Energy Storage Safety Strategic Plan, prepared by the US Department of Energy in December of 2014, recognized that *"first responders must be included in the discussion to ensure that all areas of potential failure are identified and the best mitigation strategies are developed, spanning the chemistries and materials choices through components, module layouts and deployment."* The document emphasized the need for *"deliberate and concerted effort to engage the first responder community early in the design and siting of energy storage systems so that proper mitigation techniques can be developed and systems [can be] designed to improve the overall safety and ability to quickly and safely resolve the incident. This must include the development of techniques to extinguish any fires if they were to occur and respond to the variety of non-fire incidents that may require fire department response, developing site specific training for first responders, improved systems design, and the development of incident response plans. All of these must be based on the scientific understanding of the systems, materials and processes."* The report also highlighted the importance of ensuring that those mechanisms be included as part of the requirements *"in codes, standards and regulations."*[2]

In spite of this clear guidance issued by a reliable source, first responders arrive at the scene of an emergency without this critical information. In March of 2018, after first responders worked for hours to extinguish a deadly electric vehicle fire near Mountain View, California, the vehicle manufacturer dispatched a team of engineers to assist in the removal of the battery pack.[3] As it pertains to buildings, first responders should be able to reasonably anticipate the types of hazards to be encountered prior to being dispatched. Having to wait for a manufacturer or other facility personnel to arrive and provide critical information to successfully address the hazards could result in loss of life, injuries, and loss of property. A report from the UL Firefighter Safety Research Institute included similar recommendations. Prepared after the 2018 fire and explosion at an ESS facility in Sunrise, Arizona, that resulted in injuries to four firefighters, the investigative report was the first of its kind and was issued as part of the Study of Firefighter Line of Duty Injuries and Near Misses. The report included *"recommendations on how to improve codes, standards, and emergency response training to better protect first responders, maintenance personnel and nearby communities."*[4] The report indicated that an Emergency Response Plan was neither required, nor provided to fire service personnel prior to the incident and that the report provided on arrival did not include adequate guidance to mitigate the typical potential hazards to be found at an ESS facility: thermal runaway, fire, and explosion. The burden of preparing the emergency response plan during design and permitting and making it available to the fire code official prior to an incident is minor when compared to the potential to injuries to first responders.

Much of the work and information required for the preparation of an ERP is basically already required under in Item #7 on the same list and code section (*"details on fire suppression, smoke or fire detection, thermal management, ventilation, exhaust and deflagration venting systems, if*

provided"). Many of the technical aspects required in Item #7 will inform the creation of the emergency response plan.

[1] <https://www.ready.gov/business/implementation/emergency>

[2] https://www.sandia.gov/ess-ssl/docs/other/DOE_OE_Safety_Strategic_Plan_Dec_2014_final.pdf

[3] <https://www.cnet.com/roadshow/news/tesla-model-x-autopilot-crash-fire/> and <https://electrek.co/2018/03/23/tesla-fire-battery-pack-model-x-crash/>

[4] <https://ulffirefightersafety.org/posts/four-firefighters-injured-in-lithium-ion-battery-energy-storage-system-explosion.html>

Bibliography: *Emergency Response Plan*. Ready Campaign. FEMA. www.ready.gov/business/implementation/emergency. Accessed 12/2/2020. *Energy Storage Safety Strategic Plan*. US Department of Energy. December, 2014. www.sandia.gov/ess-ssl/docs/other/DOE_OE_Safety_Strategic_Plan_Dec_2014_final.pdf. Accessed 12/2/2020.

Hyatt, Kyle. *Tesla Model X Fatal Crash and Fire Under Investigation*. CNET. 03/28/2018. www.cnet.com/roadshow/news/tesla-model-x-autopilot-crash-fire/. Accessed 12/2/2020.

Lambert, Fred. *Tesla Assists in Removing Partially Destroyed Battery Pack After Tragic Fatal Crash Resulted in a Fire*. Electrek. [www.electrek.co/2018/03/23/tesla-fire-battery-pack-model-x-crash/Four Firefighters Injured in Lithium-Ion Battery](https://www.electrek.co/2018/03/23/tesla-fire-battery-pack-model-x-crash/Four-Firefighters-Injured-in-Lithium-Ion-Battery). Accessed 12/2/2020.

McKinnon, Mark B., DeCrane, Sean, and Kerber, Stephen. *Energy Storage System Explosion - Arizona*. UL Firefighter Safety Research Institute. www.ulffirefightersafety.org/posts/four-firefighters-injured-in-lithium-ion-battery-energy-storage-system-explosion.html. Accessed 12/2/2020.

Emergency Response Planning Checklist. Akita Box. www.home.akitabox.com/emergency-response-planning-checklist-pdf. Accessed 12/2/2020.

Cost Impact: The code change proposal will increase the cost of construction

Any responsible development will likely include some level of hazard mitigation and incident pre-planning at some stage of the project process, regardless. This proposal simply would require that all that information be gathered into a standard Emergency Response Plan (ERP) during design and permitting and be subject to the approval of the fire code official.

Sample checklists for the development of a general Emergency Response Plan can be found online free of charge.[1] Completing the checklist and customizing a plan based on the presence of a lithium-ion battery ESS on the premises will likely require one to three hours depending on the preparer's level of familiarity with and the complexities of the system being used. Where a battery type other than lithium-ion is being proposed, less information is readily available and likely more time will be required. As mentioned in the Reason Statement, some of the research and documentation needed to prepare an ERP will be readily available, since much of the technical information that is already required in Item #7 of the same list and section will form the basis for the creation of the ERP.

Once a plan is developed, the designer or the supplier of the system can use it as the basis for future projects, therefore, the time required to prepare it for subsequent projects will decrease. Likewise, a plan developed for another facility with the same technology and a similar scope can inform the development of a plan for a new facility, also reducing the time required to develop the new plan.

The cost of inaction, when considering the risks to first responders and property losses, far outweighs the cost of pre-planning.

[1] <https://home.akitabox.com/emergency-response-planning-checklist-pdf>

F134-21

IFC: 1207.1.3.1 (New)

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Fire Code

Add new text as follows:

1207.1.3.1 Utilities applicability. Plans and specifications associated with ESS owned and operated by electric utilities as a component of the electric grid that are considered critical infrastructure documents in accordance with the provisions of the North American Electric Reliability Corporation and other applicable governmental laws and regulations shall be made available to the fire code official for viewing based on the requirements of the applicable governmental laws and regulations.

Reason Statement: This proposed change is consistent with NFPA 855, Section 4.1.2.1.2 and recognizes that there are federally enforced NAERC restrictions that regulate distribution of certain sensitive electric utility plans and documents.

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 and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: <https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/>

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal only addresses the manner in which documentation is provided to the code official.

F134-21

F135-21

IFC: 1207.1.4, 1207.1.4.1, 1207.1.4.2

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Fire Code

Revise as follows:

1207.1.4 Hazard mitigation analysis. A failure modes and effects analysis (FMEA) or other *approved* hazard mitigation analysis shall be provided in accordance with Section 104.8.2 under any of the following conditions:

1. Where ESS technologies not specifically identified in Table 1207.1.1 are provided.
2. More than one ESS technology is provided in a ~~room or enclosed single fire~~ area where there is a potential for adverse interaction between technologies.
3. Where allowed as a basis for increasing maximum allowable quantities. See Section 1207.5.2.
4. Where required by the fire code official to address a potential hazard with an ESS installation that is not addressed by existing requirements.

1207.1.4.1 Fault condition. The hazard mitigation analysis shall evaluate the consequences of the following failure modes. Only single failure modes shall be considered.

1. A thermal runaway condition in a single ~~electrochemical ESS rack, module or~~ unit.
2. A mechanical failure of a non-electrochemical ESS unit.
2. 3. Failure of any battery (energy) management system or fire protection system within the ESS equipment that is not covered by the product listing failure mode effects analysis (FMEA).
3. 4. Failure of any required ~~ventilation or exhaust system~~ protection system external to the ESS including but not limited to ventilation (HVAC), exhaust ventilation, smoke detection, fire detection, gas detection or fire suppression system.
4. ~~Voltage surges on the primary electric supply.~~
5. ~~Short circuits on the load side of the ESS.~~
6. ~~Failure of the smoke detection, fire detection, fire suppression or gas detection system.~~
7. ~~Required spill neutralization not being provided or failure of a required secondary containment system.~~

1207.1.4.2 Analysis approval. The *fire code official* is authorized to approve the hazardous mitigation analysis provided that the consequences of the hazard mitigation analysis demonstrate:

1. Fires will be contained within unoccupied ESS rooms or areas for the minimum duration of the fire-resistance-rated separations identified in Section 1207.7.4.
2. Fires involving the ESS will allow occupants or the general public to evacuate to a safe location. ~~in occupied work centers will be detected in time to allow occupants within the room or area to safely evacuate.~~
3. ~~Toxic and highly toxic gases released during fires will not reach concentrations in excess of the IDLH level in the building or adjacent means of egress routes during the time deemed necessary to evacuate occupants from any affected area.~~
4. ~~Flammable gases released from ESS during charging, discharging and normal operation will not exceed 25 percent of their lower flammability limit (LFL).~~
5. ~~Flammable gases released from ESS during fire, overcharging and other abnormal conditions will be controlled through the use of ventilation of the gases, preventing accumulation, or by deflagration venting.~~

Reason Statement: This proposal addresses the following:

1207.1.4 – Editorially corrected the reference to fire area.

1207.1.4.1

- Item 2 addresses potential mechanical ESS failure modes for nonelectrochemical ESS, such as loss of speed controls on flywheel ESS.
- Item 3 added failure of fire protection systems within the ESS enclosure, that was not covered by the UL 9540 listing FMEA, such as an off-gas air sampling systems.
- Item 4 combined ventilation and protection systems, formerly item (7), and added required HVAC equipment needed to keep the ESS in a safe temperature range. It also made these changes:.
- Voltage surges (item 5) and short circuits (item 6) protection are covered by the ESMS or BMS equipment requirements.
- When it comes to the FMEA, there was limited value in considering lack of spill neutralization materials or failure of secondary containment under single fault failure modes, so item 8 is being deleted. .

1207.1.4.2 – A major outcome of the HMA analysis is to allow occupants or the general public (for outdoor installations) to evacuate to a safe area. Item 3 is deleted because the IDLH level does not need to be stated and is covered by getting individuals to a safe area. Item 4 is being deleted because it is a performance requirement during normal operating conditions. Item 5 is being deleted because it is not an outcome, but rather ONE method of achieving the desired results.

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 and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: <https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/>

Cost Impact: The code change proposal will increase the cost of construction

The cost impact was shown as possibly increasing however this may vary. The revised hazard mitigation analysis (HMA) requirements may not impact the outcome or could change the protection to be provided.

F135-21

F136-21

IFC: CHAPTER 12, SECTION 1207, 1207.1, 1207.1.5

Proponents: Robert J Davidson, Davidson Code Concepts, LLC, representing Tesla, USA (rjd@davidsoncodeconcepts.com)

2021 International Fire Code

CHAPTER 12 ENERGY SYSTEMS

SECTION 1207 ELECTRICAL ENERGY STORAGE SYSTEMS (ESS).

1207.1 General. The provisions in this section are applicable to stationary and mobile electrical energy storage systems (ESS).

Exception: ESS in Group R-3 and R-4 occupancies shall comply with Section 1207.11.

Revise as follows:

1207.1.5 Large-scale fire test. Where required elsewhere in Section 1206, large-scale fire testing shall be conducted on a representative ESS in accordance with UL 9540A. The testing shall be conducted or witnessed and reported by an *approved* testing laboratory and show that a fire involving one ESS will not propagate to an adjacent ESS, and where installed within buildings, enclosed areas and walk-in units will be contained within the room, enclosed area or walk-in unit for a the duration equal to the fire-resistance rating of the room separation specified in Section 1207.7.4 of the test. The test report shall be provided to the *fire code official* for review and approval in accordance with Section 104.8.2.

Reason Statement: The purpose of this change is to correct a technical problem.

When the struck language was added to the fire code it was believed that this factor could be tested for and have the results contained within the large scale burn test report based on how long a fire-resistance-rated wall lasted. However, when working with UL on the development of UL 9540A as the test standard we were informed that this factor, fire-resistance rating as understood by the codes based upon E119 or ANSI/UL 263 testing could not be tested for in the large scale burn tests because there is no way to utilize a test furnace and the heat generation is entirely different.

Because of how the indoor tests in UL 9540A are tested you do know if the two simulated walls in the Unit Level Test survive testing, an important factor that is part of the distance to wall criteria, and with the Installation Level Test there is a room with ceiling and suppression that again provides knowledge of whether a room would survive. The problem is it cannot be reported in terms of length of fire-resistance rating.

The change in the language will provide data on duration for sharing with the code official, it just won't be in fire-resistant rating. Bottom line, the phrase deleted cannot be tested for, therefor it should be deleted/modified.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

Since this does not change the construction methods required, nor does it eliminate the need to conduct a large scale test, there is no impact on costs of construction.

F136-21

F137-21

IFC: 1207.1.6.1

Proponents: Gregory Benton, NYS DOS Division of Building Standards and Codes, representing NYS DOS Division of Building Standards and Codes (gregory.benton@dos.ny.gov); Emma Gonzalez-Laders, representing NYS DOS Division of Building Standards and Codes (emma.gonzalez-laders@dos.ny.gov)

2021 International Fire Code

Revise as follows:

1207.1.6.1 Fire mitigation personnel. Where, in the opinion of the *fire code official*, it is essential for public safety that trained personnel be on-site to respond to possible ignition or re-ignition of a damaged ESS, the system owner, agent or lessee shall ~~immediately~~ dispatch within 15 minutes one or more fire mitigation personnel to the premise, as required and *approved*, at their expense. These personnel shall remain on duty continuously after the fire department leaves the premise until the damaged energy storage equipment is removed from the premises, or earlier if the *fire code official* indicates the public safety hazard has been abated.

Reason Statement: The word "immediately" is unspecific and therefore unenforceable. The selection of 15 minutes was based on the New York City Fire Department's New Fire Department Rule 3 RCNY 608-01 "Outdoor Stationary Storage Battery Systems", which was adopted on October 1, 2019. In RCNY 608-01 the Fire Department requires a technical representative from the battery manufacturer with knowledge of the battery system be made available within 15 minutes of the Fire Department's request.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The specification of a maximum dispatch time will have a negligible affect on cost.

F137-21

F138-21

IFC: 1207.2.1, IEEE (New), IEEE C2-2017 (New)

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Fire Code

Revise as follows:

1207.2.1 Commissioning. Commissioning of newly installed ESS and existing ESS that have been retrofitted, replaced or previously decommissioned and are returning to service shall be conducted prior to the ESS being placed in service in accordance with a commissioning plan that has been *approved* prior to initiating commissioning. The commissioning plan shall include the following:

1. A narrative description of the activities that will be accomplished during each phase of commissioning, including the personnel intended to accomplish each of the activities.
2. A listing of the specific ESS and associated components, controls and safety-related devices to be tested, a description of the tests to be performed and the functions to be tested.
3. Conditions under which all testing will be performed, which are representative of the conditions during normal operation of the system.
4. Documentation of the owner's project requirements and the basis of design necessary to understand the installation and operation of the ESS.
5. Verification that required equipment and systems are installed in accordance with the *approved* plans and specifications.
6. Integrated testing for all fire and safety systems.
7. Testing for any required thermal management, ventilation or exhaust systems associated with the ESS installation.
8. Preparation and delivery of operation and maintenance documentation.
9. Training of facility operating and maintenance staff.
10. Identification and documentation of the requirements for maintaining system performance to meet the original design intent during the operation phase.
11. Identification and documentation of personnel who are qualified to service, maintain and decommission the ESS, and respond to incidents involving the ESS, including documentation that such service has been contracted for.
12. A decommissioning plan for removing the ESS from service, and from the facility in which it is located. The plan shall include details on providing a safe, orderly shutdown of energy storage and safety systems with notification to the code officials prior to the actual decommissioning of the system. The decommissioning plan shall include contingencies for removing an intact operational ESS from service, and for removing an ESS from service that has been damaged by a fire or other event.

Exception Exceptions: Commissioning shall not be required for lead-acid and nickel-cadmium battery systems at facilities under the exclusive control of communications utilities that comply with NFPA 76 and operate at less than 50 VAC and 60 VDC. A decommissioning plan shall be provided and maintained where required by the fire code official.

1. Lead-acid and nickel-cadmium battery systems less than 50 V ac, 60 V dc that are in telecommunications facilities for installations of communications equipment under the exclusive control of communications utilities and located outdoors or in building spaces or walk-in units used exclusively for such installations that are in compliance with NFPA 76 shall be permitted to have a commissioning plan in compliance with recognized industry practices in lieu of complying with Section 1207.2.1.
2. Lead-acid and nickel-cadmium battery systems that are designed in accordance with IEEE C2, used for dc power for control of substations and control or safe shutdown of generating stations under the exclusive control of the electric utilities, and located in building spaces or walk-in units used exclusively for such installations shall be permitted to have a commissioning plan in compliance with applicable governmental laws and regulations in lieu of developing a commissioning plan in accordance with Section 1207.2.1.

Add new standard(s) as follows:

IEEE

Institute of Electrical and Electronics
Engineers Standards Association
445 Hoes Lane
Piscataway NJ 08854
USA

IEEE C2-2017 National Electrical Safety Code(R) (NESC(R)).

Staff Analysis: A review of the standard proposed for inclusion in the code, IEEE C2-2017, National Electrical Safety Code(R) (NESC(R)), with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

Reason Statement: This proposed change is consistent with NFPA 855, Sections 8.1.1, 6.1.1.2, and 8.1.2 and allows options for lead acid and Ni-cad battery system ESS commissioning for telecommunications and electric utility installations. 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 and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: <https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/>

Cost Impact: The code change proposal will not increase or decrease the cost of construction. It merely provides industry options for commissioning ESS.

F138-21

F139-21

IFC: 1207.2.2

Proponents: Gregory Benton, NYS DOS Division of Building Standards and Codes, representing NYS DOS Division of Building Standards and Codes (gregory.benton@dos.ny.gov); Emma Gonzalez-Laders, representing NYS DOS Division of Building Standards and Codes (emma.gonzalez-laders@dos.ny.gov); Daniel Carroll, representing NYS DOS Division of Building Standards and Codes (daniel.carroll@dos.ny.gov)

2021 International Fire Code

Revise as follows:

1207.2.2 Operation and maintenance. An operation and maintenance manual shall be provided to both the ESS *owner* or their authorized agent and the ESS operator before the ESS is put into operation and shall include the following:

1. Manufacturer's operation manuals and maintenance manuals for the entire ESS, or for each component of the system requiring maintenance, that clearly identify the required routine maintenance actions.
2. Name, address and phone number of a service agency that has been contracted to service the ESS and its associated safety systems.
3. Maintenance and calibration information, including wiring diagrams, control drawings, schematics, system programming instructions and control sequence descriptions, for all energy storage control systems.
4. Desired or field-determined control set points that are permanently recorded on control drawings at control devices or, for digital control systems, in system programming instructions.
5. A schedule for inspecting and recalibrating all ESS controls.
6. A service record log form that lists the schedule for all required servicing and maintenance actions and space for logging such actions that are completed over time and retained on-site.

The ESS shall be operated and maintained in accordance with the manual and a copy of the manual shall be retained at an approved on-site location and be available to the fire code official.

Reason Statement: The fire code official is responsible with the administration and enforcement of the code. As such, the fire code official should have the operations and maintenance manual for the energy storage systems available to him/her.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

This proposal does not require additional labor, materials, or equipment required by the current code and therefore will not increase the cost of construction.

F139-21

F140-21

IFC: 1207.3.1, IEEE (New), IEEE C2-2017 (New), UL Chapter 80 (New)

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Fire Code

Revise as follows:

1207.3.1 Energy storage system listings. ESS shall be *listed* in accordance with UL 9540.

~~Exception-Exceptions:~~ ~~Lead-acid and nickel-cadmium battery systems installed in facilities under the exclusive control of communications utilities, and operating at less than 50 VAC and 60 VDC in accordance with NFPA 76, are not required to be listed.~~

1. Lead-acid and nickel-cadmium battery systems less than 50 V ac, 60 V dc in telecommunications facilities for installations of communications equipment under the exclusive control of communications utilities located outdoors or in building spaces used exclusively for such installations that are in compliance with NFPA 76.
2. Lead-acid and nickel-cadmium battery systems that are designed in accordance with IEEE C2, used for dc power for control of substations and control or safe shutdown of generating stations under the exclusive control of the electric utility, and located outdoors or in building spaces used exclusively for such installations.
3. Lead-acid battery systems in uninterruptible power supplies listed and labeled in accordance with UL 1778 and utilized for standby power applications.

Add new standard(s) as follows:

IEEE

Institute of Electrical and Electronics
Engineers Standards Association
445 Hoes Lane
Piscataway NJ 08854
USA

IEEE C2-2017 National Electrical Safety Code(R) (NESC(R)).

UL

Underwriters Laboratories LLC
333 Pfingsten Road
Northbrook IL 60062

1778-2014 - with revisions through October 2017 : Uninterruptible Power Systems

Staff Analysis: A review of the following standards proposed for inclusion in the code, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

- IEEE C2-2017, National Electrical Safety Code(R) (NESC(R))
- UL 1778-2014 - Uninterruptible Power Systems with revisions through October 2017

Reason Statement: This proposed change is consistent with NFPA 855, Sections 4.2.1.1 through 4.2.1.3 and allows certain battery systems in telecommunication, electric utility and UPS applications to not be listed to UL 9540.

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 and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: <https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/>

Cost Impact: The code change proposal will not increase or decrease the cost of construction. It introduces applications in which certain ESS technologies are not required to be listed.

F140-21

F141-21

IFC: 1207.3.7.1, IEEE (New), IEEE C2-2017 (New), UL Chapter 80 (New)

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Fire Code

Revise as follows:

1207.3.7.1 Retrofitting lead acid and nickel cadmium. ~~Section 1207.3.7 shall not apply to~~ Changing out or retrofitting of lead-acid and nickel-cadmium batteries with other lead-acid and nickel-cadmium batteries in the following applications shall be considered repairs where there is no increase in system size or energy capacity greater than 10 percent of the original design

1. At facilities under the exclusive control of communications utilities that comply with NFPA 76 and operate at less than 50 VAC and 60 VDC.
2. Battery systems designed in accordance with IEEE C2, used for dc power for control of substations and control or safe shutdown of generating stations under the exclusive control of the electric utility, and located outdoors or in building spaces used exclusively for such installations.
3. Batteries in uninterruptible power supplies listed and labeled in accordance with UL 1778 and used for standby power applications only.

Add new standard(s) as follows:

IEEE

Institute of Electrical and Electronics
Engineers Standards Association
445 Hoes Lane
Piscataway NJ 08854
USA

IEEE C2-2017 National Electrical Safety Code(R) (NESC(R)).

UL

Underwriters Laboratories LLC
333 Pfingsten Road
Northbrook IL 60062

1778-2014: Uninterruptible Power Systems - with revisions through October 2017

Staff Analysis: A review of the following standards proposed for inclusion in the code, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

- IEEE C2-2017, National Electrical Safety Code(R) (NESC(R))
- UL 1778-2014 - Uninterruptible Power Systems with revisions through October 2017

Reason Statement: This proposed change is consistent with NFPA 855, Sections 4.2.3.2 through 4.2.3.4 and recognizes exceptions for changing out batteries for telecommunications, electric utility and UPS systems without additional commissioning or pulling a permit.

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 and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: <https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/>

Cost Impact: The code change proposal will not increase or decrease the cost of construction
It may decrease costs by not requiring additional commissioning or pulling a permit.

F141-21

F142-21

IFC: TABLE 1207.5

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Fire Code

Revise as follows:

**TABLE 1207.5
MAXIMUM ALLOWABLE QUANTITIES OF ELECTROCHEMICAL ESS**

TECHNOLOGY	MAXIMUM ALLOWABLE QUANTITIES ^a
STORAGE BATTERIES	
Flow batteries ^b	600 kWh
Lead-acid, all types	Unlimited
Lithium-ion	600 kWh
Sodium nickel chloride Nickel metal hydride (Ni-MH)	Unlimited <u>600kWh</u>
Nickel-cadmium (Ni-Cd), <u>Nickel metal hydride (NI-MH)</u> and nickel zinc (Ni-Zn)	Unlimited
<u>Zinc Manganese dioxide (Zn-MnO₂)</u>	<u>Unlimited</u>
Other battery technologies	200 kWh
CAPACITORS	
All types	20 kWh
OTHER ELECTROCHEMICAL ESS	
All types	20 kWh

For SI: 1 kilowatt hour = 3.6 megajoules.

- a. For electrochemical ESS units rated in amp-hours, kWh shall equal rated voltage times the amp-hour rating divided by 1,000.
- b. Shall include vanadium, zinc-bromine, polysulfide-bromide and other flowing electrolyte-type technologies.

Reason Statement: This proposed change is consistent with NFPA 855, Table 4.8, it adds nickel zinc technology, zinc manganese dioxide and sodium nickel chloride into the table based on testing performed and the data provide to the NFPA 855 technical committee. It also relocated the nickel metal hydride batteries reference with no technical change.

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 and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: <https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/>

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal will not increase the cost of construction. It just introduces two new battery technologies.

F142-21

F143-21

IFC: 1207.5.1, IEEE (New), IEEE C2-2017 (New), UL Chapter 80 (New)

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Fire Code

Revise as follows:

1207.5.1 Size and separation. Electrochemical ESS shall be segregated into groups not exceeding 50 kWh (180 megajoules). Each group shall be separated a minimum of 3 feet (914 mm) from other groups and from walls in the storage room or area. The storage arrangements shall comply with Chapter 10.

1. Lead-acid and nickel-cadmium battery systems in facilities under the exclusive control of communications utilities and operating at less than 50 VAC and 60 VDC in accordance with NFPA 76.
2. Lead-acid and nickel cadmium systems that are designed in accordance with IEEE C2, used for dc power for control of substations and control or safe shutdown of generating stations under the exclusive control of the electric utility, and located outdoors or in building spaces used exclusively for such installations.
3. Lead-acid battery systems in uninterruptible power supplies listed and labeled in accordance with UL 1778, utilized for standby power applications, and limited to not more than 10% of the floor area on the floor on which the ESS is located.
- 2.4. The *fire code official* is authorized to approve larger capacities or smaller separation distances based on large-scale fire testing complying with Section 1207.1.5.

Add new standard(s) as follows:

IEEE

Institute of Electrical and Electronics
Engineers Standards Association
445 Hoes Lane
Piscataway NJ 08854
USA

IEEE C2-2017 National Electrical Safety Code(R) (NESC(R)).

UL

Underwriters Laboratories LLC
333 Pfingsten Road
Northbrook IL 60062

1778-2014: : Uninterruptible Power Systems with revisions through October 2017

Staff Analysis: A review of the following standards proposed for inclusion in the code, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

- IEEE C2-2017, National Electrical Safety Code(R) (NESC(R))
- UL 1778-2014 - Uninterruptible Power Systems with revisions through October 2017

Reason Statement: This proposed change is consistent with NFPA 855, Sections 4.6.6 and 4.6.7 and includes exceptions for certain battery technologies in electric utility and UPS 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 and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: <https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/>

Cost Impact: The code change proposal will not increase or decrease the cost of construction

This proposal will not increase the cost of construction. It introduces applications in which certain ESS technologies are not required to meet size and separation requirements.

F143-21

F144-21

IFC: 1207.5.3, IEEE (New), IEEE C2-2017 (New), UL Chapter 80 (New)

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Fire Code

Revise as follows:

1207.5.3 Elevation. Electrochemical ESS shall not be located in the following areas:

1. Where the floor is located more than 75 feet (22 860 mm) above the lowest level of fire department vehicle access.
2. Where the floor is located below the lowest *level of exit discharge*.

Exceptions:

1. Lead-acid and nickel-cadmium battery systems less than 50 VAC and 60 VDC installed in facilities under the exclusive control of communications utilities in accordance with NFPA 76.
2. Lead-acid and nickel cadmium systems that are designed in accordance with IEEE C2, used for dc power for control of substations and control and safe shutdown of generating stations under the exclusive control of the electric utility, and located outdoors or in building spaces used exclusively for such installations.
3. Lead-acid battery systems in uninterruptible power supplies listed and labeled in accordance with UL 1778, utilized for standby power applications, which is limited to not more than 10% of the floor area on the floor on which the ESS is located.
- 2.4. Where *approved*, installations shall be permitted in underground vaults complying with NFPA 70, Article 450, Part III.
3. 5. Where *approved by the fire code official*, installations shall be permitted on higher and lower floors.

Add new standard(s) as follows:

IEEE

Institute of Electrical and Electronics
Engineers Standards Association
445 Hoes Lane
Piscataway NJ 08854
USA

IEEE C2-2017 National Electrical Safety Code(R) (NESC(R)).

UL

Underwriters Laboratories LLC
333 Pfingsten Road
Northbrook IL 60062

1778-2014: Uninterruptible Power Systems

Staff Analysis: A review of the following standards proposed for inclusion in the code, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

- IEEE C2-2017, National Electrical Safety Code(R) (NESC(R))
- UL 1778-2014 - Uninterruptible Power Systems with revisions through October 2017

Reason Statement: This proposed change is consistent with NFPA 855, Section 4.3.9.3 and allows exceptions to elevation requirements for certain battery technologies in electric utility and UPS systems.

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 and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: <https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/>

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal will not increase the cost of construction. It is actually a relaxation of requirements.

F144-21

F145-21

IFC: 1207.5.4, 1207.5.4.1, IEEE (New), IEEE C2-2017 (New)

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Fire Code

Revise as follows:

1207.5.4 Fire detection. An *approved* automatic smoke detection system or radiant energy-sensing fire detection system complying with Section 907.2 shall be installed in rooms, indoor areas and walk-in units containing electrochemical ESS. An *approved* radiant energy-sensing fire detection system shall be installed to protect open parking garage and rooftop installations. Alarm signals from detection systems shall be transmitted to a central station, proprietary or remote station service in accordance with NFPA 72, or where *approved* to a constantly attended location.

Exception: Normally unoccupied, remote stand-alone telecommunications structures with a gross floor area of less than 1500 ft² (139 m²) utilizing lead-acid or nickel cadmium batteries shall not be required to have a fire detection system installed.

1207.5.4.1 System status. Lead-acid and nickel-cadmium battery systems that are designed in accordance with IEEE C2, used for dc power for control of substations and control or safe shutdown of generating stations under the exclusive control of the electric utility, and located outdoors or in building spaces used exclusively for such installations shall be allowed to use the process control system to monitor the smoke or radiant energy-sensing fire detectors required in Section 1207.5.4.

~~Where required by the fire code official, visible annunciation shall be provided on cabinet exteriors or in other *approved* locations to indicate that potentially hazardous conditions associated with the ESS exist.~~

Add new standard(s) as follows:

IEEE

Institute of Electrical and Electronics
Engineers Standards Association
445 Hoe Lane
Piscataway NJ 08854
USA

IEEE C2-2017 National Electrical Safety Code(R) (NESC(R)).

Staff Analysis: A review of the standard proposed for inclusion in the code, IEEE C2-2017, National Electrical Safety Code(R) (NESC(R)), with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

Reason Statement: This proposed change is consistent with NFPA 855, Sections 4.10.2 and 4.10.3. It allows small remote telecommunication facilities, such as mountaintop repeaters, to not require a fire detection system. It also revises the fire detection system requirements for certain electric utility installations to use process control systems to monitor the smoke or fire detectors.

Cost Impact: The code change proposal will not increase or decrease the cost of construction. It is actually a relaxation of requirements.

F145-21

F146-21

IFC: 1207.5.5, IEEE (New), IEEE C2-2017 (New), UL Chapter 80 (New)

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Fire Code

Revise as follows:

1207.5.5 Fire suppression systems. Rooms and areas within buildings and walk-in units containing electrochemical ESS shall be protected by an automatic fire suppression system designed and installed in accordance with one of the following:

1. ~~An Automatic sprinkler systems system designed and installed in accordance with Section 903.3.1.1 for ESS units (groups) with a maximum stored energy capacity of 50 kWh, as described in Section 1207.5.1, shall be designed with a minimum density of 0.3 gpm/ft² (1.1 l/min) based on the fire area over the area of the room or 2500 ft² (232 m²) design area, whichever is smaller, unless a lower density is approved based upon large-scale fire testing in accordance with Section 1207.1.5.~~
2. ~~Where approved, an automatic sprinkler system designed and installed in accordance with Section 903.3.1.1 with a sprinkler hazard classification. Automatic sprinkler systems for ESS units (groups) exceeding 50 kWh shall use a density based on large-scale fire testing complying with Section 1207.1.5.~~
3. The following alternative automatic fire-extinguishing systems designed and installed in accordance with Section 904, provided that the installation is *approved* by the *fire code official* based on large-scale fire testing complying with Section 1207.1.5:
 - 3.1. NFPA 12, *Standard on Carbon Dioxide Extinguishing Systems*.
 - 3.2. NFPA 15, *Standard for Water Spray Fixed Systems for Fire Protection*.
 - 3.3. NFPA 750, *Standard on Water Mist Fire Protection Systems*.
 - 3.4. NFPA 2001, *Standard on Clean Agent Fire-Extinguishing Systems*.
 - 3.5. NFPA 2010, *Standard for Fixed Aerosol Fire-Extinguishing Systems*.

Exception Exceptions:

1. Fire suppression systems for lead-acid and nickel-cadmium battery systems at facilities under the exclusive control of communications utilities that operate at less than 50 VAC and 60 VDC shall be provided where required by NFPA 76.
2. Lead-acid and nickel cadmium systems that are designed in accordance with IEEE C2, used for dc power for control of substations and control or safe shutdown of generating stations under the exclusive control of the electric utility, and located outdoors or in building spaces used exclusively for such installations shall not be required to have a fire suppression system installed.
3. Lead-acid battery systems in uninterruptible power supplies listed and labeled in accordance with UL 1778, utilized for standby power applications, which is limited to not more than 10% of the floor area on the floor on which the ESS is located shall not be required to have a fire suppression system.

Add new standard(s) as follows:

IEEE

Institute of Electrical and Electronics
Engineers Standards Association
445 Hoe Lane
Piscataway NJ 08854
USA

IEEE C2-2017 National Electrical Safety Code(R) (NESC(R)).

UL

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1778-2014: : Uninterruptible Power Systems with revisions through October 2017

Staff Analysis: A review of the following standards proposed for inclusion in the code, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

- IEEE C2-2017, National Electrical Safety Code(R) (NESC(R))
- UL 1778-2014 - Uninterruptible Power Systems with revisions through October 2017

Reason Statement: This proposed change is consistent with NFPA 855, TIA Log #1486, and Sections 4.11.6 and 4.11.5. The new sprinkler density

requirements were based, in part, on testing conducted by FM. The two exemptions for not requiring fire suppression for certain lead-acid and Ni-Cad battery systems used in electric utility and UPS applications were consistent with requirements in place prior to the 2018 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 and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: <https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/>

Cost Impact: The code change proposal will increase the cost of construction

This proposal may result in an increase in the cost of construction. Large scale UL 9540A fire testing may dictate larger sprinkler densities be provided. However, the two exceptions have the potential to reduce the cost of construction.

F146-21

F147-21

IFC: TABLE 1207.6

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Fire Code

Revise as follows:

**TABLE 1207.6
ELECTROCHEMICAL ESS TECHNOLOGY-SPECIFIC REQUIREMENTS**

COMPLIANCE REQUIRED ^b		BATTERY TECHNOLOGY						OTHER ESS AND BATTERY TECHNOLOGIES ^b	CAPACITOR ESS ^b
Feature	Section	Lead- acid	Nickel cadmium (Ni-Cd), and nickel metal hydride (Ni-MH) and nickel zinc (Ni-Zn)	Zinc Manganese dioxide (Zn MnO ₂)	Lithium- ion	Flow	Sodium nickel chloride		
Exhaust ventilation	1207.6.1	Yes	Yes	<u>Yes</u>	No	Yes	<u>No</u>	Yes	Yes
Explosion control	1207.6.3	Yes ^a	Yes ^a	<u>Yes</u>	Yes	No	<u>Yes</u>	Yes	Yes
Safety caps	1207.6.4	Yes	Yes	<u>No</u>	No	No	<u>No</u>	Yes	Yes
Spill control and neutralization	1207.6.2	Yes ^c	Yes ^c	<u>Yes^f</u>	No	Yes	<u>No</u>	Yes	Yes
Thermal runaway	1207.6.5	Yes ^d	Yes	<u>Yes^e</u>	Yes ^e	No	<u>Yes</u>	Yes ^e	Yes

- a. Not required for lead-acid and nickel-cadmium batteries at facilities under the exclusive control of communications utilities that comply with NFPA 76 and operate at less than 50 VAC and 60 VDC.
- b. Protection shall be provided unless documentation acceptable to the fire code official is provided in accordance with Section 104.8.2 that provides justification why the protection is not necessary based on the technology used.
- c. Applicable to vented-type (i.e., flooded) nickel-cadmium and lead-acid batteries.
- d. Not required for vented-type (i.e., flooded) lead-acid batteries.
- e. The thermal runaway protection is permitted to be part of a battery management system that has been evaluated with the battery as part of the evaluation to UL 1973.
- f. Not required for batteries with gelled electrolyte.

Reason Statement: Data had been provided to address addition of nickel zinc (Ni-Zn), zinc manganese dioxide (ZnMnO₂), and sodium nickel chloride batteries to the table. This revision for nickel chloride batteries is consistent with NFPA 855 Table 9.2.

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 and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: <https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/>

Cost Impact: The code change proposal will not increase or decrease the cost of construction

This has the potential to lower costs since it recognizes new electrochemical ESS technologies, which are no longer classified under the more stringent "other" technology provisions.

F147-21

F148-21

IFC: TABLE 1207.6

Proponents: Richard Kluge, Ericsson Inc., representing Alliance for Telecommunications Industry Solutions (ATIS) (richard.kluge@ericsson.com)

2021 International Fire Code

Revise as follows:

**TABLE 1207.6
ELECTROCHEMICAL ESS TECHNOLOGY-SPECIFIC REQUIREMENTS**

COMPLIANCE REQUIRED ^b		BATTERY TECHNOLOGY				OTHER ESS AND BATTERY TECHNOLOGIES ^b	CAPACITOR ESS ^b
Feature	Section	Lead-acid	Ni-Cd and Ni-MH	Lithium-ion	Flow		
Exhaust ventilation	1207.6.1	Yes	Yes	No	Yes	Yes	Yes
Explosion control	1207.6.3	Yes ^a	Yes ^a	Yes	No	Yes	Yes
Safety caps	1207.6.4	Yes	Yes	No	No	Yes	Yes
Spill control and neutralization	1207.6.2	Yes ^c	Yes ^c	No	Yes	Yes	Yes
Thermal runaway	1207.6.5	Yes ^d	Yes ^d	Yes ^e	No	Yes ^e	Yes

- a. Not required for lead-acid and nickel-cadmium batteries at facilities under the exclusive control of communications utilities that comply with NFPA 76 and operate at less than 50 VAC and 60 VDC.
- b. Protection shall be provided unless documentation acceptable to the fire code official is provided in accordance with Section 104.8.2 that provides justification why the protection is not necessary based on the technology used.
- c. Applicable to vented-type (i.e., flooded) nickel-cadmium and lead-acid batteries.
- d. Not required for vented-type (i.e., flooded) ~~lead-acid~~ batteries.
- e. The thermal runaway protection is permitted to be part of a battery management system that has been evaluated with the battery as part of the evaluation to UL 1973.

Reason Statement: Flooded nickel-cadmium batteries do not require thermal-runaway control for safe operation. In fact, they are as abuse tolerant as flooded lead-acid batteries, if not more so. Prior editions of the IFC did not require thermal runaway control for flooded nickel-cadmium batteries.

From the 2018 Edition: **1206.2.12.2 (3)** "Thermal runaway control shall be provided for valve-regulated sealed nickel-cadmium storage batteries in accordance with section 1206.2.10.7."

Note this specifically exempts flooded nickel-cadmium batteries which are neither sealed nor valve-regulated. The language in prior IFC editions was similar and never required thermal runaway control for flooded nickel-cadmium batteries.

The change to include thermal runaway control for flooded nickel-cadmium batteries may have inadvertently been made when this part of the energy storage section was updated and put into tabular format in the 2021 edition as there was no justification recorded for the change. A Public Input to correct a similar mistake found in the 2018 edition of NFPA 855 was recently accepted at the technical committee level. See attached pdf file of first revision 114 of NFPA 855 - in particular, edit to note e.

Nickel-metal-hydride batteries are not made in a flooded or vented configuration, so even though they are included in the same column as nickel-cadmium, the footnote exempting them from thermal runaway control would not apply.

Cost Impact: The code change proposal will decrease the cost of construction

Not requiring thermal runaway control for nickel-cadmium batteries will result in a slightly lower cost for these installations as simpler charge controllers without temperature compensation can be utilized.

F148-21

F149-21

IFC: 1207.6.1, 1207.6.1.1, 1207.6.1.2

Proponents: Richard Kluge, Ericsson Inc., representing Alliance for Telecommunications Industry Solutions (ATIS) (richard.kluge@ericsson.com)

2021 International Fire Code

Revise as follows:

1207.6.1 Exhaust ventilation. Where required by Table 1207.6 or elsewhere in this code, natural or mechanical exhaust ventilation of rooms, areas and walk-in units containing electrochemical ESS shall be provided in accordance with the *International Mechanical Code* and Section 1207.6.1.1 or 1207.6.1.2.

1207.6.1.1 Ventilation based on LFL. The natural or mechanical exhaust ventilation system shall be designed to limit the maximum concentration of flammable gas to 25 percent of the lower flammable limit (LFL) of the total volume of the room, area or walk-in unit during the worst-case event of simultaneous charging of batteries at the maximum charge rate, in accordance with nationally recognized standards.

1207.6.1.2 Ventilation based on ~~exhaust rate~~ floor area. Mechanical exhaust ventilation shall be provided at a rate of not less than 1 ft³/min/ft² (5.1 L/sec/m²) of floor area of the room, area or walk-in unit. The mechanical exhaust ventilation shall be either continuous or shall be activated by a gas detection system in accordance with Section 1207.6.1.2.4.

Reason Statement: The proposed text clarifies that the exhaust ventilation, particularly when based on the LFL, can be either natural or mechanical. In many instances of smaller battery deployments, natural ventilation is more common as it is more energy efficient and more reliable. The text is further edited to indicate the second option is based on floor area - not exhaust rate. Both options need a minimum exhaust rate to assure proper ventilation. The first option determines this ventilation rate based on gas generation, the second option determines the ventilation rate based on floor area.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

The proposal emphasizes alternatives currently available in the code but does not impact the cost of compliance with the code as properly interpreted.

F149-21

F150-21

IFC: 1207.6.1.2.3, 1207.6.1.2.4

Proponents: Richard Kluge, Ericsson Inc., representing Alliance for Telecommunications Industry Solutions (ATIS) (richard.kluge@ericsson.com)

2021 International Fire Code

Revise as follows:

1207.6.1.2.3 Supervision. Required mechanical exhaust ventilation systems shall be supervised ~~by an approved central station, proprietary or remote station service in accordance with NFPA 72, or~~ and shall initiate an audible and visible signal at an *approved* constantly attended ~~on-site~~ location.

1207.6.1.2.4 Gas detection system. Where required by Section 1207.6.1.2, rooms, areas and walk-in units containing ESS shall be protected by an *approved* continuous gas detection system that complies with Section 916 and with the following:

1. The gas detection system shall be designed to activate the mechanical ventilation system when the level of flammable gas in the room, area or walk-in unit exceeds 25 percent of the LFL.
2. The mechanical ventilation system shall remain on until the flammable gas detected is less than 25 percent of the LFL.
3. The gas detection system shall be provided with a minimum of 2 hours of standby power in accordance with Section 1203.2.5.
4. Failure of the gas detection system shall ~~annunciate a trouble signal at an approved central station, proprietary or remote station service in accordance with NFPA 72, or~~ shall initiate an audible and visible trouble signal at an *approved* constantly attended ~~on-site~~ location.

Reason Statement: The requirements to “supervise mechanical exhaust ventilation and gas detection system operation at an approved central station, proprietary or remote station service in accordance with NFPA 72” is incongruent with other parts of the code and is not warranted by the safety record of traditional battery systems to which these code sections apply.

Compare these supervision requirements to those of *IFC Chapter 6: Building Services and Systems, Section 608 Mechanical Refrigeration, subsection 608.18.1 Ventilation system activation* which requires:

1. The detectors shall activate at or below a refrigerant concentration of 25 percent of the LFL.
2. Upon activation, the detection system shall activate the emergency ventilation system in Section 608.18.2.
3. The detection, signaling and control circuits shall be supervised.

While items 1 and 2 are consistent with the section on battery system ventilation and gas detection, item 3 is much more flexible as there is no requirement that operations be supervised by an approved central station, proprietary or remote station service.

Furthermore, *IFC Chapter 6004: Highly Toxic and Toxic Compressed Gases, Section 6004.2.2.10.1 Gas detection system alarms* specifies:

The 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 audible and 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.

Once again, it is required the alarm be transmitted to a constantly attended location, but it is left to the user to decide if central station, proprietary or remote station service is warranted.

Meanwhile, *IFC Chapter 9: Fire Protection and Life Safety Systems* comes close to discouraging the use of fire alarm systems to monitor gas sensors and detectors. *Section 916 Gas Detection Systems, subsection 916.10 Fire alarm system connections* states:

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.

Section 1207.6.1.2 on ventilation of batteries used for energy storage is the only location in the code that dictates monitoring of mechanical ventilation and gas detection systems via central station, proprietary or remote station service. While the option for monitoring at a constantly attended on-site location is available in the current text, installations of many telecommunications network batteries are at normally unattended locations, so this option is not available.

A better approach is to permit a failure of the ventilation or gas detection system to initiate an audible and visible signal at any approved constantly attended location as proposed by the code change submittal. This would, as an example, allow for alarms from telecommunications facilities to be monitored and detected at a Network Operations Center or other proprietary alarm center, consistent with how similar alarms for refrigerant gases and toxic gases are treated in the code.

Also note that in the 100-year experience with the use of batteries as standby power within the telecommunications industry there is no history of explosions resulting from gas evolution within buildings as a result of failed ventilation or monitoring. Even on large battery plants, the generation rate of hydrogen gas is maintained well below the LFL by normal room ventilation specified for human occupancy. It is neither consistent with the code treatment of these types of systems nor justified by the scant loss record to mandate monitoring of these systems by any third-party.

Cost Impact: The code change proposal will decrease the cost of construction

Allowing for other alternatives for monitoring of mechanical ventilation and gas detection system operation will reduce the cost of code compliance.

F150-21

F151-21

IFC: 1207.6.3, IEEE (New), IEEE C2-2017 (New), UL Chapter 80 (New)

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Fire Code

Revise as follows:

1207.6.3 Explosion control. Where required by Table 1207.6 or elsewhere in this code, explosion control complying with Section 911 shall be provided for rooms, areas, ESS cabinets or ESS walk-in units containing electrochemical ESS technologies.

Exceptions:

1. Where *approved*, explosion control is permitted to be waived by the *fire code official* based on large-scale fire testing complying with Section 1207.1.5 that demonstrates that flammable gases are not liberated from electrochemical ESS cells or modules ~~where tested in accordance with UL 9540A.~~
2. Where *approved*, explosion control is permitted to be waived by the *fire code official* based on documentation provided in accordance with Section 104.7 that demonstrates that the electrochemical ESS technology to be used does not have the potential to release flammable gas concentrations in excess of 25 percent of the LFL anywhere in the room, area, walk-in unit or structure under thermal runaway or other fault conditions.
3. Where approved, ESS cabinets that have no debris, shrapnel, or enclosure pieces ejected during large scale fire testing complying with Section 1207.1.5 shall be permitted in lieu of providing explosion control complying with Section 911.
4. Explosion control is not required for lead-acid and nickel cadmium battery systems less than 50 V ac, 60 V dc in telecommunication facilities under the exclusive control of communications utilities located in building spaces or walk-in units used exclusively for such installations.
5. Explosion control is not required for lead-acid and nickel cadmium systems designed in accordance with IEEE C2, used for dc power for control of substations and control or safe shutdown of generating stations under the exclusive control of the electric utility located in building spaces or walk-in units used exclusively for such installations.
6. Explosion control is not required for lead-acid battery systems in uninterruptible power supplies listed and labeled in accordance with UL 1778, utilized for standby power applications, and housed in a single cabinet in a single fire area in buildings or walk-in units.

Add new standard(s) as follows:

IEEE

Institute of Electrical and Electronics
Engineers Standards Association
445 Hoe Lane
Piscataway NJ 08854
USA

IEEE C2-2017 National Electrical Safety Code.

UL

Underwriters Laboratories LLC
333 Pfingsten Road
Northbrook IL 60062

1778-2014: Uninterruptible Power Supply Systems with revisions through October 2017

Staff Analysis: A review of the following standards proposed for inclusion in the code, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

- IEEE C2-2017, National Electrical Safety Code(R) (NESC(R))
- UL 1778-2014 - Uninterruptible Power Systems with revisions through October 2017

Reason Statement: This proposal accomplishes the following:

1. ESS Cabinets - Several large ESS cabinets containing lithium ion batteries are now being manufactured. This corrects an oversight for these units not requiring explosion control. In lieu of providing explosion control in accordance with Section 911 (e.g. NFPA 68 or 69) these ESS cabinets can be designed so that "no debris, shrapnel, or enclosure pieces are ejected" during large scale fire testing complying, which is terminology used in the unit level test acceptance criteria in UL 9540A. See item (3)

2. The reference to UL 9540A is being removed from exception 1 since it is covered by the reference to 1207.5.1.

3. Allows exemptions (4), (5), and (6) for lead-acid and Ni-Cad ESS at telecom, electric utility and UPS installations that are consistent with NFPA

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 and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: <https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/>

Cost Impact: The code change proposal will not increase or decrease the cost of construction

The proposal has the potential to increase the cost of construction It requires explosion control in ESS cabinets which was overlooked during the last code cycle. It can decrease the cost of construction for installations covered by (4), (5) and (6).

F151-21

F152-21

IFC: 1207.10.1, 1207.10.2, IEEE (New), IEEE C2-2017 (New)

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Fire Code

Revise as follows:

1207.10.1 Charging and storage. For the purpose of Section 1207.10, charging and storage covers the operation where mobile ESS are charged and stored so they are ready for deployment to another site, and where they are charged and stored after a deployment.

Exception: Mobile ESS used to temporarily provide power to lead-acid and nickel cadmium systems that are designed in accordance with IEEE C2, used for dc power for control of substations and control or safe shutdown of generating stations under the exclusive control of the electric utility, and located outdoors or in building spaces used exclusively for such installations.

1207.10.2 Deployment. For the purpose of Section 1207.10, deployment covers operations where mobile ESS are located at a site other than the charging and storage site and are being used to provide power.

Exception: Mobile ESS used to temporarily provide power to lead-acid and nickel cadmium systems that are designed in accordance with IEEE C2, used for dc power for control of substations and control or safe shutdown of generating stations under the exclusive control of the electric utility, and located outdoors or in building spaces used exclusively for such installations.

Add new standard(s) as follows:

IEEE

Institute of Electrical and Electronics
Engineers Standards Association
445 Hoe Lane
Piscataway NJ 08854
USA

IEEE C2-2017 National Electrical Safety Code.

Staff Analysis: A review of the standard proposed for inclusion in the code, IEEE C2-2017, National Electrical Safety Code(R) (NESC(R)), with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

Reason Statement: This proposed change allows exemptions for lead-acid and Ni-Cad battery systems used in electric utility applications, and is consistent with NFPA 855, Sections 4.5.1.1 and 4.5.2.1.

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 and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: <https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/>

Cost Impact: The code change proposal will not increase or decrease the cost of construction

This is a relaxation of requirements for mobile ESS providing temporary power with lead-acid and nickel cadmium systems so will reduce cost of compliance.

F152-21

F153-21

IFC: 1207.1, 1207.11, 1207.11.1, 1207.11.2, 1207.11.2.1, 1207.11.3, 1207.11.4, 1207.11.5, 1207.11.6, 1207.11.7, 1207.11.8, 1207.11.9, 1207.11.10

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Fire Code

Revise as follows:

1207.1 General. The provisions in this section are applicable to stationary and mobile electrical energy storage systems (ESS).

Exception: ESS in Group R-3 and R-4 occupancies shall only be required to comply with Section 1207.11 except where Section 1207.11.4 requires compliance with Sections 1207.1 through 1207.9.

1207.11 ESS in Group R-3 and R-4 occupancies. ESS in Group R-3 and R-4 occupancies shall be ~~installed and maintained~~ in accordance with Sections 1207.11.1 through 1207.11.9. ~~The temporary use of an owner or occupant's electric-powered vehicle as an ESS shall be in accordance with Section 1207.11.10.~~

Exceptions:

1. ESS listed and labeled in accordance with UL 9540 and marked "For use in residential dwelling units", where installed in accordance with the manufacturer's instructions and NFPA 70.
2. ESS rated less than 1 kWh (3.6 megajoules).

1207.11.1 Equipment listings. ESS shall ~~be listed and labeled~~ in accordance with UL 9540. ~~ESS listed and labeled solely for utility or commercial use shall not be used for residential applications.~~

Exceptions:

1. ~~Where approved, repurposed unlisted battery systems from electric vehicles are allowed to be installed outdoors or in detached dedicated cabinets located not less than 5 feet (1524 mm) from exterior walls, property lines and public ways.~~
2. ~~ESS less than 1 kWh (3.6 megajoules).~~

1207.11.2 Installation. ESS shall be installed in accordance with the manufacturer's instructions and their listing.

1207.11.2.1 Spacing. Individual ESS units shall be separated from each other by at least 3 feet (914 mm) ~~of spacing unless~~ except where smaller separation distances are documented to be adequate based on large-scale fire testing complying with Section 1207.1.5.

1207.11.3 Location. ESS shall be installed only in the following locations:

1. Detached garages and detached accessory structures.
2. Attached garages separated from the *dwelling unit* living space and *sleeping units* in accordance with Section 406.3.2 of the *International Building Code*.
3. Outdoors or on the exterior side of exterior walls located a minimum of 3 feet (914 mm) from doors and windows directly entering the dwelling unit.
4. Enclosed utility closets, basements, and storage or utility spaces within dwelling units and sleeping units with finished or noncombustible walls and ceilings. Walls and ceilings of unfinished wood-framed construction shall be provided with not less than 5/8 in. Type X gypsum wallboard.

ESS shall not be installed in sleeping rooms, or closets or spaces opening directly into sleeping rooms.

1207.11.4 Energy ratings. Individual ESS units shall have a maximum rating of 20 kWh. The aggregate rating of the ESS structure shall not exceed:

1. 40 kWh within utility closets, basements, and storage or utility spaces.
2. 80 kWh in attached or detached garages and detached accessory structures.
3. 80 kWh on exterior walls.
4. 80 kWh outdoors on the ground.

ESS installations exceeding the permitted individual or aggregate ratings shall be installed in accordance with Section 1207.1 through 1207.9.

1207.11.5 Electrical installation. ESS shall be installed in accordance with NFPA 70. Inverters shall be *listed* and *labeled* in accordance with UL 1741 or provided as part of the UL 9540 listing. Systems connected to the utility grid shall use inverters *listed* for utility interaction.

1207.11.6 Fire detection. Rooms and areas within *dwelling units, sleeping units, basements* and attached garages in which ESS are installed shall be protected by smoke alarms in accordance with Section 907.2.11. A *heat detector listed* and interconnected to the smoke alarms shall be installed in locations within *dwelling units, sleeping units* and attached garages where smoke alarms cannot be installed based on their listing.

1207.11.7 Protection from impact. ~~Stationary storage battery systems~~ ESS installed in a location subject to vehicle damage shall be protected by approved barriers. ~~Appliances in garages shall also be installed in accordance with Section 304.3 of the International Mechanical Code.~~

1207.11.8 Ventilation. Indoor installations of ESS that include batteries that produce hydrogen or other flammable gases during charging shall be provided with exhaust ventilation in accordance with Section 304.5 of the *International Mechanical Code* ~~1207.6.1~~.

Delete without substitution:

~~**1207.11.9 Toxic and highly toxic gas.** ESS that have the potential to release toxic or highly toxic gas during charging, discharging and normal use conditions shall not be installed within Group R-3 or R-4 occupancies.~~

Revise as follows:

~~1207.11.10~~ **1207.11.9 Electric vehicle use.** The temporary use of an *owner* or occupant's electric-powered vehicle to power a *dwelling unit* or *sleeping unit* while parked in an attached or detached garage or outdoors outside shall comply with the vehicle manufacturer's instructions and NFPA 70.

Reason Statement: Significant changes were made when the ESS requirements were updated in the 2021 International Residential Code. Those changes are also being introduced into the next edition of the NFPA 855 Stationary Energy Storage system standard. This update includes requirements that are essentially identical to the 2021 IRC, with the following two exceptions.

1. In section 1207.11.1 an exception was removed that allowed, where approved, repurposed unlisted battery systems from electric vehicles are allowed to be installed outdoors or in detached dedicated cabinets located not less than 5 feet (1524 mm) from exterior walls, property lines and public ways. This type of installation is not common, and there are concerns with the overall safety of these unlisted systems. This was also not allowed in NFPA 855.
2. There has been considerable discussion about whether ESS should be allowed in certain rooms and spaces within the dwelling unit. Item 4 to Section 1207.11.3 provides more requirements for protection of walls and ceilings where located in utility closets, basements and storage or utility spaces.

The footnote to 1207.1 was revised to clarify that ESS in Group R-3 and R-4 occupancies only have to comply with section 1207.11, except when larger systems that exceed the energy capacity limits of Section 1207.11.4. Those larger system must comply with the requirements that apply to commercial ESS installations, which is also in the 2021 IRC.

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 and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: <https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/>

Cost Impact: The code change proposal will increase the cost of construction

This proposal has the potential to increase the cost of construction due to the eliminations of exceptions and possible limitations on locations of ESS.

F153-21

F154-21

IFC: 1207.11.6

Proponents: Larry Sherwood, on behalf of Sustainable Energy Action Committee, representing Interstate Renewable Energy Council (Larry@irecusa.org); Kevin Reinertson, Riverside County Fire Dept., representing California Fire Chiefs Association FPO (kevin.reinertson@fire.ca.gov); Benjamin Davis, CA Solar & Storage Association, representing CA Solar & Storage Association (ben@calssa.org); Joseph H. Cain, P.E., Solar Energy Industries Association (SEIA), representing SEIA (JoeCainPE@gmail.com)

2021 International Fire Code

Revise as follows:

1207.11.6 Fire detection. ESS installed in group R-3 and R-4 occupancies shall comply with the following:

1. Rooms and areas within *dwelling units, sleeping units* and attached garages in which ESS are installed shall be protected by smoke alarms in accordance with Section 907.2.11 ~~907.2.10~~.
2. A ~~listed heat alarm~~ heat detector listed and interconnected to the smoke alarms shall be installed in locations ~~within dwelling units, sleeping units and attached garages~~ where smoke alarms cannot be installed based on their listing.

Staff Analysis: Note that the reference to Section 907.2.10 has been corrected by errata to Section 907.2.11 for the first printing of the 2021 IFC.

Reason Statement: The purpose of this proposal is to:

1. Divide the single paragraph into distinct parts for clarity, separating the charging language from the provisions to provide single-station or multi-station smoke alarms per the code.
2. Correct the section pointer to section 907.2.10 to the revised location in the 2021 IFC, 907.2.11.
3. Clarify the intent is to provide both heat detection and alarm annunciation in the ESS location through the use of listed heat alarms.

The term heat detector was replaced because the heat detectors do not include a local annunciator. A heat detector is only required to detect a heat event, and safety officials want an audible alarm.

The term interconnected is removed from this section as the requirements for interconnection are provided in section 907.2.11 of the code.

This proposal was prepared by the Sustainable Energy Action Committee (SEAC), a forum for all stakeholders (including, but not limited to, AHJs, designers, engineers, contractors, first responders, manufacturers, suppliers, utilities, and testing labs) to collaboratively identify and find solutions for issues that affect the installation and use of solar energy systems, energy storage systems, demand response, and energy efficiency. The purpose is to facilitate the deployment and use of affordable, clean and renewable energy in a safe, efficient, and sustainable manner.

All recommendations from SEAC are approved by diverse stakeholders through a consensus process.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal clarifies existing code language.

F154-21

F155-21

IFC: 1207.11.7, 1207.11.7.1 (New), 1207.11.7.2 (New), 1207.11.7.3 (New), FIGURE 1207.11.7.1 (New), FIGURE 1207.11.7.3 (New)

Proponents: Larry Sherwood, on behalf of Sustainable Energy Action Committee, representing Interstate Renewable Energy Council (Larry@irecusa.org); Kevin Reinertson, Riverside County Fire Dept., representing California Fire Chiefs Association FPO (kevin.reinertson@fire.ca.gov); Benjamin Davis, CA Solar & Storage Association, representing CA Solar & Storage Association (ben@calssa.org); Joseph H. Cain, P.E., Solar Energy Industries Association (SEIA), representing SEIA (JoeCainPE@gmail.com)

2021 International Fire Code

Revise as follows:

1207.11.7 Protection from impact. ~~Stationary storage battery systems~~ ESS installed in a location subject to vehicle damage in accordance with ~~shall~~ Section 1207.11.7.1 or 1207.11.7.2 shall be provided with impact protection in accordance with Section 1207.11.7.3. ~~be protected by approved barriers. Appliances in garages shall also be installed in accordance with Section 304.3 of the International Mechanical Code.~~

Add new text as follows:

1207.11.7.1 Garages. Where an ESS is installed in the normal driving path of vehicle travel within a garage, impact protection complying with Section 1207.11.3 shall be installed. The normal driving path is a line perpendicular to the garage vehicle opening to the back wall, extending 3 ft. (914 mm) to either side along the back wall and to a height of 48 in. (1219 mm). (See Figure 1207.11.7.1)

Exception: Where the clear height of the vehicle garage opening is 7 ft 6 in. (2286 mm) or less, ESS installed not less than 36 inches (914 mm) above finished floor are not subject to vehicle impact protection requirements.

1207.11.7.2 Other locations subject to vehicle impact. Where an ESS is installed in a location other than as defined in Section 1207.11.7.1, and is subject to vehicle damage, impact protection shall be provided in accordance with Section 1207.11.7.3.

1207.11.7.3 Impact Protection Options. Where ESS is required to be protected from impact in accordance with Section 1207.11.7.1 or 1207.11.7.2 such protection shall comply with one of the following:

1. Bollards constructed in accordance with one of the following:
 - 1.1 48 inches (1219 mm) in length by 3 inches (76mm) in diameter schedule. 80 steel pipe embedded in a concrete pier 12 inches (304 mm) deep and 6 inches (152 mm) in diameter, with 36 inches (914 mm) of pipe exposed, filled with concrete, and spaced at a maximum interval of 5 feet (1524 mm). Each bollard shall be located not less than 6 inches (152 mm) from an ESS.
 - 1.2 36 inches (914 mm) in height by 3 inches (76 mm) in diameter schedule 80 steel pipe fully welded to an 8 inches (203 mm) by 8 inches (203 mm) by ¼ inch (6.4 mm) thick steel plate and bolted to a concrete floor by means of 4 - ½ inch (13 mm) concrete anchors with 3 inch (76 mm) minimum embedment. Spacing shall be not greater than 60 inches. (1524 mm), and each bollard shall be located not less than 6 inches (152 mm) from the ESS.
 - 1.3 Pre-manufactured steel pipe bollards shall be filled with concrete and anchored in accordance with the manufacturer's installation instructions, with spacing not greater than a 60 inches. (1524 mm). Located not less than 6 inches (152mm) from the ESS.
2. Wheel barriers constructed in accordance with one of the following:
 - 2.1. 6 inches (152 mm) in height by 6 inches (152 mm) in width wheel barrier made of concrete or polymer, anchored to the concrete floor not less than every 36 inches (914 mm) and located not less than 54 inches (1372 mm) from the ESS.. Minimum 2 - ½ inch (13 mm) diameter concrete anchors with 3 inch (76 mm) embedment per barrier shall be used. Spacing between barriers shall be no greater than 36 inches. (914 mm).
 - 2.2. Pre-manufactured wheel barriers shall be anchored in accordance with the manufacturers installation instructions.
3. Approved method designed to resist a 2000 lbf (8899 Newtons) impact in the direction of travel at 24 inches (608 mm) above grade.

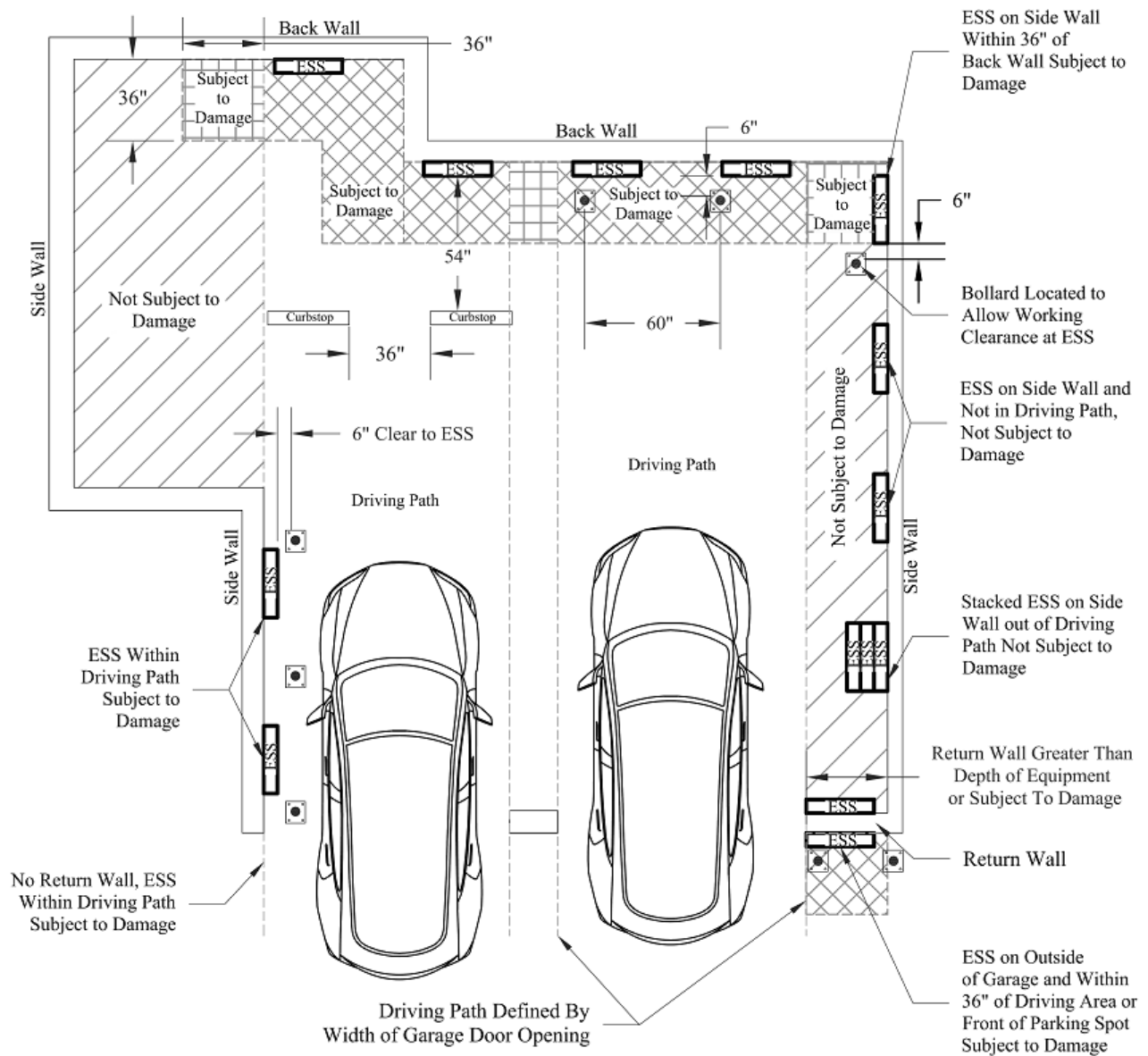


FIGURE 1207.11.7.1
ESS VEHICLE IMPACT PROTECTION

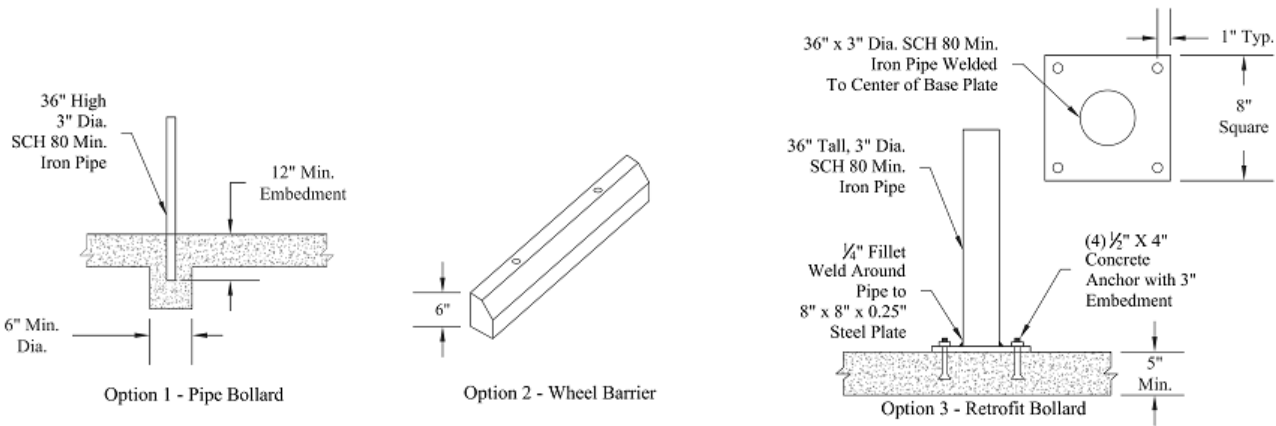


FIGURE 1207.11.7.3
IMPACT PROTECTION OPTIONS

Reason Statement: Summary

First, a minor editorial change is needed to replace stationary storage battery system with ESS. This should have been part of a global change last cycle.

Second, the last sentence referring to appliances has been removed. Section 304.3 is related to the elevation of ignition sources not vehicle impact protection. The concern about raising ignition sources has historically been applied to fuel-fired appliances such as water heaters. These types of appliances are the only equipment able to be listed as flammable vapor ignition resistant. Even when a water heater has not been evaluated to ANSI Z21.10, only the actual ignition source needs to be elevated above 18", not the entire water heater. It's important to note that NFPA 70 does not consider the area below 18" a classified location in above-grade residential garages.

The third and most substantial change addresses the need for a clearly defined area in which a residential garage ESS installation would trigger the "Subject to Vehicle Damage" requirement found in 1207.11.7. The existing language has led to widely varying interpretations and enforcement of impact protection.

- New language (1207.11.1) has been added to define this area and set the expectation that the barriers are intended to deflect, resist, or visually deter an impact. This language mirrors the existing Section 312.3 in the IFC.
- A minimum installation height of 48" within the likely impact area has been added to allow elevation of the ESS as a permissible mitigation option. An exception to this 48" minimum has been included to recognize that a reduced garage opening height would thereby limit vehicle height and allow a lower placement of equipment before additional protection is needed. This exception is inspired by existing IMC Commentary:

"The height of the vehicle entry opening of the garage or carport can be used as a guide in determining how tall of a vehicle could be driven into the garage or carport"

- A new Figure 1207.11.7.1 has been added to illustrate the zones in which a typical residential garage ESS installation would trigger the need for impact protection. This figure is based on existing IMC commentary related to the installation of fuel-fired appliances that may pose a fire hazard when damaged. The IMC commentary Figure 304.6 (2) has been modified to reflect common ESS installation locations and takes a similar approach to mitigating the risk of impact.
- New language (1207.11.7.2) has been added to address other than garage locations that may also have vehicle access such as residential driveways, and also allows some flexibility to the AHJ and installer for larger, non-typical, or custom residential garages where the normal path of vehicle travel falls outside of the area defined in 1207.11.7.1.

Finally, the prescriptive barrier and post designs per IBC 1607.10 or IFC 312.2 may be appropriate for an energy storage system in a public access parking lot, garage, or other thoroughway. We are therefore not proposing any changes to 1207.4.5. However, the forces assumed in these sections are not representative of the impact scenarios expected in a private residential garage reserved for permanent occupants.

For example, the calculation in IBC 1607.8.3 results in approx. 12K lb-force applied to the anchorage, which causes readily available bollard to concrete connections to fail. This effectively eliminates the possibility of retrofitting a floor mounted bollard as a solution. Additionally, the posts described in IFC 312.2 can not be reasonably installed in an existing residential garage, and although uncommon especially those with tensioned concrete slabs. This leaves AHJs and installers with no guidelines for a retrofit bollard designed to deter vehicle operators from carelessly striking the ESS units. While IFC Section 312.3 does allow an alternative approach, designers, installers, and code officials will benefit from more explicit guidance within Section 1207.11. In new construction posts designed in accordance with Section 312 may be feasible, however it is unlikely that a homeowner would be able to anticipate the installation of an ESS in a specific location in a garage. The proposed options for impact protection were inspired by existing IMC commentary figure 304.6(2). These options have been modified to provide a consistent amount of force resistance across the available choices, something the IMC commentary does not do. These options more reasonably reflect the expected impact scenario

described in the commentary text:

"The barriers shown in the commentary figure will not eliminate all possibility of a motor vehicle contacting the appliances but will offer a reasonable warning to a driver who is slowly navigating near the appliances"

And:

"Although this section does not specifically require the impact protection provided to stop any type of vehicle at any speed, the intent is for the impact protection to cause the driver to want to stop vehicle movement out of concern for damage that could be occurring. The choice of the type, structural capacity and the location of barriers is the responsibility of the designer."

Between limiting the locations that ESS Batteries can be installed, and defining the requirements when impact protection is required, the result will be an improved level of protection from the risk of vehicle impacts, and damage mitigation if incidents do occur.

Technical Justification

An engineering review of the impact protection guidance found across the I-Codes and ASCE 7-16 was completed. Specifically Section 312 of both the prior and existing IFC, Section 4.5.3 of ASCE 7-16, and commentary language and figures associated with Section 304.6 of the IMC.

It is important to recognize that the prescription of the IFC Section 312 for bollards in public driving areas does not lead to a bollard that will resist 12k lbs. as prior editions of the code suggested.. In actual testing ((Harrison (SwRI), Evaluation of collision protection provided by vehicle impact bollards and propane cylinder exchange cabinets 2013)) the static resistance was between 900 lbs. at 36" (2.7k lbs. reaction) and 11k lbs. at 36" (33k lbs. reaction).

ASCE 7-16 specifies vehicle barrier systems must resist 6k lbs. load at between 18" and 27" (9k to 13.5k lbs. reaction) There are no commonly available retrofittable bollards that can do this in an average residential garage without adding thickness to the concrete.

The IMC commentary figure when back calculated sets a bar of physical resistance which seems more appropriate to this risk and allows for solutions that are more practical to apply. For example, the bollard shown in IMC commentary Figure 304.6(2) will take an impact of about 625 lbs. load applied at 24", resulting in a 1250 lb reaction force at the post to base plate connection. Likely outcomes based on this force include:

- No damage at 0.5 mph impact from an average passenger car.
- Bollard would deflect permanently a few inches at a 2 mph collision speed
- Anchor bolts would shear off or blowout at a 5 mph collision speed.

The limitation is mostly the concrete to base plate connection. The IRC requires a 2500-3000 psi mix for garages, and garages are often of stronger mix, especially in freeze prone areas. The average garage concrete slab will fall within these specifications: 2500 - 4000 psi concrete with 5" min thickness. Using 1/2" epoxy anchors this equates to roughly a 2mph impact that could be sustained without significant damage to the bollard. This is aligned with a standard Uline 4.5" bollard with 1/8" wall thickness and a 8x8x3/8" base plate. More strength requires a larger base plate, as the limitation is the connection to the concrete.

The bolt down bollard specified in this proposal will take a 2000 lb impact, 24" off the ground with no damage, given 3000 psi concrete. More than 6" of permanent deflection would require a very significant force, and then only touching the face of the ESS. This seems a reasonable level of protection, and clearance distance.

This proposal was prepared by the Sustainable Energy Action Committee (SEAC), a forum for all stakeholders (including, but not limited to, AHJs, designers, engineers, contractors, first responders, manufacturers, suppliers, utilities, and testing labs) to collaboratively identify and find solutions for issues that affect the installation and use of solar energy systems, energy storage systems, demand response, and energy efficiency. The purpose is to facilitate the deployment and use of affordable, clean and renewable energy in a safe, efficient, and sustainable manner.

All recommendations from SEAC are approved by diverse stakeholders through a consensus process.

Bibliography:

Harrison, O. (2013). Evaluation of Collision Protection provided by vehicle impact bollards and propane cylinder exchange cabinets (Rep. No. 18.19083.01.107.FR1). Southwest Research Institute.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal clarifies and gives more technical rigor to the requirements.

F156-21

IFC: 2305.1.3

Proponents: James Russell Brauksieck, US EPA, representing self (brauksieck.james@epa.gov)

2021 International Fire Code

Revise as follows:

2305.1.3 Tank fill connections. Delivery of *flammable liquids* to tanks more than 1,000 gallons (3785 L) in capacity shall be made by means of *approved* liquid- and vapor-tight connections between the delivery hose and tank fill pipe. Where tanks are equipped with any type of vapor recovery system, all connections required to be made for the safe and proper functioning of the particular vapor recovery process shall be made. Such connections shall be made liquid and vapor tight and remain connected throughout the unloading process. Vapors shall not be discharged at grade level during delivery. At the conclusion of the unloading process, the delivery hose shall be disconnected from the tank fill pipe and vapor recovery process shall be disconnected from the tank.

Reason Statement: Delivery hoses that are left connected to fill pipes at the conclusion of a delivery should be considered part of the underground tank system (based on the definition of system in chapter 2) and would need to meet the requirements for aboveground piping. Since delivery hoses do not meet the standards for aboveground piping, the delivery hose needs to be properly emptied and disconnected from the fill pipe.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

This is an operational requirement. There would be a small increase in time to complete a delivery when having to make the connections to the fill pipe as compared to when the transfer hose is not disconnected.

F156-21

F157-21

IFC: 2310.4

Proponents: Kevin Duerr-Clark, representing New York State Department of State (kevin.duerr-clark@dos.ny.gov); Chad Sievers, representing NYS Dept. of State (chad.sievers@dos.ny.gov)

2021 International Fire Code

Revise as follows:

2310.4 Fueling of marine vehicles at other than approved marine motor fuel-dispensing facilities. Fueling of floating marine craft at other than a marine motor fuel-dispensing facility shall comply with Sections 2310.4.1 and 2310.4.2, and where applicable, Section 5706.5.4.

Reason Statement: This proposal is to tie the two sections pertaining to marine craft fueling together. As the code currently is written, 2310.4 has requirements for fueling marine vehicles at other than approved dispensing facilities, which would include fueling from a tank vehicle, tank car, or mobile fueling vehicle. However, there is no tie to the other sections such as 5706.5.4. Without this tie, 2310.4.1 specifically does not permit Class I fuels at other than a marine motor fuel dispensing facility, but 5706.5.4.1 is not that specific and would appear to allow any liquid fuel, which is likely not the intent. Providing the tie eliminates this discrepancy.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
There is no anticipated cost of construction increase. This is intended to simply tie two related code sections together.

F157-21

F158-21

IFC: 2404.2 (New), 2404.3 (New)

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Fire Code

Add new text as follows:

2404.2 Prohibited enclosures for spray application operations. Inflatable or portable enclosures shall not be used for spray application of flammable finishes.

Exception: Enclosures for the spray application of flammable finishes in marinas, dry docking areas or construction areas shall comply with 2404.3.

2404.3 Membrane enclosures. The design, construction, protection, operation and maintenance of membrane Enclosures shall be in accordance with NFPA 33.

Reason Statement: Inflatable or portable enclosures for spray application operations are prohibited as they do not meet the minimum codes set forth for spray booths. Examples of such noncompliance are as follows:

1. Location of spray-finishing operations
2. Construction type not that of noncombustible material
3. Omission of fire protection systems - not protected by an approved automatic fire-extinguishing system
4. Ventilation and filtration requirements
5. Air supported structure collapse with any significant fire incident. Additionally, if an inflatable or portable enclosure is able to meet the intent of the codes applicable to IFC Section 2404 Spray Finishing, a local fire official would have the ability to allow such use as an equivalent alternative.

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 and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: <https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/>

Cost Impact: The code change proposal will not increase or decrease the cost of construction

There is not a cost associated with this proposal as current code does not specifically permit temporary and inflatable spray application operations of flammable finishes and this proposal does not change the allowable conditions associated with marinas, dry docking or construction areas.

F158-21

F159-21

IFC: 2404.3.4 (New)

Proponents: Geoffrey Raifsnider, representing Self (graifsnider@globalfinishing.com)

2021 International Fire Code

Add new text as follows:

2404.3.4 Limited Finishing Workstation. A limited finishing workstation shall comply with the applicable provisions of NFPA 33 and Sections 2404.4 through 2404.8.

Reason Statement: This proposed addition addresses a common type of spray application enclosure currently used in the finishing industry that is not currently addressed by the code. NFPA 33 includes definitions and the minimum safety requirements for this type of equipment. This language describes an enclosure type and not an operation conducted in the open which is addressed by existing section 2404.9.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
There is no cost impact due to this change. Equipment is currently built to meet the requirements of NFPA 33.

F159-21

F160-21

IFC: 2404.6.1.2.1

Proponents: Geoffrey Raifsnider, Global Finishing Solutions, representing Self (graifsnider@globalfinishing.com)

2021 International Fire Code

Revise 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 on completing not fewer than 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~~ discharge temperature of the air heater exceeds the maximum discharge air temperature allowed in accordance with the heater's listing or 200 221 ° F (93 105 ° C), whichever is less.

Reason Statement: Proposed change brings this requirement in alignment with the 2021 Edition of NFPA 33. NFPA 33 Section 13.3.1.2.1 states "A high-temperature-limit switch shall be provided to automatically shut off the heat source if the discharge temperature of the air heater exceeds the maximum discharge air temperature allowed by the standard under which the heater is listed or 105 ° C (221 ° F), whichever is less."

NFPA 33 Committee Statement: "The maximum temperature in the spray area was updated to correlate other information in the standard pertaining to air temperatures."

UL844 states that the exterior surface temperature of a luminaire subject to deposits of combustible paint residue shall not attain a temperature higher than 105 degrees C (221 degrees F). If the air temperature is held to the same requirements, the interior surface temperatures of the spray booth or spray room should not exceed these values. Luminaires for spray booths and spray rooms are typically listed to UL844.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

There is no cost impact due to this change. This change will allow a higher operating temperature during drying or curing modes.

F160-21

F161-21

IFC: 2404.6.2.1

Proponents: Geoffrey Raifsnider, representing Self (graifsnider@globalfinishing.com)

2021 International Fire Code

Revise as follows:

2404.6.2.1 Glass panels. Panels for luminaires or for observation shall be of heat-treated glass, wired glass or hammered wire glass and shall be sealed to confine vapors, mists, residues, dusts and deposits to the flammable vapor area. Panels for luminaires shall be separated from the luminaire to prevent the surface temperature of the panel from exceeding ~~200~~ 221° F (~~93~~ 105° C).

Reason Statement: Proposed change brings this requirements in alignment the with 2021 Edition of NFPA 33. NFPA 33 Section 5.6.2 states "Panels shall be separated from the luminaire to prevent the surface temperature of the panel from exceeding 105° C (221° F)."

NFPA 33 Committee Statement: "Revised language was added to align with language in UL844 which states that the exterior surface temperature of a luminaire subject to deposits of combustible paint residue shall not attain a temperature higher than 105 degrees C (221 degrees F). Luminaires for spray booths and spray rooms are typically listed to UL844."

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change will allow for a higher operating temperature during drying or curing modes.

F161-21

F162-21

IFC: TABLE 2704.2.2.1; IBC: TABLE 415.11.1.1.1

Proponents: William Koffel, representing Semiconductor Industry Association (wkoffel@koffel.com)

2021 International Fire Code

Revise as follows:

TABLE 2704.2.2.1
QUANTITY LIMITS FOR HAZARDOUS MATERIALS IN A SINGLE FABRICATION AREA IN GROUP H-5^a

HAZARD CATEGORY	SOLIDS (pounds per square foot)	LIQUIDS (gallons per square foot)	GAS (cubic feet @ NTP per square foot)
Physical-Hazard Materials			
Combustible dust	Note b	Not Applicable	Not Applicable
Combustible fiber Loose	Note b	Not Applicable	Not Applicable
Baled	Notes b and c	Not Applicable	Not Applicable
Combustible liquid Class II	Not Applicable	0.01 <u>0.02</u> 0.02 <u>0.04</u> Not Limited <u>0.08</u>	Not Applicable
Class IIIA			
Class IIIB			
Combination Class I, II and IIIA			
Cryogenic gas Flammable	Not Applicable	Not Applicable	Note d 1.25 <u>2.5</u>
Oxidizing			
Explosives	Note b	Note b	Note b
Flammable gas Gaseous	Not Applicable	Not Applicable	Note d
Liquefied			Note d
Flammable liquid Class IA	Not Applicable	0.0025 <u>0.005</u> 0.025 <u>0.05</u> 0.025 <u>0.05</u> 0.025 <u>0.05</u> 0.04 <u>0.08</u>	Not Applicable
Class IB			
Class IC			
Combination Class IA, IB and IC			
Combination Class I, II and IIIA			
Flammable solid	0.001 <u>0.002</u>	Not Applicable	Not Applicable
Organic peroxide Unclassified detonable	Note b Note b 0.025 <u>0.05</u> 0.1 <u>0.2</u> Not Limited Not Limited	Not Applicable <u>Note b</u>	Not Applicable
Class I		<u>Note b</u>	
Class II		<u>0.0025</u>	
Class III		<u>0.02</u>	
Class IV		<u>Not Limited</u>	
Class V		<u>Not Limited</u>	
Oxidizing gas Gaseous	Not Applicable	Not Applicable	1.25 <u>2.5</u>
Liquefied			1.25 <u>2.5</u>
Combination of gaseous and liquefied			1.25 <u>2.5</u>
Oxidizer			

Class 4			
Class 3	Note b 0.003 <u>0.006</u>	Note b 0.03 <u>0.06</u>	Not Applicable
Class 2	0.003 <u>0.006</u>	0.03 <u>0.06</u>	
Class 1	0.003 <u>0.006</u>	0.03 <u>0.06</u>	
Combination Class 1, 2, 3			
Pyrophoric materials	0.01 <u>Note b</u>	0.00125 <u>0.0025</u>	Notes d and e
Unstable (reactive) Class 4			
Class 3	Note b 0.025 <u>0.05</u>	Note b 0.0025 <u>0.005</u>	Note b Note b Note b Not Limited
Class 2	0.1 <u>0.2</u> Not Limited	0.01 <u>0.02</u> Not Limited	
Class 1			
Water reactive Class 3			
Class 2	0.01 <u>0.02^f</u> 0.25 <u>0.5</u> Not Limited	0.00125 <u>0.0025</u> 0.025 <u>0.05</u> Not Limited	Not Applicable
Class 1			
Health-Hazard Materials			
Corrosives	Not Limited	Not Limited	Not Limited
Highly toxic	Not Limited	Not Limited	Note d
Toxics	Not Limited	Not Limited	Note d

For SI: 1 pound = 0.454 kg, 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.

- Hazardous materials within piping shall not be included in the calculated quantities.
- 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).
- Densely packed baled cotton that complies with the packing requirements of ISO 8115 shall not be included in this material class.
- The aggregate quantity of flammable, pyrophoric, toxic and highly toxic gases shall not exceed the greater of 0.2 cubic feet at NTP/square foot or 9,000 cubic feet at NTP.
- The aggregate quantity of pyrophoric gases in the building shall not exceed the amounts set forth in Table 5003.8.2.
- Quantity of Class 3 water-reactive solids in a single tool shall not exceed 1 pound.

2021 International Building Code

Revise as follows:

TABLE 415.11.1.1.1
QUANTITY LIMITS FOR HAZARDOUS MATERIALS IN A SINGLE FABRICATION AREA IN GROUP H-5^a

HAZARD CATEGORY		SOLIDS (pounds per square foot)	LIQUIDS (gallons per square foot)	GAS (cubic feet @ NTP/square foot)
PHYSICAL-HAZARD MATERIALS				
Combustible dust		Note b	Not Applicable	Not Applicable
Combustible fiber	Loose	Note b	Not Applicable	Not Applicable
	Baled	Notes b and c		
Combustible liquid	II	Not Applicable	0.01 <u>0.02</u>	Not Applicable
	IIIA		0.02 <u>0.04</u>	
	IIIB		Not Limited	
Combination Class	I, II and IIIA		0.04 <u>0.08</u>	
Cryogenic gas	Flammable	Not Applicable	Not Applicable	Note d
	Oxidizing			1.25 <u>2.5</u>
Explosives		Note b	Note b	Note b
Flammable gas	Gaseous	Not Applicable	Not Applicable	Note d
	Liquefied			Note d
Flammable liquid	IA	Not Applicable	0.0025 <u>0.005</u>	Not Applicable
	IB		0.025 <u>0.05</u>	
	IC		0.025 <u>0.05</u>	
Combination Class	IA, IB and IC		0.025 <u>0.05</u>	
Combination Class	I, II and IIIA		0.04 <u>0.08</u>	
Flammable solid		0.004 <u>0.002</u>	Not Applicable	Not Applicable
Organic peroxide	Unclassified detonable	Note b	Not Applicable <u>Note b</u>	Not Applicable
	Class I	Note b	<u>Note b</u>	
	Class II	0.025 <u>0.05</u>	<u>0.0025</u>	
	Class III	0.1 <u>0.2</u>	<u>.02</u>	
	Class IV	Not Limited	<u>Not Limited</u>	
	Class V	Not Limited	<u>Not Limited</u>	
Oxidizing gas	Gaseous	Not Applicable	Not Applicable	1.25 <u>2.5</u>
	Liquefied			1.25 <u>2.5</u>
Combination of gaseous and liquefied				
Oxidizer	Class 4	Note b	Note b	Not Applicable
	Class 3	0.003 <u>0.006</u>	0.03 <u>0.06</u>	
	Class 2	0.003 <u>0.006</u>	0.03 <u>0.06</u>	
	Class 1	0.003 <u>0.006</u>	0.03 <u>0.06</u>	
Combination Class	1, 2, 3	0.003 <u>0.006</u>	0.03 <u>0.06</u>	
Pyrophoric materials		0.01 <u>Note b</u>	0.00125 <u>0.0025</u>	Notes d and e
Unstable (reactive)	Class 4	Note b	Note b	Note b
	Class 3	0.025 <u>0.05</u>	0.0025 <u>0.005</u>	Note b
	Class 2	0.1 <u>0.2</u>	0.01 <u>0.02</u>	Note b
	Class 1	Not Limited	Not Limited	Not Limited
Water reactive	Class 3	0.01 <u>0.02</u> ^f	0.00125 <u>0.0025</u>	

Water reactive	Class 2	0.25 <u>0.5</u>	0.025 <u>0.05</u>	Not Applicable
	Class 1	Not Limited	Not Limited	
HEALTH-HAZARD MATERIALS				
Corrosives		Not Limited	Not Limited	Not Limited
Highly toxic		Not Limited	Not Limited	Note d
Toxics		Not Limited	Not Limited	Note d

For SI: 1 pound = 0.454 kg, 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 the greater of 0.2 cubic feet at NTP/square foot or 9,000 cubic feet at NTP.
- e. The aggregate quantity of pyrophoric gases in the building shall not exceed the amounts set forth in Table 415.6.5.
- f. Quantity of Class 3 water-reactive solids in a single tool shall not exceed 1 pound.

Reason Statement: The proposed changes are consistent with the limits identified in Table 5.5.2, NFPA 318. The proposed higher densities are needed to meet current manufacturing needs. In addition, advances in technology have resulted in reducing the fire risk associated with workstations and tools both with respect to the materials used and operationally (less hand pouring). The higher densities have been in NFPA 318 since 2002 and there have not been any documented problems associated with increased densities.

Cost Impact: The code change proposal will not increase or decrease the cost of construction. The proposed changes are not likely to impact the cost of construction. The proposed changes are primarily operational limits.

F162-21

F163-21

IFC: 202 (New), 3101.1, SECTION 3106 (New), 3106.1 (New), 3106.2 (New), 3106.3 (New), 3106.4 (New), 3106.5 (New), 3106.6 (New), ASTM Chapter 80 (New)

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Fire Code

Add new definition as follows:

INFLATABLE AMUSEMENT DEVICE. A device made of flexible fabric or other combustible materials that is inflated by one or more air-blowers providing internal air pressure to maintain its shape. Such a device is typically designed for recreational activities that allow occupants to bounce, climb, slide, negotiate an obstacle course or participate in interactive play.

Revise as follows:

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 Sections 3104 and ~~3106~~ 3107 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 inflatable amusement devices. The provisions of Section ~~3106~~ 3107 are applicable to outdoor assembly events. Other temporary structures shall comply with the *International Building Code*.

Add new text as follows:

SECTION 3106 INFLATABLE AMUSEMENT DEVICES.

3106.1 Scope. Inflatable amusement devices shall comply with this Section.

Exception: Inflatable amusement devices operated on private property where use is not open to the public.

3106.2 General. Inflatable amusement devices shall be designed, anchored, operated and maintained in accordance with the manufacturer's instructions and the requirements of ASTM F2374.

3106.3 Combustible Materials. The materials used in the construction of the inflatable amusement device shall meet the flame propagation criteria of Test Method 2 of NFPA 701. Additionally, a label and affidavit containing the information required in Sections 3104.3 and 3104.4 of this code shall be permanently affixed to the device.

3106.4 Electrical equipment and wiring. Electrical equipment, blower motors and temporary wiring for electrical power or lighting shall comply with Section 604.

3106.5 Portable generators. Portable generators shall comply with the applicable provisions of NFPA 70 and with the portable generator requirements of this code.

3106.6 Portable Fire Extinguishers. Each generator shall be provided with an approved portable fire extinguisher complying with Section 906 and placed in an approved location.

Add new standard(s) as follows:

ASTM

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

ASTM F2374-19: Standard Practice For Design, Manufacture, Operation, And Maintenance Of Inflatable Amusement Devices

Staff Analysis: A review of the standard proposed for inclusion in the code, ASTM F2374-19, Standard Practice For Design, Manufacture, Operation, And Maintenance Of Inflatable Amusement Devices, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

Reason Statement: This proposal introduces basic safety requirements for inflatable amusement devices also known as "bounce houses". There have been numerous reported incidents of accidents and injuries involving these devices caused by weather events such as sustained or wind gusts and/or improper set-up, anchorage or use where the "bounce house" is uplifted, carried away and/or overturned with children or adults inside. A proposal to regulate these devices was presented in the last cycle but there was concern regarding the difference between outdoors and indoors and permits. At the time ASTM F2374 was not written in a way that it could be referenced but that has changed now and it is in good shape (including all mandatory language). No discussion of either location or permits is included in this proposal. This proposal is much more compact than the earlier one.

Chapter scoping section is modified to reference proposed new section.

This new section simply adds basic fire and electrical safety requirements for the construction, placement and operation of portable inflatable

amusement devices. The section addresses safety requirements for both outdoor and indoor use of these devices. The electrical safety section simply refers to an existing code section

A definition for inflatable amusement devices is also included to correlate the type of devices covered by these new IFC code requirements. The information regarding a certificate and affidavit refers to the existing sections for tents.

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 and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: <https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/>

Cost Impact: The code change proposal will increase the cost of construction

This will increase the cost of construction (compliance) because products that are unregulated will now require to undergo some fire testing.

F163-21

F164-21

IFC: 105.5, 105.5.49, [A] 105.6, [A] 105.6.21, [A] 105.6.24, 3103.2, 3103.4, 3105.2, 3105.3

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Fire Code

105.5 Required operational permits. The *fire code official* is authorized to issue operational permits for the operations set forth in Sections 105.5.2 through 105.5.52.

Revise as follows:

105.5.49 Temporary membrane structures, special event structures and tents. An operational permit is required to operate an air-supported temporary membrane structure, a temporary *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. Funeral tents and curtains, or extensions attached thereto, when used for funeral services.
- 2.3. Tents open on all sides, which comply with all of the following:
 - 2.1. 3.1 Individual tents having a maximum size of 700 square feet (65 m²).
 - 2.2. 3.2 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. 3.3 A minimum clearance of 12 feet (3658 mm) to structures and other tents shall be provided.

[A] 105.6 Required construction permits. The *fire code official* is authorized to issue construction permits for work as set forth in Sections 105.6.1 through 105.6.24.

Revise as follows:

[A] 105.6.21 Special event structure. A single construction permit is required to erect and take down a *temporary special event structure* in accordance with Section 105.5.49.

[A] 105.6.24 Temporary membrane structures and tents. A construction permit is required to erect an air-supported temporary membrane structure, a ~~temporary stage canopy~~ temporary special event structure or a tent in accordance with Section 105.5.49 ~~having an area in excess of 400 square feet (37 m²).~~

Exceptions:

1. ~~Tents used exclusively for recreational camping purposes.~~
2. ~~Funeral tents and curtains, or extensions attached thereto, when used for funeral services.~~
3. ~~Tents and awnings open on all sides, which comply with all of the following:~~
 - 3.1. ~~Individual tents shall have a maximum size of 700 square feet (65 m²).~~
 - 3.2. ~~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.~~
 - 3.3. ~~A minimum clearance of 12 feet (3658 mm) to structures and other tents shall be maintained.~~

3103.2 Approval required. ~~Tents and membrane structures~~ required to have a permit as set forth in Sections 105.5 and 105.6 ~~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.~~

Delete without substitution:

3103.4 Permits. ~~Permits shall be required as set forth in Sections 105.5 and 105.6.~~

Revise as follows:

3105.2 Approval. Temporary special event structures ~~required to have a permit as set forth in Sections 105.5 and 105.6 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.

Delete without substitution:

3105.3 Permits. ~~Permits shall be required as set forth in Sections 105.5 and 105.6.~~

Reason Statement: The intent of this proposal is to eliminate duplication of code language and consistent use of the defined terms and approach to references. In looking at requirements for temporary membrane structures, temporary special event structures and tents in Permits and Chapter 31 has indicated an inconsistency in terminology. This deletion of text will not change requirements, but instead put the criteria in one location so it will remain consistent over time.

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 and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: <https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/>

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is simply an editorial clean up of permit requirements to make the requirements consistent.

F164-21

F165-21

IFC: 3103.9.1 (New), 3103.6

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Fire Code

Add new text as follows:

3103.9.1 Water Filled Vessels. Water filled vessels shall not be used to anchor a tent or membrane structure unless approved and in accordance with the tent or membrane structure manufacturer's instructions.

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. Water filled vessels used to anchor a tent or membrane structure shall be in accordance with Section 3103.9.1.

Reason Statement: The use of water filled barrels as anchors has long been problematic. With a great deal of variance in how water filled barrels react based on connections, fill amounts, and connection of straps to the barrel itself, it is the intent of this code proposal to ensure that manufacturers of tents and membrane structures dictate how water barrels may be used to anchor their products, taking a local entity out of the equation.

Tent safety as performed by the tent installer is a very complicated issue and has an enormous number of variables. Many different factors go into proper anchoring of tents and many of those have scientific bases; but because each factor has an influence on the other factors the science can get very confusing.

To give an example of the variables involved, here is a short list

Surface (concrete, dirt, asphalt, grass, other)

Size of tent

Type of stake

Distance from tent of stake

Geometry of staking pattern

Angle of stake/strap

Number of stakes/straps

Stake/Strap connection method

Type of soil

Moisture level in soil

Construction of strapping or rope

Quite often tents are set up on concrete. The ideal method would of installation on concrete are concrete anchors. These anchors are very strong. Depending on the condition and age of the concrete the failure pressure of this type anchor is anywhere from 2000 to 3000 lbs. or more. This is as close to ideal as you are going to get in the tent business.

Unfortunately for several reasons the property owner will not allow drilling and placement of concrete anchors.

"Water Barrels" are commonly used to secure tents. This is the method most often misused.

A typical water barrel holds 50 gallons of water. Water weighs about 8.34 lbs. per gallon. So, the actual weight of a water barrel is about 420 lbs. Not nearly sufficient weight for holding down a large tent. A water barrel has a plastic bottom that tends to slide if pressure is applied. Water barrels are tied at the top, leaving your pressure point about 40" up (should be at absolute ground level). Water barrels also tend to tip over and spill their contents, effectively causing you to lose ballast.

If we have a 40x40 frame tent we will need a minimum of 16,000 lbs. of holding capacity to safely secure this tent in normal conditions. That means in the best of conditions we would need over 60 water barrels to secure one single 40x40 tent.

We can conclude that water barrels are not a good alternative for securing tents. And many municipalities have recognized that and no longer allow the use of water barrels. Safety and liability are the key factors. Most tent and membrane manufactures do not recommend water barrels do to the following reasons: Water barrels have a low coefficient of friction, reduce weight effectiveness to other methods, have a larger quantities of water barrels to other methods, the tie off location affect the amount to uplift that the barrel may withstand.

For those manufacturers who would allow the use of water barrels for anchoring of their tents, a provision has been made to allow for the tent manufacturer to provide the documentation on their use.

For more information and videos please see the link below <https://www.gettent.com/content/water-barrels-deadweights.asp>

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 and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: <https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/>

Cost Impact: The code change proposal will not increase or decrease the cost of construction

The cost of construction will not change since the option to use the water filled vessel is still allowed if approved by the manufacturer.

F165-21

F166-21

IFC: 3104.2, CCR (New)

Proponents: Paul Armstrong, IFAI, representing IFAI

2021 International Fire Code

Revise as follows:

3104.2 Flame propagation performance testing and certification. Before a permit is granted, the *owner* or agent shall file with the *fire code official* a certificate provided by the product manufacturer to verify that the materials have been tested and certified by an *approved* testing laboratory. The certificate shall indicate that the floor coverings, *tents*, *membrane structures* and their appurtenances, which include sidewalls, drops and tarpaulins, are composed of materials meeting the flame propagation performance of Test Method 1 or Test Method 2 of NFPA 701 or 19 CCR 1237. Additionally, it shall indicate that the bunting and combustible decorative materials and effects are composed of material meeting the flame propagation performance criteria of Test Method 1 or Test Method 2 of NFPA 701, as applicable. Alternatively, the materials shall be treated with a flame retardant in an *approved* manner and meet the flame propagation performance criteria of the applicable test method of NFPA 701. The certificate shall indicate compliance with the testing requirements of NFPA 701, Chapter 16. The flame propagation performance criteria shall be effective for the period specified by the permit.

Add new text as follows:

CCR

California Code of Regulations
Office of Administrative Law
300 Capitol Mall, Suite 1250
Sacramento CA 95814-4339
USA

Add new standard(s) as follows:

CCR California Code of Regulations. 19 CCR 1237 Test Requirements for Exterior Flame-Retardant Chemicals (when Applied to Standard Test Fabric)

Staff Analysis: A review of the standard proposed for inclusion in the code, CCR California Code of Regulations 19 CCR 1237 Test Requirements for Exterior Flame-Retardant Chemicals (when Applied to Standard Test Fabric), with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

Reason Statement: The Industrial Fabric Association International (IFAI) members have for a number of years already had their tent fabric tested and evaluated per the California State Fire Marshal regulations which allow for small sample testing for fire-resistance with good performance. The IFC is proposed to include both Method 1 of NFPA 701 and the California State Fire Marshal regulations for small sample testing. This will allow tent materials tested under the California regulations to be used throughout the country without the use of an Alternate determination.

Cost Impact: The code change proposal will decrease the cost of construction

This proposal recognizes the existing use of California regulations and allows for a less costly small sample test for fire resistance of tent fabric.

F166-21

F167-21

IFC: 3104.3, 3104.4

Proponents: Marcelo Hirschler, GBH International, representing self (mmh@gbhint.com)

2021 International Fire Code

Revise as follows:

3104.3 Label. *Membrane structures* or *tents* shall have a permanently affixed label bearing the following information:

1. The identification of size and fabric or material.
2. The names and addresses of the manufacturers of the *tent* or air-supported structure.
3. A statement that the fabric or material meets the requirements of Section 3104.2.
4. If treated, the date when a flame retardant treatment was last applied to the fabric or material ~~was last treated with flame retardant solution~~, the trade name or kind of chemical used in treatment, name of person or firm treating the fabric or material, and name of testing agency and test standard by which the fabric or material was tested.
5. If untreated, a statement that no treatment was applied when the fabric or material met the requirements of Section 3104.2.

3104.4 Affidavit. The affidavit required by Section 3104.2 shall contain all of the information specified in Section 3104.3.

Reason Statement: The flame retardant treatment is not necessarily a flame retardant solution and the revised language clarifies that. In fact, for most plastic materials, the flame retardant treatment is unlikely to be a "flame retardant solution" and is more likely to be incorporated into the plastic during manufacturing, either by reaction or as an additive.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal is just clarification and does not add requirements.

F167-21

F168-21

IFC: 3106.5.1, 3107.4, 3107.12.5, 3107.12.5.1 (New), 3107.12.6

Proponents: Crystal Sujeski, California Fire Chiefs Association, representing California Fire Chiefs Association (crystal.sujeski@fire.ca.gov)

2021 International Fire Code

Revise as follows:

3106.5.1 Separation from tents or structures. ~~Cooking appliances or devices operations shall be in compliance with Section 3107.12 that produce sparks or grease-laden vapors or flying embers (firebrands) shall not be used 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 904.13.~~

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~~10 feet (~~6096~~ 3048 mm) of the *tent* or *membrane structures* while open to the public unless *approved* by the *fire code official*.

Exception: Cooking devices shall comply with section 3107.12

3107.12.5 Separation of cooking tents. *Tents*

with sidewalls or drops where cooking is performed shall be separated from other non-cooking tents or *membrane structures* by not less than ~~20~~10 feet (~~6096~~ 3048 mm).

Exception: Small tents limited to 100 square feet that are accessory to the cooking operations of the cooking tent and are not occupied by the public.

Add new text as follows:

3107.12.5.1 Groups of cooking tents. Cooking tents shall be permitted to be placed side by side where the following conditions are met:

1. The area of the cooking tents has a maximum area of 700 square feet.
2. Each grouping of tents shall have a fire break clearance of at least 12 feet.
3. A fire access aisle separating rows of cooking tents has a minimum width of 16 feet clear.

Revise as follows:

3107.12.6 Outdoor cooking operations. ~~Outdoor~~

cooking that produces sparks or grease-laden vapors shall not be performed within ~~20~~10 feet (6096 mm) of a *tent* or *membrane structure* except where the following conditions are met:

1. Cooking devices shall be isolated from the public.
2. Cooking devices shall be maintained and used according to the manufactures instructions.

Exception: Designated cooking tents with an automatic sprinkler system installed in accordance with 903.3.1.1.

Reason Statement: The proposal is to correlate many different provision in the International Fire Code (IFC) that relate to cooking, open flame and separation from tents. With the advancement of flame retardant materials required for tents the over restrictive regulation of 20 feet separation is excessive and not feasible in many outdoor events and activities. Historically the 20 foot separation was prior to requirement of tent materials applied with flame retardant properties. The current International Building Code (IBC) at 10 feet and greater, doesn't require a lot of openings to be protected any longer because the danger of radiant heat transfer is less at that distance, and convective/ conductive heat transfer is almost non-existent beyond 10 feet.

Additional IFC Sections that have a separation provisions:

- 305.2. has hot ashes minimum 10' from combustibles
- 307.4 exception 1 allows open burning in approved containers 15' from structures
- 307.4.3 portable outdoor fireplace 15'

- 308.1.4 open flame cooking devices 10' from combustible construction
- 3103.2 exception 2.1 and 2.2 700 square feet, side by side fire break of 12'

Gas grills are outdoor cooking appliances that are typically listed to ANSI Z21.58. The clearances may be determined by the manufacturer's installation requirements. Gas grills typically have controls to regulate the flame.

This proposal will allow for special events to have cooking operations done in a safe and consistent manner, while supporting vendors and event planners. This also removes conflicts within the code.

The grouping of cooking tents is modeled from the permit provisions in 3103.2. It correlates the 700 square feet provision. The rationale of the 16 feet fire department access is to allow for one fire apparatus or one ambulance, or allowable room for a golf cart with and pedestrian traffic.

Cost Impact: The code change proposal will decrease the cost of construction

The cost will allow for special events to have cooking operations done in a safe and consistent manner, while supporting vendors and event planners. This also removes conflicts within the code.

F168-21

F169-21

IFC: TABLE 3203.8

Proponents: Kevin Scott, representing KH Scott & Associates LLC (khscottassoc@gmail.com)

2021 International Fire Code

Revise as follows:

TABLE 3203.8
EXAMPLES OF COMMODITY CLASSIFICATION

Portions of table not shown remain unchanged.

PRODUCT CATEGORY	PRODUCT	CLASSIFICATION
Batteries	Dry cells (excludes lithium, lithium-ion and other similar exotic metals or combustible electrolyte); without blister packing (if blister packed, refer to the commodity classification definitions)	Class I
	Dry cells (nonlithium or similar exotic metals); in blister packing; cartoned	Class II
	Vehicle; any size (for example, automobile or truck); empty plastic casing	High-hazard (Group A unexpanded)
	Vehicle; large (in other words, truck or larger); dry or wet cells (excludes lithium-ion and other cells containing combustible electrolytes)	High-hazard (Group A unexpanded)
	Vehicle; small (for example, automobile); wet cells (excludes lithium-ion and other cells containing combustible electrolytes)	Class I
	Lithium-ion (<u>excludes lithium-ion installed in the equipment or appliance it powers</u>)	High-hazard

For SI: 1 inch = 25.4 mm, 1 gallon = 3.8 L, 1 ounce = 29.57 ml.

Reason Statement: This entry of “lithium-ion” was added in the 2021 IFC. It is an open-ended reference and not clear on what is intended to be included. This proposal is intended to clarify the application of this item and specify that it is not intended to consider batteries installed in equipment or appliances.

The hazard associated with a pile of lithium-ion batteries far exceeds the hazard of those same batteries located in devices and placed in packaging.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

This is clarification. There is no affect to cost of construction.

F169-21

F170-21

IFC: 3206.7, 3206.7.1, 3206.7.2

Proponents: Elley Klausbruckner, Klausbruckner & Associates, Inc., representing Klausbruckner & Associates, Inc.

2021 International Fire Code

Revise as follows:

3206.7 Fire department access doors. Where fire department access doors are required by Table 3206.2, fire department access doors shall be provided in accordance Sections 3206.7.1 through ~~3206.7.8~~ 3206.7.7.

3206.7.1 Exterior walls without fire department access doors Where Located. ~~Fire department access doors are not required in an exterior wall that does not face a fire apparatus access road provided that all of the following conditions occur:~~

Where exterior walls surrounding high-piled storage areas face fire apparatus access roads, such walls shall be provided with fire department access doors. Fire department access doors are not required in an exterior wall that does not face a fire apparatus access road.

Exception: Fire department access doors are not required in an exterior wall that faces a fire apparatus access road provided that all of the following conditions exist:

1. The opposite exterior wall faces a fire apparatus access road.
2. The opposite exterior wall is provided with fire department access doors.
3. The entire interior surface of the exterior wall is 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.~~

Reason Statement: Please see Figure 1 below as an example of what the intent of this code change is. The language as it's currently written is impractical for the following reasons:

1. Section 3206.7.1 (access doors are required where exterior walls do NOT face an access road unless conditions 1-4 are met) is in conflict with Section 3206.7.2 (access doors are only required where exterior walls face an access road).
2. Access from a side of a building that does not have an access road is impractical. The building in most cases is small enough not to require access roads along one side of the building, thereby allowing access from other sides due to the size of the building.
3. This will create a problem in existing buildings when one business moves out and another moves in, thereby forcing the new tenant to cut holes in exterior building walls.
4. If the side of the building that does not require access roads abuts another building, then in many cases openings are not allowed along that side of the building, thereby creating a conflict in the code. Please see Figure 2 below as an example.

Figure 1 - Example of the Intent

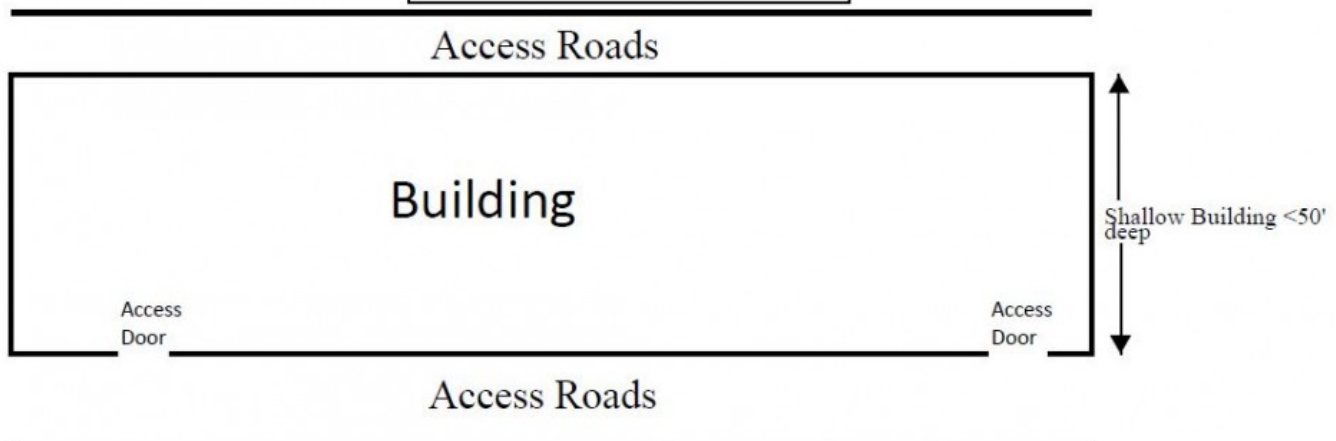
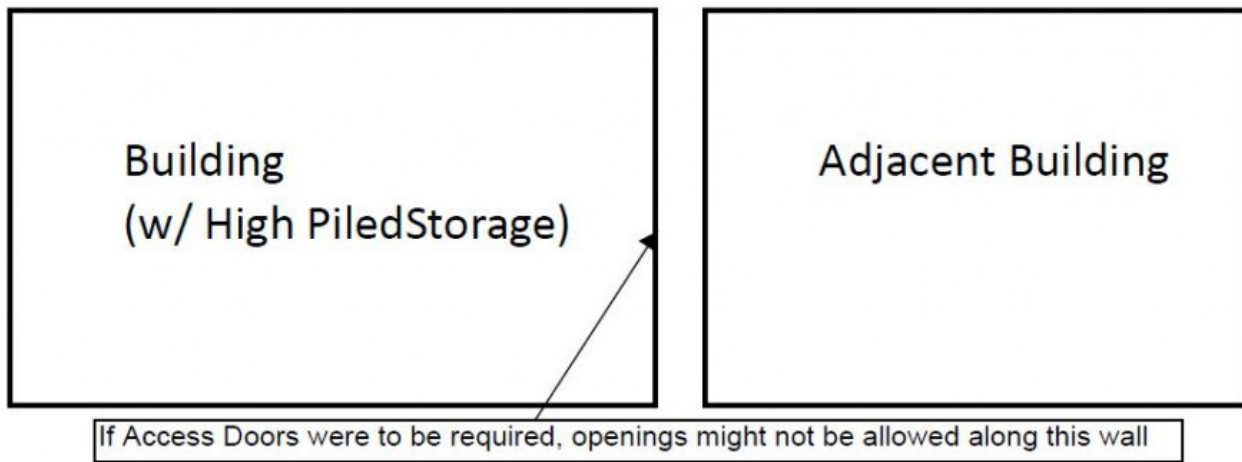


Figure 2 - Conflicts



Cost Impact: The code change proposal will decrease the cost of construction

The revisions clarify the code and eliminate conflicts in the requirements to provide access doors in an exterior wall that does not face a fire apparatus access road or abuts another building.

F170-21

F171-21

IFC: 3208.3.1

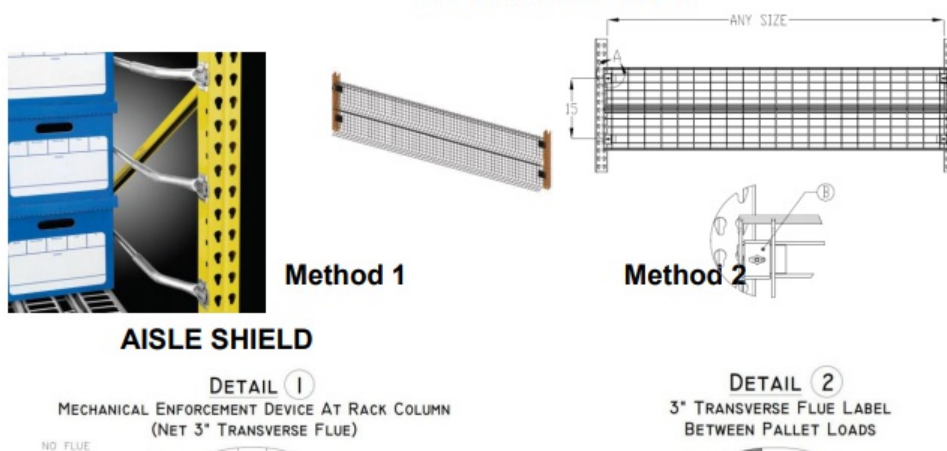
Proponents: Elley Klausbruckner, Klausbruckner & Associates, Inc., representing Klausbruckner & Associates, Inc. (jm@klausbruckner.com)

2021 International Fire Code

Revise as follows:

3208.3.1 Flue space protection. ~~Longitudinal flue spaces~~ required by Table 3208.3 above the first tier of storage in ~~single, double or multiple row~~ rack storage installations shall, where required by the *fire code official*, be equipped with *approved* protection devices. Where required by the fire code official, other approved methods, including but not limited to "keep clear" stickers or other marking, are acceptable methods of transverse flue space maintenance. Such devices or approved methods shall not be removed or modified.

Reason Statement: The use of mechanical means (such as L brackets) was originally intended as an inexpensive method of preventing obstruction of flue spaces. It was originally intended for longitudinal flue spaces where forklift operators can potentially push pallets too far back to a point where the longitudinal flue spaces are blocked. These days jurisdictions are requiring elaborate and expensive methods of maintaining transverse flue spaces when in most cases simple markings with the use of "keep clear" stickers can accomplish similar results. Forklift operators cannot "push" pallets into transverse flue spaces, especially into the rack uprights. The expense associated with installing mechanical means such as the ones shown in the attached figure (as an example) for small businesses (when simple stickers accomplish the same intent) is unjustified.



Cost Impact: The code change proposal will decrease the cost of construction

This may reduce cost of construction only for jurisdictions that specifically were requiring mechanical means of maintaining transverse flue spaces.

F171-21

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Fire Code

CHAPTER 33 FIRE SAFETY DURING CONSTRUCTION AND DEMOLITION

SECTION 3301 GENERAL.

3301.1 Scope. This chapter shall apply to structures in the course of construction, *alteration* or demolition, including those in underground locations. Compliance with NFPA 241 is required for items not specifically addressed herein.

3301.2 Purpose. This chapter prescribes minimum safeguards for construction, *alteration* and demolition operations to provide reasonable safety to life and property from fire during such operations.

SECTION 3302 DEFINITIONS.

3302.1 Terms defined in Chapter 2. Words and terms used in this chapter and defined in Chapter 2 shall have the meanings ascribed to them as defined therein.

Revise as follows:

SECTION 3303 ~~OWNER'S RESPONSIBILITY FOR FIRE PROTECTION~~ ADMINISTRATIVE SAFETY CONTROLS.

3303.1 Program development and maintenance. The *owner* or *owner's* authorized agent shall be responsible for the development, implementation and maintenance of an *approved*, written *site safety plan* establishing a fire prevention program at the project site applicable throughout all phases of the construction, repair, *alteration* or demolition work. The plan shall be submitted and *approved* before a building permit is issued. Any changes to 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 submitted for approval.

3303.1.1 Components of site safety plans. *Site safety plans* shall include the following as applicable:

1. Name and contact information of site safety director.
2. Documentation of the training of the site safety director and fire watch personnel.
3. Procedures for reporting emergencies.
4. Fire department vehicle access routes.
5. Location of fire protection equipment, including portable fire extinguishers, standpipes, fire department connections and fire hydrants.
6. Smoking and cooking policies, designated areas to be used where *approved*, and signage locations in accordance with Section 3305.8.
7. Location and safety considerations for temporary heating equipment.
8. Hot work permit plan.
9. Plans for control of combustible waste material.
10. Locations and methods for storage and use of *flammable* and *combustible liquids* and other hazardous materials.
11. Provisions for site security.
12. Changes that affect this plan.
13. Other site-specific information required by the *fire code official*.

3303.2 Site safety director. The *owner* shall designate a person to be the site safety director. The site safety director shall be responsible for ensuring compliance with the *site safety plan*. The site safety director 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 site safety director shall be responsible for the guard service.

Revise as follows:

~~3303.6~~ 3303.2.1 Training. Training of fire watch and other responsible personnel in the use of fire protection equipment shall be the responsibility of the site safety director. Records of training shall be kept and made a part of the written plan for the *site safety plan*.

3303.3 Daily fire safety inspection. The site safety director shall be responsible for completion of a daily fire safety inspection at the project site. Each day, all building and outdoor areas shall be inspected to ensure compliance with the inspection list in this section. The results of each inspection shall be documented and maintained on-site until a certificate of occupancy has been issued. Documentation shall be immediately

available on-site for presentation to the *fire code official* upon request.

1. Any contractors entering the site to perform hot work each day have been instructed in the hot work safety requirements in Chapter 35, and hot work is performed only in areas *approved* by the site safety director.
2. Temporary heating equipment is maintained away from combustible materials in accordance with the equipment manufacturer's instructions.
3. Combustible debris, rubbish and waste material is removed from the building in areas where work is not being performed.
4. Temporary wiring does not have exposed conductors.
5. *Flammable liquids* and other hazardous materials are stored in locations that have been *approved* by the site safety director when not involved in work that is being performed.
6. Fire apparatus access roads required by Section 3311 are maintained clear of obstructions that reduce the width of the usable roadway to less than 20 feet (6096 mm).
7. Fire hydrants are clearly visible from access roads and are not obstructed.
8. The location of fire department connections to standpipe and in-service sprinkler systems are clearly identifiable from the access road and such connections are not obstructed.
9. Standpipe systems are in service and continuous to the highest work floor, as specified in Section 3313.1.
10. Portable fire extinguishers are available in locations required by Sections 3316 and 3318.3.

3303.3.1 Violations. Failure to properly conduct, document and maintain documentation required by this section shall constitute an unlawful act in accordance with Section 112.1 and shall result in the issuance of a notice of violation to the site safety director in accordance with Section 112.3. Upon the third offense, the *fire code official* is authorized to issue a stop work order in accordance with Section 113, and work shall not resume until satisfactory assurances of future compliance have been presented to and *approved* by the *fire code official*.

3303.4 Qualifications. Site safety directors shall acquire training specific to their roles and responsibilities. Upon request, the training and qualifications of the site safety director shall be submitted to the *fire code official* for approval.

Revise as follows:

~~3305.5~~ **3303.5 Fire watch.** Where required by the *fire code official* or the *site safety plan* established in accordance with Section 3303.1, a fire watch shall be provided for building demolition and for building construction.

~~3305.5.1~~ **3303.5.1 Fire watch during construction.** A fire watch shall be provided during nonworking hours for new construction that exceeds 40 feet (12 192 mm) in height above the lowest adjacent grade at any point along the building perimeter, for new multistory construction with an aggregate area exceeding 50,000 square feet (4645 m²) per story or as required by the *fire code official*.

~~3305.5.2~~ **3303.5.2 Fire watch personnel.** Fire watch personnel shall be provided in accordance with this section.

~~3305.5.2.1~~ **3303.5.2.1 Duties.** The primary duty of fire watch personnel 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.

~~3305.5.2.2~~ **3303.5.2.2 Training.** Personnel shall be trained to serve as an on-site fire watch. Training shall include the use of portable fire extinguishers. Fire extinguishers and fire reporting shall be in accordance with Section 3310.

~~3305.5.2.3~~ **3303.5.2.3 Means of notification.** Fire watch personnel shall be provided with not fewer than one *approved* means for notifying the fire department.

~~3305.5.3~~ **3303.5.3 Fire watch location and records.** The fire watch shall include areas specified by the *site safety plan* established in accordance with Section 3303.

~~3305.5.4~~ **3303.5.4 Fire watch records.** Fire watch personnel shall keep a record of all time periods of duty, including the log entry for each time the site was patrolled and each time a structure was entered and inspected. Records shall be made available for review by the *fire code official* upon request.

~~3310.1~~ **3303.6 Emergency telephone.** Emergency telephone facilities with *ready access* 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. Alternatively, 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.

SECTION 3304 ~~TEMPORARY HEATING EQUIPMENT~~ PROTECTION OF COMBUSTIBLE MATERIALS.

~~3305.2~~ **3304.1 Combustible debris, rubbish and waste.** Combustible debris, rubbish and waste material shall comply with the requirements of Sections 3305.2.1 through 3305.2.4.

~~3305.2-1~~ **3304.1.1 Combustible waste material accumulation.** Combustible debris, rubbish and waste material shall not be accumulated within buildings.

~~3305.2-2~~ **3304.1.2 Combustible waste material removal.** Combustible debris, rubbish and waste material shall be removed from buildings at the end of each shift of work.

~~3305.2-3~~ **3304.1.3 Rubbish containers.** Where rubbish containers with a capacity exceeding 5.33 cubic feet (40 gallons) (0.15 m³) are used for temporary storage of combustible debris, rubbish and waste material, they shall have tight-fitting or self-closing lids. Such rubbish containers shall be constructed entirely of materials that comply with either of the following:

1. Noncombustible materials.
2. Materials that meet a peak rate of heat release not exceeding 300 kW/m² when tested in accordance with ASTM E1354 at an incident heat flux of 50 kW/m² in the horizontal orientation.

~~3305.2-4~~ **3304.2 Spontaneous ignition.** Materials susceptible to spontaneous ignition, such as oily rags, shall be stored in a *listed* disposal container.

SECTION 3305 PRECAUTIONS AGAINST FIRE IGNITION SOURCE CONTROLS.

~~3304-1~~ **3305.1 Listed.** Temporary heating devices shall be *listed* and *labeled*. The installation, maintenance and use of temporary heating devices shall be in accordance with the listing and the manufacturer's instructions.

~~3304-2~~ **3305.1.1 Oil-fired heaters.** Oil-fired heaters shall comply with Section 605.

~~3304-3~~ **3305.1.2 LP-gas heaters.** Fuel supplies for liquefied-petroleum gas-fired heaters shall comply with Chapter 61 and the *International Fuel Gas Code*.

~~3304-4~~ **3305.1.3 Refueling.** Refueling operations for liquid-fueled equipment or appliances shall be conducted in accordance with Section 5705. The equipment or appliance shall be allowed to cool prior to refueling.

~~3304-5~~ **3305.1.4 Installation.** Clearance to combustibles from temporary heating devices shall be maintained in accordance with the *labeled* equipment. When in operation, temporary heating devices shall be fixed in place and protected from damage, dislodgement or overturning in accordance with the manufacturer's instructions.

~~3304-6~~ **3305.1.5 Supervision.** The use of temporary heating devices shall be supervised and maintained only by competent personnel.

~~3305-1~~ **3305.2 Smoking.** Smoking shall be prohibited except in *approved* areas. Signs shall be posted in accordance with Section 310. In *approved* areas where smoking is permitted, *approved* ashtrays shall be provided in accordance with Section 310.

3305.3 Burning of combustible debris, rubbish and waste. Combustible debris, rubbish and waste material shall not be disposed of by burning on the site unless *approved*.

3305.4 Open burning. *Open burning* shall comply with Section 307.

Revise as follows:

~~3305-6~~ **3305.5 Cutting and welding.** Welding, cutting, open torches and other hot work operations and equipment shall comply with Chapter 35.

~~3305-7~~ **3305.6 Electrical.** Temporary wiring for electrical power and lighting installations used in connection with the construction, *alteration* or demolition of buildings, structures, equipment or similar activities shall comply with NFPA 70.

~~3305-8~~ **3305.7 Cooking.** Cooking shall be prohibited except in *approved* designated cooking areas separated from combustible materials by a minimum of 10 feet (3048 mm). Signs with a minimum letter height of 3 inches (76 mm) and a minimum brush stroke of 1/2 inch (13 mm) shall be posted in conspicuous locations in designated cooking areas and state:

DESIGNATED COOKING AREA
COOKING OUTSIDE OF A DESIGNATED
COOKING AREA IS PROHIBITED

~~3309-1~~ **3305.8 General.** Portable generators used at construction and demolition sites shall comply with Section 1204.

~~3309-8~~ **3305.9 Hot work operations.** The site safety director shall ensure hot work operations and permit procedures are in accordance with Chapter 35.

~~3318-1~~ **3305.10 Safeguarding roof operations General.** Roofing operations utilizing heat-producing systems or other ignition sources shall be conducted in accordance with Sections 3318.2 and 3318.3 and Chapter 35.

~~3318-2~~ **3305.10.1 Asphalt and tar kettles.** Asphalt and tar kettles shall be operated in accordance with Section 303.

~~3318.3~~ **3305.10.2 Fire extinguishers for roofing operations.** Fire extinguishers shall comply with Section 906. There shall be not less than one multiple-purpose portable fire extinguisher with a minimum 3-A 40-B:C rating on the roof being covered or repaired.

SECTION 3306 FLAMMABLE AND COMBUSTIBLE LIQUIDS FIRE PROTECTION SYSTEMS AND DEVICES.

~~3303.7~~ **3306.1 Fire protection devices.** The site safety director shall ensure that all fire protection equipment is maintained and serviced in accordance with this code. Fire protection equipment shall be inspected in accordance with the fire protection program.

~~3303.9~~ **3306.2 Impairment of fire protection systems.** The site safety director shall ensure impairments to any *fire protection system* are in accordance with Section 901.

~~3303.9-1~~ **3306.3 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. 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.

~~3303.10~~ **3306.4 Temporary covering of fire protection devices.** Coverings placed on or over fire protection devices to protect them from damage during construction processes shall be immediately removed upon the completion of the construction processes in the room or area in which the devices are installed.

~~3315.1~~ **3306.5 Automatic Sprinkler system. Completion before occupancy.** In buildings where an *automatic sprinkler system* is required by this code or the *International Building Code*, it shall be unlawful to occupy any portion of a building or structure until the *automatic sprinkler system* installation has been tested and *approved*, except as provided in Section 105.3.4.

~~3315.2~~ **3306.5.1 Operation of valves.** Operation of sprinkler control valves shall be allowed only by properly authorized personnel and shall be accompanied by notification of duly designated parties. Where the sprinkler protection is being regularly turned off and on to facilitate connection of newly completed segments, the sprinkler control valves shall be checked at the end of each work period to ascertain that protection is in service.

~~3316.1~~ **3306.6 Where required. Portable fire extinguishers.** Structures under construction, *alteration* or demolition shall be provided with not less than one *approved* portable fire extinguisher in accordance with Section 906 and sized for not less than ordinary hazard as follows:

1. At each *stairway* on all floor levels where combustible materials have accumulated.
2. In every storage and construction shed.
3. Additional portable fire extinguishers shall be provided where special hazards exist including, but not limited to, the storage and use of *flammable and combustible liquids*.

SECTION 3307 FLAMMABLE GASES FIRE DEPARTMENT SITE ACCESS AND WATER SUPPLY.

~~3311.1~~ **3307.1 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.

~~3311.2~~ **3307.1.2 Key boxes.** Key boxes shall be provided as required by Chapter 5.

[BE] ~~3312.1~~ **3307.1.3 Stairways required.** Where building construction exceeds 40 feet (12 192 mm) in height above the lowest level of fire department vehicle access, a temporary or permanent *stairway* shall be provided. As construction progresses, such *stairway* shall be extended to within one floor of the highest point of construction having secured decking or flooring.

~~3312.2~~ **3307.1.4 Maintenance.** Required *means of egress* and required *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.

~~3313.1~~ **3307.2 When required. Water supply for fire protection.** An *approved* water supply for fire protection, either temporary or permanent, shall be made available as soon as combustible building materials arrive on the site, on commencement of vertical combustible construction and on installation of a standpipe system in buildings under construction, in accordance with Sections 3307.2.1 through 3307.4, ~~3313.2 through 3313.5~~.

Exception: The *fire code official* 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.

~~3313.2~~ **3307.2.1 Combustible building materials.** When combustible building materials of the building under construction are delivered to a site, a minimum fire flow of 500 gallons per minute (1893 L/m) shall be provided. The fire hydrant used to provide this fire-flow supply shall be within 500 feet (152 m) of the combustible building materials, as measured along an *approved* fire apparatus access lane. Where the site configuration is such that one fire hydrant cannot be located within 500 feet (152 m) of all combustible building materials, additional fire hydrants shall be required to provide coverage in accordance with this section.

~~3313.3~~ **3307.2.2 Vertical construction of Types III, IV and V construction.** Prior to commencement of vertical construction of Type III, IV or V buildings that utilize any combustible building materials, the fire flow required by Sections ~~3307.2.2.1 through 3307.2.2.3~~ ~~3313.3.1 through 3313.3.3~~ shall be provided, accompanied by fire hydrants in sufficient quantity to deliver the required fire flow and proper coverage.

~~3313.3.1~~ **3307.2.2.1 Fire separation up to 30 feet.** Where a building of Type III, IV or V construction has a *fire separation distance* of less than 30 feet (9144 mm) from property lot lines, and an adjacent property has an existing structure or otherwise can be built on, the water supply shall provide either a minimum of 500 gallons per minute (1893 L/m) or the entire fire flow required for the building when constructed, whichever is greater.

~~3313.3.2~~ **3307.2.2.2 Fire separation of 30 feet up to 60 feet.** Where a building of Type III, IV or V construction has a fire separation distance of 30 feet (9144 mm) up to 60 feet (18 288 mm) from property lot lines, and an adjacent property has an existing structure or otherwise can be built on, the water supply shall provide a minimum of 500 gallons per minute (1893 L/m) or 50 percent of the fire flow required for the building when constructed, whichever is greater.

~~3313.3.3~~ **3307.2.2.3 Fire separation of 60 feet or greater.** Where a building of Type III, IV or V construction has a fire separation of 60 feet (18 288 mm) or greater from a property *lot line*, a water supply of 500 gallons per minute (1893 L/m) shall be provided.

~~3313.4~~ **3307.3 Vertical construction, Type I and II construction.** If combustible building materials are delivered to the construction site, water supply in accordance with Section 3313.2 shall be provided. Additional water supply for fire flow is not required prior to commencing vertical construction of Type I and II buildings.

~~3313.5~~ **3307.4 Standpipe supply.** Regardless of the presence of combustible building materials, the construction type or the *fire separation distance*, where a standpipe is required in accordance with Section 3314, a water supply providing a minimum flow of 500 gallons per minute (1893 L/m) shall be provided. The fire hydrant used for this water supply shall be located within 100 feet (30 480 mm) of the fire department connection supplying the standpipe.

~~3314.1~~ **3307.5 Where required. Standpipes.** 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 standpipes shall be provided with fire department hose connections at locations adjacent to *stairways* complying with Section ~~3307.1.3~~ ~~3314.2~~ ~~4~~. As construction progresses, such standpipes shall be extended to within one floor of the highest point of construction having secured decking or flooring.

~~3314.2~~ **3307.5.1 Buildings being demolished.** Where a building is being demolished and a standpipe is existing within such a building, such standpipe shall be maintained in an operable condition so as to be available for use by the fire department. Such standpipe shall be demolished with the building but shall not be demolished more than one floor below the floor being demolished.

~~3314.3~~ **3307.5.2 Detailed requirements.** Standpipes shall be installed in accordance with the provisions of Section 905.

Exception: Standpipes shall be either temporary or permanent in nature, and with or without a water supply, provided that such standpipes comply with the requirements of Section 905 as to capacity, outlets and materials.

SECTION ~~3317~~ 3308 MOTORIZED CONSTRUCTION EQUIPMENT.

~~3317.1~~ **3308.1 Conditions of use.** Internal-combustion-powered construction equipment shall be used in accordance with all of the following conditions:

1. Equipment shall be located so that exhausts do not discharge against combustible material.
2. Exhausts shall be piped to the outside of the building.
3. Equipment shall not be refueled while in operation.
4. Fuel for equipment shall be stored in an *approved* area outside of the building.

SECTION ~~3308~~ 3309 EXPLOSIVE MATERIALS- HAZARDOUS MATERIALS.

~~3306.1~~ **3309.1 Storage of flammable and combustible liquids.** Storage of *flammable* and *combustible liquids* shall be in accordance with Section 5704.

~~3306.2~~ **3309.1.1 Class I and Class II liquids.** The storage, use and handling of *flammable* and *combustible liquids* at construction sites shall be in accordance with Section 5706.2. Ventilation shall be provided for operations involving the application of materials containing flammable solvents.

~~3306.3~~ **3309.1.2 Housekeeping.** *Flammable* and *combustible liquid* storage areas shall be maintained clear of combustible vegetation and waste materials. Such storage areas shall not be used for the storage of combustible materials.

~~3306.4~~ **3309.1.3 Precautions against fire.** Sources of ignition and smoking shall be prohibited in *flammable* and *combustible liquid* storage areas. Signs shall be posted in accordance with Section 310.

~~3306.5~~ **3309.1.4 Handling at point of final use.** Class I and II liquids shall be kept in *approved* safety containers.

~~3306.6~~ **3309.1.5 Leakage and spills.** Leaking vessels shall be immediately repaired or taken out of service and spills shall be cleaned up and

disposed of properly.

~~3307.1~~ **3309.2 Storage and handling of flammable gas.** The storage, use and handling of flammable gases shall comply with Chapter 58.

~~3307.2~~ **3309.2.1 Cleaning with flammable gas.** Flammable gases shall not be used to clean or remove debris from piping open to the atmosphere.

~~3307.2.1~~ **3309.2.2 Pipe cleaning and purging.** The cleaning and purging of flammable gas piping systems, including cleaning new or existing piping systems, purging piping systems into service and purging piping systems out of service, shall comply with NFPA 56.

Exceptions:

1. *Compressed gas* piping systems other than fuel gas piping systems where in accordance with Chapter 53.
2. Piping systems regulated by the *International Fuel Gas Code*.
3. Liquefied petroleum gas systems in accordance with Chapter 61.

~~3308.1~~ **3309.3 Storage and handling.** *Explosive* materials shall be stored, used and handled in accordance with Chapter 56.

~~3308.2~~ **3309.3.1 Supervision.** Blasting operations shall be conducted in accordance with Chapter 56.

~~3308.3~~ **3309.3.2 Demolition using explosives.** *Approved* fire hoses for use by demolition personnel shall be maintained at the demolition site wherever *explosives* are used for demolition. Such fire hoses shall be connected to an *approved* water supply and shall be capable of being brought to bear on post-*detonation* fires anywhere on the site of the demolition operation.

SECTION 3309 ~~3310~~ PORTABLE GENERATORS ADDITIONAL SAFEGUARDS FOR OCCUPIED BUILDINGS.

~~3312.3~~ **3310.1 Storage.** Combustible materials associated with construction, demolition, remodeling or *alterations* to an occupied structure shall not be stored in *exits*, enclosures for *stairways* and *ramps*, or *exit access corridors* serving an occupant load of 30 or more.

Exceptions:

1. Where the only occupants are construction workers.
2. Combustible materials that are temporarily accumulated to support work being performed when workers are present.

SECTION 3310 ~~3311~~ FIRE-REPORTING ADDITIONAL SAFEGUARDS FOR TYPE I & II CONSTRUCTION.

~~3305.9~~ **3311.1 Separations between construction areas.** Separations used in Type I and Type II construction to separate construction areas from occupied portions of the building shall be constructed of materials that comply with one of the following:

1. Noncombustible materials.
2. Materials that exhibit a flame spread index not exceeding 25 when tested in accordance with ASTM E84 or UL 723.
3. Materials exhibiting a peak heat release rate not exceeding 300 kW/m² when tested in accordance with ASTM E1354 at an incident heat flux of 50 kW/m² in the horizontal orientation on specimens at the thickness intended for use.

SECTION 3311 ~~3312~~ ACCESS FOR FIRE-FIGHTING ADDITIONAL SAFEGUARDS FOR TYPE IV CONSTRUCTION.

~~3303.5~~ **3312.1 Fire safety requirements for buildings of Types IV-A, IV-B and IV-C construction.** Buildings of Types IV-A, IV-B and IV-C construction designed to be greater than six stories above *grade plane* shall comply with the following requirements during construction unless otherwise *approved* by the *fire code official*:

1. Standpipes shall be provided in accordance with Section 3313.
2. A water supply for fire department operations, as *approved* by the *fire code official* and the *fire chief*.
3. Where building construction exceeds six stories above *grade plane* and noncombustible protection is required by Section 602.4 of the *International Building Code*, at least one layer of noncombustible protection shall be installed on all building elements on floor levels, including mezzanines, more than four levels below active mass timber construction before additional floor levels can be erected.

Exception: Shafts and vertical exit enclosures shall not be considered part of the active mass timber construction.

4. Where building construction exceeds six stories above *grade plane*, required exterior wall coverings shall be installed on floor levels, including mezzanines, more than four levels below active mass timber construction before additional floor levels can be erected.

Exception: Shafts and vertical exit enclosures shall not be considered part of the active mass timber construction.

Delete without substitution:

SECTION 3312 MEANS OF EGRESS.

SECTION 3313 WATER SUPPLY FOR FIRE PROTECTION.

SECTION 3314 STANDPIPES.

SECTION 3315 AUTOMATIC SPRINKLER SYSTEM.

SECTION 3316 PORTABLE FIRE EXTINGUISHERS.

SECTION 3318 SAFEGUARDING ROOFING OPERATIONS.

Reason Statement: The Construction Fire Safety working group of the Fire Code Action Committee (FCAC) concluded that no new construction fire safety provisions were needed at this time, the construction fire problem is due to a lack of enforcement not a gap in the codes. In an effort to bolster enforcement the working group decided that Chapter 33 should be reorganized in an effort to make it more user friendly and less disjointed. The proposal groups similar code provisions together in an orderly fashion under applicable section names. Note that the entire chapter is shown in this code change proposals. No new sections have been created nor have any existing sections been deleted. In some cases main section heading titles have been deleted as they are no longer necessary.

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 and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: <https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/>

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal does not create new requirements in the code, it simply reorganizes existing code provisions.

F172-21

F173-21

IFC: 3301.3 (New), 3303.1.1, 3303.4, 3303.9.1, 3303.10 (New), 3303.10.1 (New), 3303.10.2 (New), 3303.10.3 (New), 3305.1 (New), 3305.5.2 (New), 3305.6 (New), 3305.6.1 (New), 3305.6.2 (New), 3310.2 (New), SECTION 202 (New), SECTION 202, NFPA Chapter 80 (New); IBC 202

Proponents: Joseph R Cervantes, Space Age Electronics, representing Space Age Electronics (joseph.cervantes@1sae.com)

2021 International Fire Code

Add new text as follows:

3301.3 Electronic technologies. Where approved the use of electronic technologies shall be permitted.

Revise as follows:

3303.1.1 Components of site safety plans. *Site safety plans*

shall be developed in accordance with NFPA 1620 and shall include the following as applicable:

1. Name and contact information of site safety director.
2. Documentation of the training of the site safety director and fire watch personnel.
3. Procedures for reporting emergencies.
4. Fire department vehicle access routes.
5. Location of fire protection equipment, including portable fire extinguishers, standpipes, fire department connections and fire hydrants.
6. Smoking and cooking policies, designated areas to be used where *approved*, and signage locations in accordance with Section 3305.8.
7. Location and safety considerations for temporary heating equipment.
8. Hot work permit plan.
9. Plans for control of combustible waste material.
10. Locations and methods for storage and use of *flammable* and *combustible liquids* and other hazardous materials.
11. Provisions for site security.
12. Changes that affect this plan.
13. Other site-specific information required by the *fire code official*.

3303.4 Qualifications. ~~Site safety directors shall acquire training specific to their roles and responsibilities.~~ The site safety director shall be a competent person with knowledge of the applicable fire protection codes and standards, available fire protection systems, and fire inspection procedures. Upon request, the training and qualifications of the site safety director shall be submitted to the *fire code official* for approval.

3303.9.1 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. 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.

Exception: Temporary electronic systems utilizing temporary construction dustproof smoke sensors listed for the construction environment.

Add new text as follows:

3303.10 Temporary electronic systems. Where approved electronic systems used to alert of possible fire or other emergency conditions on a construction site shall be in accordance with Sections 3303.10.1 through 3303.10.3.

3303.10.1 Approval. The electronic systems shall be used in accordance with the manufacture instructions.

3303.10.2 Commissioning and decommissioning. Temporary electronic systems shall be approved for use on a temporary basis during construction activities and shall be commissioned and decommissioned as required by the fire code official.

3303.10.3 Locations. Where used during construction activities temporary electronic systems shall be in accordance with this section. Device and sensor locations shall be located but not limited to the following locations based upon the level of combustibility.

1. Hot work locations.
2. Trash Chutes.
3. Trash Bins.

4. Combustible Material Storage locations.
5. Locations with flammable material storage.
6. Locations where there is a high likelihood of electrically induced combustion of materials.
7. Temporary shelters and trailers.
8. Other locations as required by the local building official or fire code official.

3303.10.4 Wireless alarm system control unit. Temporary electronic systems shall use a wireless alarm system control unit.

3305.1 Temporary Protection During Construction, Alteration, or Demolition. During construction, alteration, or demolition, the use of temporary electronically supervised automatic sprinkler protection approved by the fire code official shall be permitted as supplemental protection.

3305.5.2 Temporary Protection Systems During Construction, Alteration, or Demolition. During construction, alteration, or demolition, the use of temporary electronic systems, approved by the fire code official, shall be permitted as supplemental protection. Temporary electronic systems shall comply with Section 3303.10.

3305.6 Fire department command post. Fire department command posts shall be in accordance with Sections 3305.6.1 and 3305.6.2.

3305.6.1 Where required. High-rise buildings under construction shall be required to be provided with a fire department command post in a location approved by the fire code official.

3305.6.2 Components of fire department command post. The fire department command post shall be provided with information as required by Section 3303.1.1.

3310.2 Means of Notification and Alerting During Working Hours. Appropriate means of automatic, site wide alerting and notification to all construction workers for evacuation during normal site working hours shall be provided in approved locations on the construction site. The system shall be comprised of alerting devices such as bells, horns, speakers, lights, beacons, call points or text displays that provides audible, tactile or visible outputs, or any combination thereof, sufficient for alerting workers. Such systems shall be used in accordance with the intended purpose in accordance with the manufacturers instructions.

Revise as follows:

ALARM NOTIFICATION APPLIANCE. A fire alarm system component such as a bell, horn, speaker, call point, light or text display that provides audible, tactile or visible outputs, or any combination thereof. See also “Audible alarm notification appliance” or “Visible alarm notification appliance.”

ALARM VERIFICATION FEATURE. A feature of automatic fire detection, temporary electronic system and alarm systems to reduce unwanted alarms wherein smoke detectors report alarm conditions for a minimum period of time, or confirm alarm conditions within a given time period, after being automatically reset, in order to be accepted as a valid alarm-initiation signal.

AUTOMATIC SMOKE DETECTION SYSTEM. A fire alarm system or temporary electronic system that has initiation devices that utilize smoke detectors for protection of an area such as a room or space with detectors to provide early warning of fire.

BATTERY TYPES. For the purposes of this code, certain types are defined as follows:

Flow battery A type of storage battery that includes chemical components dissolved in two different liquids. Ion exchange, which provides the flow of electrical current, occurs through the membrane while both liquids circulate in their respective spaces.

Lead-acid battery A storage battery that is comprised of lead electrodes immersed in a solution of water and sulphuric acid electrolyte.

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 graphite anode.

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 form. Lithiated metal oxide is typically a cathode and forms of carbon or graphite typically form the anode.

Nickel-cadmium (Ni-Cd) battery An alkaline storage battery in which the positive active material is nickel oxide, the negative electrode contains cadmium and the electrolyte is a solution of water and potassium hydroxide.

Nickel-metal hydride (Ni-MH) An alkaline storage battery in which the positive active material is nickel oxide, the negative electrode is an intermetallic compound and the electrolyte is usually potassium hydroxide.

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.

Alkaline batteries Usually disposable (primary cells) premium general purpose battery. In an alkaline cell the electrical energy is essentially derived from the reaction of a metal with oxygen. The electrodes are zinc and manganese dioxide and the electrolyte is potassium hydroxide.

Add new definition as follows:

CALL POINT. A device or mechanism that when activated allows a site wide alarm to be raised from any unit on a construction site used to initiate an evacuation alarm signal or other emergency alert functions.

Revise as follows:

FIRE PROTECTION SYSTEM. *Approved devices, equipment, temporary electronic system, and systems or combinations of systems used to detect a fire, activate an alarm, extinguish or control a fire, control or manage smoke and products of a fire or any combination thereof.*

Add new definition as follows:

TEMPORARY CONSTRUCTION DUST PROOF SMOKE SENSOR. A temporary device used to sense visible or invisible particles of combustion that can differentiate from construction dust.

TEMPORARY ELECTRONIC SYSTEMS. A temporary system comprised of electronic units to provide indication and warning of emergency situations.

WIRELESS ALARM SYSTEM CONTROL UNIT. A system component of a temporary electronic system that receives inputs from automatic, manual fire alarm or alarm system devices and may be capable of supplying power to off-premises transmitter(s). The control unit has an independent power source for a length acceptable to the local fire authority. Failure of the control unit shall not inhibit the function of the alarm system alerting where means of notification are used for alerting of an emergency situation with the system.

Add new standard(s) as follows:

NFPA

National Fire Protection Association
1 Batterymarch Park
Quincy MA 02169-7471

1620-2020: Standard for Pre-Incident Planning

Staff Analysis: A review of the standard proposed for inclusion in the code, NFPA 1620-2020, Standard for Pre-incident Planning, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

Reason Statement: Based on reporting from the NFPA 241 Technical Committee report from Feb. 2020, the US Average Annual Fire responses number from 3,750 due to new construction, 2650 from alterations and 2,130 from demolition. That combines to 8,530 total per year. These fires cost well over \$300 million per occurrence and injure around 130 humans. In the year 2020, there were 89 major incidents with 42 fatalities and 24 injuries.

Currently, Chapter 33 of the IFC/IBC outlines "general" fire safety precautions for all structures and all occupancies during construction and demolition operations. In general, these requirements seek to maintain required levels of fire protection, limit fire spread, establish the appropriate operation of equipment and promote prompt response to fire emergencies. Unfortunately, because there have been adaptations to new technology with long code cycles, the model code was not able to be proposed for amendment until now to create the allowance and definitions for use and approval by the local authorities having jurisdiction. With the proliferation of light weight timber in construction, the ability to provide more specific detection capabilities for earlier notification of a fire incident, the need for sensors and technology that is temporary in nature and made for the construction environment is critical to help aide in the quickest response possible by first responders.

These changes and adds will provide means to send new technology to 3rd party nationally recognized laboratories for review and approvals because it gives the basis for design and deployment of these temporary systems.

Bibliography: ICC Roundtable LINK - <http://dig.abcclocal.go.com/wtvd/docs/ICC-roundtable.pdf>

NFPA codes & standards Many large and costly fires involving buildings under construction underscore the need for more widespread use of NFPA 241, Standard for Safeguarding Construction, Alteration and Demolition Operations, to address a range of related hazards.

- NFPA Research Foundation – Fires in Vacant Buildings <https://www.nfpa.org/-/media/Files/News-and-Research/Fire-statistics-and-reports/Building-and-life-safety/osvacantbuildings.pdf>
- NFPA 241 Bulletin - <https://www.nfpa.org/-/media/A5E51A61F35A4BC79A3E1456F289BFF1.pdf>
- NFPA 241 Fact Sheet 72420
- <https://www.nfpa.org/-/media/Files/Code%20or%20topic%20fact%20sheets/NFPA%20241%20fact%20sheet%2072420.pdf>

- NFPA Fires in Structures Under Construction or Renovations. <https://www.nfpa.org/News-and-Research/Data-research-and-tools/Building-and-Life-Safety/Fires-in-Structures-Under-Construction-or-Renovation>

From NFPA Journal®

- Massive fires in buildings under construction have public safety and fire service officials alarmed. What can be done to prevent these destructive blazes? Read "Danger: Construction" from the September/October 2017 issue of NFPA Journal.
- The arson issue: take steps to protect buildings under construction against arson. Read '24/7 If Necessary' from the September/October 2017 issues of NFPA Journal.
- Read the May/June 2017 NFPA Journal feature, "Hot Work, Safe Work," on the lessons learned from the U.S. Chemical Safety and Hazard Investigation Board's review of hot work incidents.
- The March/April 2017 NFPA Journal article, "Burned Again," reported on fires in properties being built by AvalonBay in New Jersey.

A few media posts:

<https://www.kron4.com/news/santa-clara-condo-construction-fire-classified-as-undetermined-investigation-complete/><https://www.sfchronicle.com/bayarea/article/Massive-fire-breaks-out-at-construction-site-in-14059190.php>

<https://certifiedsitesafety.com/what-to-know-fire-prevention-program-manager/><https://www.osha.gov/laws-regs/regulations/standardnumber/1926/1926.150>

<https://www.chron.com/news/houston-texas/houston/article/Fire-official-speculates-on-cause-of-Montrose-5347617.php>

<https://www.nydailynews.com/news/national/houston-construction-worker-recalls-horror-escape-licking-flames-article-1.1736137>

<https://www.sfchronicle.com/bayarea/article/Massive-fire-breaks-out-at-construction-site-in-14059190.php?psid=cX56u>

<https://www.denverpost.com/2018/05/14/denver-construction-site-fires/>

<https://www.enr.com/articles/44497-builders-seek-new-defenses-against-construction-fires><https://www.enr.com/articles/46190-multifamily-builder-launches-fire-elimination-strategy-for-wood-frames><https://www.nbcbayarea.com/news/local/fire-under-construction-apartment-complex-oakland/168422/>

<https://www.sfchronicle.com/bayarea/article/East-Bay-housing-development-fire-marks-fifth-13329636.php>

<https://www.9news.com/article/news/local/body-found-in-debris-of-massive-construction-fire-near-downtown-denver/73-526642133>

https://tucson.com/news/local/photos-huge-fire-destroys-tucson-student-housing-project/collection_4644a2e6-73d4-11e8-80fb-9b4fed6fd727.html#1

<https://www.nbcnewyork.com/news/local/massive-fire-reported-in-somerset-county-nj/2258665/>

<https://www.firstcoastnews.com/article/news/local/construction-company-issues-statement-following-massive-3-alarm-fire-at-baymeadows-apartment-building/77-03070081-46f6-4b62-99b2-b80861da48dd>

<https://www.nbcboston.com/news/local/construction-site-fire-covers-seaport-in-thick-black-smoke/2060747/>

<https://www.actionnewsjax.com/news/local/duval-county/video-massive-fire-engulfs-building-off-baymeadows/6XTR4QKRURGBZCLKUUINDNA4NY/>

<https://www.nbcwashington.com/news/local/2-alarm-fire-in-alexandria-closes-route-1-firefighters-say/2212859/>

<https://mynews4.com/news/local/crews-battle-large-apartment-fire-in-south-reno-residents-evacuated>

<https://constructionfiresafety.org/fire-service-resources>

<https://www.osha.gov/news/newsreleases/region2/02192008-0>

<https://www.thedenverchannel.com/news/local-news/at-least-4-buildings-under-construction-engulfed-in-flames-near-c-470-in-douglas-county>

Cost Impact: The code change proposal will decrease the cost of construction

At \$300 Million per occurrence for fire and \$50 million on average for water damage due to water and flooding, the need for construction site temporary systems will be but a fraction of the costs of the builders risk premiums for contractors. Contractors will be able to negotiate their insurance rates with underwriters and reduce their costs overall.

F173-21

F174-21

IFC: 3303.5

Proponents: David Tyree, representing AWC (dtyree@awc.org); Raymond O'Brocki, AWC, representing AWC (robrocki@awc.org)

2021 International Fire Code

Revise as follows:

3303.5 Fire safety requirements for buildings of Types IV-A, IV-B and IV-C construction. Buildings of Types IV-A, IV-B and IV-C construction designed to be greater than six stories above *grade plane* shall comply with the following requirements during construction unless otherwise approved by the *fire code official*.

1. Standpipes shall be provided in accordance with Section 3313.
2. A water supply for fire department operations, as *approved by the fire code official and the fire chief*.
3. Where building construction exceeds six stories above *grade plane* and noncombustible protection is required by Section 602.4 of the *International Building Code*, at least one layer of noncombustible protection shall be installed on all building elements on floor levels, including mezzanines, more than four levels below active mass timber construction before additional floor levels can be erected.

Exception- Exceptions:

1. Shafts and vertical exit enclosures shall not be considered part of the active mass timber construction.
2. Noncombustible material on the top of mass timber floor assemblies shall not be required before erecting additional floor levels.
4. Where building construction exceeds six stories above *grade plane*, required exterior wall coverings shall be installed on floor levels, including mezzanines, more than four levels below active mass timber construction before additional floor levels can be erected.

Exception: Shafts and vertical exit enclosures shall not be considered part of the active mass timber construction.

Reason Statement: Applying at least one layer of the required noncombustible protection to mass timber walls and ceilings as construction progresses in height is an important component of fire safety during construction. This code requirement was informed by the experience at Brock Commons, the 18-story tall mass timber building in Vancouver, British Columbia. Less critical, and more problematic for builders, is applying the noncombustible topping on CLT floors during construction. The fire service in Vancouver did not require the CLT floors to be covered with gypcrete as the building progressed in height. They believed that it would add little fire protection and that the protection of the walls and ceilings were much more critical to the fire safety of the building than the floors.

The requirement to place the noncombustible protection over the mass timber floor panels per IFC 3303.5 before construction proceeds more than four stories above is impracticable. Enacting the 4-story trigger creates undue hardships and constructability nightmares. Some projects are looking to place up to 2" of non-structural topping on the floor panels and placing conduit within the topping to run "under the finished floor" but above the exposed mass timber underside. To place conduit in this area while the mass timber superstructure is going vertical creates many challenges. The weight of loaded drywall carts needed later in construction to finish out the required protection for other surfaces may cause damage to the conduit and gypcrete. In addition, gypcrete does not wear well in inclement weather. In most, if not all cases, the building will not be watertight as the building goes higher while placing gypcrete underneath. Damaged gypcrete affects sound ratings and could cause adhesion problems for flooring above the cracked gypcrete. Perhaps most important, requiring the gypcrete topping to be installed earlier than the normal construction sequencing calls for effectively requiring the metal stud framing, drywalling, and mechanicals/electrical/plumbing rough-ins to be completed before the gypcrete can be permanently installed. This significantly affects the critical path of construction scheduling and greatly diminishes normal scheduling savings.

The 4-story trigger for floor protection creates significant additional costs by adversely affecting the speed of construction. Compared to the obvious safety benefits of protecting walls and ceilings during construction, the benefits of protecting floors is much less critical. Therefore, the inordinate difficulty and cost associated with the current requirement justifies this proposed exception.

Cost Impact: The code change proposal will decrease the cost of construction

This proposal will reduce the construction cost by increased efficiencies and reduced construction times.

F174-21

F175-21

IFC: (New), SECTION 202, CHAPTER 38, 3801.1, 3802.1, 3804.1.1.6, 5003.8.3; IBC: (New), SECTION 202, [F] 307.1.1, [F] 414.2, SECTION 428, [F] 428.1

Proponents: Jeff O'Neill, representing American Society of Health Care Engineers (ASHE) (jeff.oneill@uphs.upenn.edu); Andrew W.J. Kollar, Self / Fused Studios P.C., representing Self (akollar@fusedstudios.org); Wayne Jewell, Green Oak Charter Township, representing Self (wayne.jewell@greenoaktwp.com)

2021 International Fire Code

Add new definition as follows:

HEALTH CARE LABORATORY. Laboratories used for to support the health care facilities through testing, analysis, research or developmental activities on a nonproduction basis including diagnostic, clinical and hospital laboratories.

HIGHER EDUCATION LABORATORY. Laboratories in Group B occupancies used for educational purposes above the 12th grade. 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.

Revise as follows:

LABORATORY SUITE. A fire-rated enclosed laboratory area that will provide one or more laboratory spaces, within a ~~Group B educational occupancy~~ higher education or health care laboratory, 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 Chapter 38.

CHAPTER 38 HIGHER EDUCATION AND HEALTH CARE LABORATORIES

3801.1 Scope. *Higher education and health care laboratories* 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 Building Code*.

3802.1 Definitions. The following terms are defined in Chapter 2:

CHEMICAL FUME HOOD.

GLOVE BOX.

HEALTH CARE LABORATORY.

HIGHER EDUCATION LABORATORY.

LABORATORY SUITE.

SPECIAL EXPERT.

3804.1.1.6 Standby or emergency power. *Higher education and health care laboratory suites* shall be provided with emergency or standby power in accordance with Section 1203.2.14.

5003.8.3 Control areas. *Control areas* shall comply with Sections 5003.8.3.1 through 5003.8.3.5.3.

Exception: *Higher education and health care laboratories* in accordance with Chapter 38 of this code and Section 428 of the International Building Code.

2021 International Building Code

Add new definition as follows:

HEALTH CARE LABORATORY. Laboratories used for to support the health care facilities through testing, analysis, research or developmental activities on a nonproduction basis including diagnostic, clinical and hospital laboratories.

Revise as follows:

[F] HIGHER EDUCATION LABORATORY. Laboratories in Group B occupancies used for educational purposes above the 12th grade. 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] LABORATORY SUITE. A fire-rated, enclosed laboratory area providing one or more laboratory spaces within a a higher education laboratory or a health care laboratory ~~Group B educational occupancy~~ that includes ancillary uses such as offices, bathrooms and corridors that are contiguous with the laboratory area, and are constructed in accordance with Section 428.

[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).
6. Liquor stores and distributors without bulk storage.
7. Refrigeration systems.
8. The storage or utilization of materials for agricultural purposes on the premises.
9. Stationary storage battery systems installed in accordance with the *International 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 product* storage, aerosol cooking spray products or plastic aerosol 3 products 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. Stationary fuel cell power systems installed in accordance with the *International Fire Code*.
16. Capacitor energy storage systems in accordance with the *International Fire Code*.
17. ~~Group B higher~~ Higher education and health care laboratories ~~laboratory occupancies~~ complying with Section 428 and Chapter 38 of the *International Fire Code*.
18. Distilling or brewing of beverages conforming to the requirements of the *International Fire Code*.
19. The storage of beer, distilled spirits and wines in barrels and casks conforming to the requirements of the *International Fire Code*.

[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 and health care laboratories in accordance with Section 428 and Chapter 38 of the *International Fire Code*.

SECTION 428 HIGHER EDUCATION AND HEALTH CARE LABORATORIES.

[F] 428.1 Scope. Higher education and health care laboratories complying with the requirements of Sections 428.1 through 428.4 shall be permitted to exceed the maximum allowable quantities of *hazardous materials* in *control areas* set forth in Tables 307.1(1) and 307.1(2) without requiring classification as a Group H occupancy. Except as specified in Section 428, such laboratories shall comply with all applicable provisions of this code and the *International Fire Code*.

Staff Analysis: This proposal addresses requirements in a different or contradicting manner to those found in Code Change 7075. The committee is urged to make their intentions clear with their actions on these proposals.

Reason Statement: First, we wish to acknowledge the efforts put forth by the Fire Code Action Committee (FCAC) and the people who worked to put together the original code change that introduced “higher education laboratories” in F340-16. That effect successfully put in place much needed regulations to address the use of hazardous materials in what are highly monitored conditions without production – laboratories in higher education institutions, by providing enhanced safety requirements.

But as was the situation prior to the approval of F340-16 and the introduction of regulations for higher education laboratories in what is now Chapter 38 in the IFC and Section 428 in the IBC, the I-Codes still do not do not specifically provide or address how to regulate those laboratories that by all

accounts operate the same as a “higher education laboratory” but cannot be classified as a “higher education laboratories” because they are not used for educational purposes above the 12th grade.” Because of this, users must try to apply general hazardous materials provisions, which oftentimes are not appropriate for clinical, diagnostic or research laboratory settings.

After being in the 2018 and 2021 codes, users have had a chance to really review and come to understand the provisions that are found in Chapter 38 of the IFC and Section 428 in the IBC. And although we do not disagree with any of the logic that the FCAC gave in the Reason statement for F340-16 for the key parameters that must be present, we do not see any technical reasons for why those provisions are should be limited to only higher education laboratories. This code change seeks to expand the application of the provisions in Chapter 38 of the IFC and Section 428 in the IBC to not just higher education laboratories but to any clinical, diagnostic or research laboratory that meets the criteria contained in those sections – what we are proposing be categorized as “health care laboratories

As was stated in the Reason statement to F340-16 “The advance of technologies, science, medicine and our knowledge of the world often relies on having vibrant and successful academic institutions.” But the laboratory settings in which those advances occur are NOT limited to only those that come out of an academic institutions (high-learning institution) – they come out of laboratories found in the private sector and the nationally-funded sectors also. The perfect example is the research that is happening right now with the race to solve the COVID-19 crisis. Most of the work involved is coming out of laboratories in that are not in a higher education sector.

In their Reason statement for F340-15 the FCAC put forth what they saw as the “conditions typically present in academic laboratories that make them unique,” but which when looked at on their own merits are conditions or characteristics also found in non-academic, non-production laboratories in other occupancies including hospitals, clinical, research and diagnostic areas. The FCAC included:

1. Lower chemical density in individual research laboratories.

“...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.”

1. Ongoing staff oversight from “Special Experts” in laboratory safety.

“...”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.”

1. Mixed-use occupancies.

“...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.”

All of these are valid conditions and important principles to use when deciding which the types of laboratories should be allowed to use the provisions in IFC Chapter 38 and IBC Section 428. But these conditions and logic are not limited to only those laboratories found in higher education institutions – rather a laboratory found in an institution of higher learner is only one of many types of laboratories that meets the conditions and principles. When each of the “conditions” is reviewed it really becomes obvious that they are not unique to academic (higher education) laboratories.

This proposal is based on the fundamental concept that it should not be the laboratory “setting” which drives the scope of IFC Chapter 38 (IBC Section 428), i.e., higher education vs private clinical, but rather it should be the characteristics and design of the laboratory. The same philosophy the I-Codes uses to engage the requirements for the hazardous materials provisions in general should be used to engage the requirements for use of IFC Chapter 38. The distribution and density of materials, the physical constraints and the qualification of on-site personal are all “conditions” that are also found in non-academic laboratories which do not support production or processing.

Many non-academic laboratories (think diagnostic and clinical) are designed in the same way higher learning laboratories are, and are made up of [to quote F340-16] “...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.” If so, then it is logical that they should be able to use the provisions in IFC Chapter 38?

Regarding the topic of “oversight” from special experts, the logic FCAC present is not unique to higher education laboratories. It is also very true for most non-academic laboratories (such as hospitals and testing organizations) because they are mandated through state and federal agencies.

Regarding the topic of “mixed occupancy,” while most post-secondary academic laboratory do occur in what are deemed to be “mixed occupancy,” so are most non-academic laboratories. A perfect example is that of a hospital – while the primary occupancy is Group I-2, almost every hospital

also contains other occupancies such as storage/utility areas, kitchens, dining facilities, office space, and clinical laboratories.

The one condition FCAC included in their Reason statement that when closely examined was a double-edged sword was:

1. 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 newer research processes.

While a limited funding stream is portrayed as a justification for implementing new regulations for laboratories associated with academic institutions, a good funding stream is actually a benefit because it allows a non-academic laboratory to be equipped with the newest equipment – both for laboratory experiments and for the protection of the occupants. Logic says that because of good funding non-academic laboratories may operate in a safer environment.

We also assert that there is a fifth condition that was present in the development of the code language in F340-16, and should be acknowledged, one that is fundamental:

1. The activities in a laboratory are not part of a production process, nor in any way simulate a production process.

Without the code change contained herein, jurisdictions will still have to do the same thing for non-academic laboratories as they have been – making state or local amendments to allow for greater numbers of control areas and larger percentages of MAQs in non-production laboratories. Code Change F340-16 brought higher education laboratories into the codes and provides the AHJ with rules but there still are no unique rules for non-academic laboratories. This proposal seeks to build on the work the FCAC did in F340-16 and provide standardized model code language to address this topic for both academic (higher education) and non-academic laboratories.

To allow non-academic laboratories to use these regulations the following revisions are proposed:

- Replace the definition of "higher learning laboratories" with "non-production laboratories;"
- Revise IFC Chapter 38 to use the new designation of "non-production laboratories"
- Revise IBC Section 428 to use the new designation of "non-production laboratories"
- Coordinate the various sections in the IFC and IBC to use the new designation of "non-production laboratories"

For those interested in the history of this topic and Code change F340-16, please visit the ICC Code Development Archives at <https://www.iccsafe.org/products-and-services/i-codes/code-development/2015-2017-code-development-cycle/>

Cost Impact: The code change proposal will decrease the cost of construction

By complying with the provisions in IFC Chapter 39 small non-academic, non-production laboratories will be classified as a Group B occupancies rather than a Group H occupancy. However, many of the non-production labs that this change would cover would seek variances to be in B-occupancies, thus avoiding the impacts of being classified as H-occupancies. Therefore, savings are in reality very slight for those areas (ie: hospital labs, commercial diagnostic labs such as Qwest or LabCorp).

F176-21

IFC: Chapter 38

Proponents: Elley Klausbruckner, Klausbruckner & Associates, Inc., representing Klausbruckner & Associates, Inc.

2021 International Fire Code

Delete without substitution:

CHAPTER 38 HIGHER EDUCATION LABORATORIES

SECTION 3801 GENERAL.

Revise as follows:

3801.1 Scope. Higher education laboratories 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 Building Code*.

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 the provisions in Chapters 50 through 67 and the *International Building Code* for quantities not exceeding the maximum allowable quantity.

Delete without substitution:

SECTION 3802 DEFINITIONS.

Revise as follows:

3802.1 Definitions. The following terms are defined in Chapter 2:

CHEMICAL FUME HOOD.

GLOVE BOX.

HIGHER EDUCATION LABORATORY.

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 8.3.4.4.1.

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 Automatic fire-extinguishing systems. New laboratories in new or existing buildings that increase maximum allowable quantities of hazardous materials based on 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 (20 L) for liquids, 50 pounds (22.7 kg) for solids, 100 cubic feet (2.83 m³) for *health hazard* gases per Table 5003.1.1(2) and 500 cubic feet (14.15 m³) for all other gases in accordance with Table 5003.1.1(1).

Exception: Hazardous waste collection containers, for other than Class I *flammable liquids* and Class II *combustible liquids*, are permitted to exceed 5.3 gallons (20 L) where *approved*.

3803.2.2 Density. Quantities of Class I *flammable liquids* in storage and use shall not exceed 8 gallons (30 L) per 100 square feet (9.29 m²) of floor area. Densities shall be reduced by 25 percent on the 4th through 6th floors of the building, and by 50 percent 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 428 of the International Building Code.

3804.1.1 Laboratory suites. The number of *laboratory suites* and percentage of maximum allowable quantities of hazardous materials in *laboratory suites* shall be in accordance with Table 3804.1.1.

**TABLE 3804.1.1
DESIGN AND NUMBER OF LABORATORY SUITES PER FLOOR**

FLOOR LEVEL		PERCENTAGE OF THE MAXIMUM ALLOWABLE QUANTITY PER LAB SUITE ^a	NUMBER OF LAB SUITES PER FLOOR	FIRE-RESISTANCE RATING FOR FIRE BARRIERS IN HOURS ^b
Above grade plane	21+	Not Allowed	Not Allowed	Not Allowed
	16-20	25	1	2 ^c
	11-15	50	1	2 ^c
	7-10	50	2	2 ^c
	4-6	75	4	1
	3	100	4	1
	1-2	100	6	1
Below grade plane	1	75	4	1
	2	50	2	1
	Lower than 2	Not Allowed	Not Allowed	Not Allowed

- a. Percentages shall be of the maximum allowable quantity per control area shown in Table 5003.1.1(1) and Table 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.
- c. Vertical fire barriers separating laboratory suites from other spaces on the same floor are permitted to be 1-hour rated.

3804.1.1.1 Separation from other nonlaboratory areas. *Laboratory suites* shall be separated from other portions of the building in accordance with the most restrictive of the following:

1. *Fire barriers* and *horizontal assemblies* as required in Table 3804.1.1. *Fire barriers* shall be constructed in accordance with Section 707 of the International Building Code and *horizontal assemblies* shall be 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*.

2. Separations as required in Section 508 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 *laboratory suites* and the construction supporting the floor of *laboratory suites* shall have a *fire-resistance rating* of not less than 2 hours.

Exception: The floor assembly of *laboratory suites* and the construction supporting the floor of *laboratory suites* are permitted to be 1-hour fire-resistance rated in buildings of Types IIA, IIIA and VA construction, provided that the building is three 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. Higher education *laboratory suites* shall be provided with emergency or standby power in accordance with Section 1203.2.14.

3804.1.1.7 Ventilation. Ventilation shall be in accordance with the *International Mechanical Code* and Chapter 7 of NFPA 45.

3804.1.1.8 Liquid-tight floor. Portions of *laboratory suites* where hazardous materials are present shall be provided with a liquid-tight floor.

3804.1.1.9 Automatic fire-extinguishing systems. Buildings containing *laboratory suites* 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 of hazardous materials in each *laboratory suite* shall be in accordance with Table 3804.1.1.

Delete without substitution:

SECTION 3805 NONSPRINKLERED LABORATORIES.

Revise as follows:

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, Chapters 50 through 67, as applicable, and Sections 3805.2 through 3805.4.

3805.2 Nonsprinklered 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), Table 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. Where *approved by the fire code official*, storage of the following hazardous materials prohibited by Table 5003.1.1(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 *control area* at 25 percent of Table 5003.1.1(1) limits for a building equipped throughout with an *automatic sprinkler system*:

1. Glass 4 oxidizers.
2. Pyrophorics.

The percentage of the *maximum allowable quantity per control area* shown in Table 3805.4 shall be applied to 25 percent of Table 5003.1.1(1) limits for Class 4 oxidizers or pyrophoric materials.

Additional quantity increases shall be prohibited, and such materials shall be stored in accordance with all of the following:

1. Containers shall be completely sealed and stored in accordance with the manufacturers' recommendations.
2. Storage shall be within *approved* hazardous material 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. Where *approved by the fire code official*, use of the following hazardous materials prohibited by Table 5003.1.1(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 *control area* at 25 percent of Table 5003.1.1(1) limits for buildings equipped throughout with an *automatic sprinkler system*:

1. Glass 4 oxidizers.
2. Pyrophorics.

The percentage of the *maximum allowable quantity per control area* shown in Table 3805.4 shall be applied to 25 percent of Table 5003.1.1(1) limits for Class 4 oxidizers or pyrophoric materials.

Additional quantity increases shall be prohibited, and such materials shall be stored in accordance with all of the following:

1. Use shall be within an *approved* chemical fume hood *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 not less than 2 feet (610 mm) 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 (6096 mm) 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 nonsprinklered 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* of hazardous materials shall comply with Table 3805.4.

TABLE 3805.4
DESIGN AND NUMBER OF CONTROL AREAS IN EXISTING NONSPRINKLERED LABORATORIES

FLOOR LEVEL		PERCENTAGE OF THE MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA ^{a,e}	NUMBER OF CONTROL AREAS PER FLOOR	FIRE-RESISTANCE RATING FOR FIRE BARRIERS IN HOURS ^{b,c,d}
Above grade plane	Higher than 9	5	1	2 ^e
	7-9	10	2	2 ^e
	4-6	25	22	2 ^e
	3	75	4	1
	1-2	100		1
Below grade plane	1	100	3	1
	2	75	2	1
	Lower than 2	Not Allowed	Not Allowed	Not Allowed

- Percentages shall be of the maximum allowable quantity per control area shown in Table 5003.1.1(1) and Table 5003.1.1(2), excluding all increases allowed in the footnotes to those tables.
- Fire barriers shall include walls, floors and ceilings necessary to provide separation from other portions of the building.
- Vertical fire barriers separating control areas from other spaces on the same floor are permitted to be 1-hour fire resistance rated.
- See Section 414.2.4 of the International Building Code for additional requirements.
- The percentage of the maximum allowable quantity per control area shown in Table 3805.4 shall be applied to 25 percent of Table 5003.1.1(1) limits for Class 4 oxidizers or pyrophoric materials.

Delete without substitution:

SECTION 3806 EXISTING SPRINKLERED LABORATORIES.

Revise as follows:

3806.1 Scope. Storage and use of hazardous materials in existing laboratories within 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 through 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 laboratories equipped with an *automatic sprinkler system* shall be in accordance with this section and Chapters 50 through 67, as applicable.

Exception: Existing laboratories in buildings equipped throughout with an *automatic sprinkler system* meeting the requirements for *laboratory suites* are permitted to comply with Section 3804.

3806.2.1 Percentage of maximum allowable quantities per control area. The percentage of *maximum allowable quantities per control area* of hazardous materials shall be in accordance with Table 3806.2.1.

**TABLE 3806.2-1
DESIGN AND NUMBER OF CONTROL AREAS IN EXISTING SPRINKLERED LABORATORIES**

FLOOR LEVEL		PERCENTAGE OF THE MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA ^a	NUMBER OF CONTROL AREAS PER FLOOR	FIRE-RESISTANCE RATING FOR FIRE BARRIERS IN HOURS ^{b, d}
Above grade plane	21+	5	1	2 ^c
	11-20	10	1	2 ^c
	7-10	25	2	2 ^c
	4-6	50	2	2 ^c
	3	75	3	1
	1-2	100	4	1
Below grade plane	1	100	3	1
	2	75	2	1
	Lower than 2	Not Allowed	Not Allowed	Not Allowed

- a. Percentages shall be of the maximum allowable quantity per control area shown in Table 5003.1.1(1) and Table 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.
- c. Vertical fire barriers separating control areas from other spaces on the same floor are permitted to be 1-hour fire-resistance rated.
- d. See Section 414.2.4 of the International Building Code for additional requirements.

CHEMICAL FUME HOOD. A ventilated enclosure designed to contain and exhaust fumes, gases, vapors, mists and particulate matter generated within the hood.

GLOVE BOX. A sealed enclosure in which items inside the box are handled exclusively using long gloves sealed to ports in the enclosure.

HIGHER EDUCATION LABORATORY. Laboratories in Group B occupancies used for educational purposes above the 12th grade. 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.

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 Chapter 38.

[A] SPECIAL EXPERT. An individual who has demonstrated qualifications in a specific area, outside the practice of architecture or engineering, through education, training and experience.

Staff Analysis: This proposal addresses requirements in a different or contradicting manner to those found in Code Change 6362. The committee is urged to make their intentions clear with their actions on these proposals.

Reason Statement: Since the adoption of the codes, we have realized that there are many issues associated to providing an exception for higher education lab:

1. The idea that higher education labs are safer than other types of labs is in this proponent's opinion a mistake. Based on our experience in providing hazardous materials code compliance services, there are universities that are extremely well maintained with a great system of tracking hazardous materials while there are other universities where students are given "carte blanche" on how they store and use chemicals without any system of tracking quantities.
2. The storage and use of smaller containers has been given as the reason for allowing higher quantities. While that is the case for university labs, it's also the case for ANY lab. Why are higher education labs being treated differently than other labs?
3. The only fatality incident in a lab that we are aware of occurred at UCLA in 2008. While increasing flammable/combustible liquids might an option for higher education labs (since the majority of the issues in upper floors are related to flammable/combustible liquids), increasing other chemicals such as pyrophorics may have may have consequences. The fatality at UCLA was from an incident involving pyrophorics.
4. Contamination from fire fighting water (i.e. fire hose discharge) spilling to lower levels in labs located in high rise can create additional liability for fire departments.

Cost Impact: The code change proposal will increase the cost of construction
The cost of construction for higher education labs will increase as a result of this code change.

F177-21

IFC: 105.5.39 (New), CHAPTER 39, 3901.1, 3901.4 (New), 3901.5 (New), UL Chapter 80 (New)

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Fire Code

Add new text as follows:

105.5.39 Indoor plant cultivation. An operational permit is required for plant cultivation where a carbon monoxide (CO₂) enriched environment is created.

Revise as follows:

CHAPTER 39 PLANT PROCESSING AND EXTRACTION FACILITIES

3901.1 Scope. Facilities where

Plant plant processing ; including cultivation and other related activities; or where either pre-extraction or post-extraction are conducted 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, 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*.

Exception: Greenhouses in compliance with Section 3112 of the International Building Code not utilizing carbon dioxide enrichment.

Add new text as follows:

3901.4 Lighting. Where used, horticultural lights or lighting systems shall be listed and labeled in accordance with UL 8800, and installed in accordance with the listing, the manufacturer's installation instructions, and NFPA 70.

3901.5 Carbon Dioxide Generation. Carbon dioxide enriched atmospheres generated using methods to create carbon dioxide as a by-product shall meet the requirements of Section 5307.4.1 through 5307.4.7.

Add new standard(s) as follows:

UL

Underwriters Laboratories LLC
333 Pfingsten Road
Northbrook IL 60062

ANSI/CAN/UL 8800-2019:

Standard for Horticultural Lighting Equipment And Systems

Staff Analysis: A review of the standard proposed for inclusion in the code, ANSI/CAN/UL 8800-2019: Standard for Horticultural Lighting Equipment And Systems, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

Reason Statement: The proposed scope changes provide additional clarification that the Chapter applies to the full breadth of plant processing intended for the acquisition of oils. This added scope content serves to include provisions for cultivation, as well as more broadly capturing the processing steps identified as "post-extraction." The post-extraction operations are generally laboratory-scale operations; however, they pose hazards through the use of flammable gases and flammable liquids to refine, purify, or distill the oil and resulting products. Each of these processes has risks and hazards associated with them, such as the use of electrical equipment, use of properly *listed* equipment, hazardous materials management, etc.

Cultivation processes include associated hazards such as carbon dioxide generation and lighting issues. Whereas these provisions are also addressed elsewhere in the Code, the hazards warrant more specific 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 and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: <https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/>

Cost Impact: The code change proposal will not increase or decrease the cost of construction

The proposed changes are considered clarification that this chapter and other sections of the International Fire Code are to be considered applicable to each phase of processing or extraction when hazardous materials are used or a hazardous condition may be created as a normal part

of the process.

F177-21

F178-21

IFC: 3901.2

Proponents: Emma Gonzalez-Laders, representing NYS DOS Division of Building Standards and Codes (emma.gonzalez-laders@dos.ny.gov); Daniel Carroll, NYS DOS Division of Building Standards and Codes, representing NYS DOS Division of Building Standards and Codes (daniel.carroll@dos.ny.gov)

2021 International Fire Code

Revise as follows:

3901.2 Existing buildings or facilities. Existing buildings or facilities used for the processing and extraction of plants ~~oils using solvents~~ shall comply with this chapter. Existing extraction processes where the medium of extraction ~~or solvent~~ is changed to include the use of solvents shall comply with this chapter.

Reason Statement: The first sentence, as written, is too broad and could be misinterpreted to apply to any agricultural building where plants are processed or to all facilities where vegetable oils are extracted or processed. This is contrary to the intent of the provisions, as stated on the proponent's reason statement, to address the hazards associated with the handling of hazardous and explosive materials in light of the 2013 fire, explosion, and fatalities at cannabis extraction facilities in Bellevue and Spokane, WA.

We propose to add the words "... and extraction of [plants] oils using solvents," consistent with the scope statement of Section 3901.1, to better reflect the intent of the provision.

The second sentence, as written, could be construed to apply to any change of process such as when a mechanical means of extraction is changed to any other means or vice versa. According to the "2018 IFC Code and Commentary," the provisions of Chapter 39 are intended to address *"the use of materials such as flammable gases and flammable liquids to process and extract fats and oils from plants."* Therefore, as a matter of clarification, we propose to re-word the sentence to make it more clearly consistent with the intent and purpose of the provisions.

Bibliography: 2018 IFC Code and Commentary. International Code Council, Inc. First Printing: August 2018.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

This proposal does not eliminate any existing code provisions, nor does it create new provisions. Instead, it provides clarification consistent with the scope and intent of the provisions of the Chapter.

F178-21

F179-21

IFC: 3903.2

Proponents: Stephen Thomas, Colorado Code Consulting, a Shums Coda Assoc Company, representing Colorado Chapter ICC
(sthomas@coloradocode.net)

2021 International Fire Code

Revise as follows:

3903.2 Prohibited occupancies. Extraction processes utilizing flammable gases or flammable *cryogenic fluids* shall not be located in any building containing a Group A, E, I or R occupancy or structures designed and constructed in accordance with the International Residential Code.

Reason Statement: We believe that the original intent of this section was to prohibit extraction operations in one- and two family dwellings and townhouses in addition to the occupancies listed. However, buildings regulated by the IRC are not Group R occupancies. As currently written, the fire department cannot prohibit plant extraction in an one- or two family dwelling and townhouse. Therefore, we are proposing this clarifying language to include those types of dwelling units as well. This provision falls within the scope of Section 102.5, Item 2 in our opinion. This is where the biggest hazard exists regarding home based extraction operations. Therefore, it needs to be addressed in the fire code.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This language is intended to clarify the intent of the section.

F179-21

F180-21

IFC: 3905.3 (New), 3905.3.1 (New), 3905.3.2 (New), 3905.3.3 (New), 3905.3.4 (New)

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Fire Code

Add new text as follows:

3905.3 Ventilation. Continuous mechanical exhaust ventilation shall be provided in accordance with Section 3905.3.1 through 3905.3.4, and Chapter 4 of the *International Mechanical Code*.

3905.3.1 Extraction processes using flammable gases or combustible liquids. Continuous mechanical exhaust ventilation shall provide a minimum airflow rate of not less than 5 cfm/ft² (0.0038 m³/(s*m²)) of floor area to prevent an accumulation of flammable vapors from exceeding 25 percent of the lower explosive limit (LEL). Recirculation of such air is prohibited.

Exception: Where the registered design professional demonstrates that an engineered mechanical exhaust ventilation system design will prevent the maximum concentration of contaminants from exceeding 25% of the LEL, the minimum required rate of exhaust shall be reduced in accordance with such engineered system design.

3905.3.2 Extraction processes using compressed asphyxiant or inert gases. Continuous mechanical exhaust ventilation shall be provided in accordance with Section 5307.2. Recirculation of such air is prohibited.

3905.3.3 Post-extraction processes using flammable or combustible liquids or gases. Where flammable liquids, combustible liquids headed above their flashpoint, or flammable gases are used in post-extraction processing the room or area shall be provided with continuous mechanical exhaust in accordance with Section 5004.3.

3905.3.4 Interlocks. Electrical equipment and appliances used in processes that generate flammable vapors or gases shall be interlocked with ventilation fans so that the equipment cannot be operated unless the exhaust ventilation fans are in operation.

Reason Statement: This section is intended to codify the requirement specifically for mechanical exhaust ventilation, removing the option for natural ventilation. Much of this language is sourced from the International Mechanical Code, to ensure consistency. The guiding Section is IFC 5001.3.3.10, which requires that ventilation be present to prevent "...an emergency condition...." which can be interpreted to mean a flammable vapor concentration in excess of 25% of the LFL.

Typically, the prescriptive requirement for exhaust is codified for Group H Occupancies when dealing with flammable materials.

The language in proposed Section 3905.3.1 provides a prescriptive option for mechanical exhaust ventilation flow rates at 5 cfm/ft², with a second option for an engineered system that is proven to keep flammable constituents in air to below 25% of the LFL.

Dilution calculations and onsite testing with portable gas detection equipment have proven that the standard 1 cfm/ft² exhaust flow rate is often insufficient to capture and contain flammable vapors in an extraction booth or extraction room due to the use-open portion of the extraction process itself. In many applications, exhaust rates up to and exceeding 4 cfm/ft are necessary to ensure proper capture and containment as required in the IMC.

Minimum exhaust rates are also established for the post-production or general laboratory areas, given the high potential for errant flammable vapors to be present and to accumulate in an area with unclassified electrical equipment. Numerous incidents in the industry have resulted from post-production operations, generally occurring with the use of ethanol.

The requirement for interlocks between exhaust fans and electrical equipment in spaces served by the exhaust fan, is a direct requirement from IMC Section 503.1.

Many of the extraction rooms or booths that are pre-manufactured, have been sourced from the paint spray booth industry, and the prescriptive requirements from IMC Section 502.7 were incorporated during early stages of the legal cannabis extraction industry. Architects and engineers designing site-constructed rooms also have been using the spray booth protection measures in the design of extraction rooms. These measures have often proven to be inadequate in the cannabis extraction industry.

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 and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: <https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/>

Cost Impact: The code change proposal will increase the cost of construction

Currently the code does not provide guidance to specifically address the types of atmospheres that may be induced as part of processing or extraction. The cost of the ventilation design will be dependent upon the complexity of the system and the number of spaces served by the system.

F180-21

F181-21

IFC: 3903.4, UL Chapter 80 (New)

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Fire Code

Revise as follows:

3903.4 Processing using flammable solvents. ~~Post-process purification and winterization.~~ ~~Post-processing and winterization Processes~~ involving the heating or pressurizing of ~~the miscella~~ flammable solvents to other than normal pressure or temperature shall be *approved* and performed in an appliance or equipment listed in accordance with UL 1389 or UL 61010-1, and approved for such use with the solvent. Domestic or commercial cooking appliances shall not be used.

Add new standard(s) as follows:

UL

Underwriters Laboratories LLC
333 Pfingsten Road
Northbrook IL 60062

61010-1- 2012: Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use - Part 1: General Requirements

Staff Analysis: UL 1389-2019: Plant Oil Extraction Equipment for Installation and Use in Ordinary (Unclassified) Locations and Hazardous (Classified) Locations is already referenced in the IFC. This is simply a new occurrence of the reference in the I-Codes. A review of the standard proposed for inclusion in the code, UL 61010-1- 2012: Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use - Part 1: General Requirements, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

Reason Statement: Currently there is UL Standard 1389 that addresses extraction equipment and pre-fabricated extraction "booths" or rooms. Many facility designers and equipment selection consultants neglect to ensure that the extraction support equipment is also listed or otherwise approved (pumps, chillers, hot plates, magnetic stirrers, laboratory fume hoods, distillation equipment, etc.). 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 and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: <https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/>

Cost Impact: The code change proposal will not increase or decrease the cost of construction. Currently much of the equipment is listed to UL standards related to small quantity laboratory set-ups. The proposed revisions keeps the reference while adding the new UL listing for large operations. This proposal will not increase construction costs but will have a potential impact on equipment costs.

F181-21

F182-21

IFC: 3903.4.2 (New), UL Chapter 80 (New)

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Fire Code

Add new text as follows:

3903.4.2 Equipment for freezing or chilling flammable solvents or miscella. Where freezers, chillers, or other equipment is used to store or lower the temperature of flammable liquids, the equipment shall be listed for use with flammable liquids in accordance with either UL 471 or UL 60335-2-89, or shall be listed for use in hazardous locations in accordance with NFPA 70.

Add new standard(s) as follows:

UL

Underwriters Laboratories LLC
333 Pfingsten Road
Northbrook IL 60062

471-2010: Standard for Commercial Refrigerators and Freezers

60335-2-89 - 2017: Household and Similar Electrical Appliances - Safety - Part 2-89: Particular Requirements for Commercial Refrigerating Appliances with an Incorporated or Remote Refrigerant Unit or Compressor

Staff Analysis: UL 471-2010: Standard for Commercial Refrigerators and Freezers and UL 60335-2-89 - 2017: Household and Similar Electrical Appliances - Safety - Part 2-89: Particular Requirements for Commercial Refrigerating Appliances with an Incorporated or Remote Refrigerant Unit or Compressor are already referenced in the IMC. This is simply a new occurrence of the reference in the I-Codes.

Reason Statement: Much of the equipment used in post-extraction is not properly *listed for use* or provided with appropriate *approvals* in accordance with IFC Section 5003.2.3. Many manufacturers of common equipment such as fume hoods, rotary evaporators, reaction vessels, refrigerators and freezers, etc. have *listed* and *non-listed* options of equipment. Many facility designers and equipment selection consultants choose the *non-listed* equipment due to cost or select the wrong equipment altogether. This is a violation of IFC Section 5003.2.3. There is widespread storage of flammable liquids in freezers not specifically listed for such use. The language in this Proposed Change provides for prescriptive requirements that the equipment used to perform post-extraction processing is also appropriately *listed* or otherwise *approved* for use. 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 and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: <https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/>

Cost Impact: The code change proposal will not increase or decrease the cost of construction. The equipment being referenced by this proposal is typically not part of building construction but rather equipment installed after construction related to the operation of a business. While the additional listing might increase the future cost of equipment it does not impact building construction itself.

F182-21

F183-21

IFC: 3903.5

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Fire Code

Revise as follows:

3903.5 Use of flammable and combustible liquids. ~~Where the use of flammable and or combustible liquids solvents are used for liquid extraction processes, such processes where the liquid is boiled, distilled or evaporated shall be located within a chemical hazardous exhaust fume hood, listed or approved rated for exhausting flammable vapors. Electrical equipment used within the hazardous exhaust chemical fume hood or enclosure shall be listed rated for use in flammable atmospheres and installed in accordance with NFPA 70. Heating of flammable or combustible liquids over an open flame is prohibited.~~

Exception: ~~The use of a heating element not rated for flammable atmospheres, where documentation from the manufacture, or approved testing laboratory indicates the element is rated for heating of flammable liquids.~~

Reason Statement: The proposed change is to clarify that the use of either flammable or combustible solvents shall be within a listed or approved fume hood or enclosure. Currently many such processes occur in a room not specifically designed for potentially flammable atmospheres. Clarification of electrical requirements within these spaces is also provided.

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 and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: <https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/>

Cost Impact: The code change proposal will not increase or decrease the cost of construction

No cost increase is expected as appropriate fume hoods or enclosures should already be provided with appropriate electrical per NFPA 70.

F183-21

F184-21

IFC: 3903.7 (New), 3903.7.1 (New)

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Fire Code

Add new text as follows:

3903.7 Means of Egress. Means of egress from rooms or areas used for extraction shall swing in the direction of egress travel.

3903.7.1 Illumination. Means of egress illumination within extraction rooms or areas shall be provided with emergency power in accordance with Section 1008.3.

Reason Statement: This section is added based on incidents in the industry, which have demonstrated the need for a quick and unimpeded exit access from extraction rooms. Incidents with flammable gas fires develop rapidly and broadly, which requires immediate action and movement from personnel impacted. In the event of a power outage a clear egress path is critical as these rooms have equipment and chemicals that could create a secondary risk to the occupant.

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 and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: <https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/>

Cost Impact: The code change proposal will increase the cost of construction

Door swing will not impact construction costs and is an easy life safety improvement. The addition of a standard emergency light would be a negligible cost impact (typical light fixture \$300-400) along with an additional electrical connection when constructing the room.

F184-21

F185-21

IFC: 3904.1, 3904.2, 3904.2.1

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Fire Code

Revise as follows:

3904.1 General requirements. Systems and equipment used with the processing ~~and~~ or extraction of oils and products from plants shall comply with Sections 3904.2 through 3904.2.2.3 and Section 5003.2, and other applicable provisions of this code, the *International Building Code* and the *International Mechanical Code*.

3904.2 Systems and equipment. Systems or equipment used for the extraction or processing of oils from plant material shall comply with Section 3904.2.1 or 3904.2.2.

3904.2.1 Listings. Systems or equipment used for the extraction or processing of oils from plant material shall be *listed* and *labeled* in accordance with UL 1389 and installed in accordance with the listing and the manufacturer's installation instructions.

Reason Statement: This change is proposed to ensure the applicability of Chapter 39 to both extraction and processing processes. These processes may also use flammable gases and flammable liquids, often in small laboratory-scale equipment that may or may not be *listed* or *approved* for use with flammable solvents, in rooms and areas that are generally not clearly prescribed with safety protocols. 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 and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: <https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/>

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is a clarification and will not impact costs of construction,

F185-21

F186-21 Part I

PART I IFC: SECTION 4005

PART II IBC: 306.2, 306.3, 311.2, 311.3

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org); Mike Nugent, Chair, representing ICC Building Code Action Committee (bcac@iccsafe.org)

THIS IS A TWO PART CODE CHANGE. PART 1 OF THIS PROPOSAL WILL BE HEARD BY THE FIRE CODE COMMITTEE AND PART 2 OF THIS PROPOSAL WILL BE HEARD BY THE BUILDING CODE GENERAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2021 International Fire Code

SECTION 4005 FIRE PROTECTION.

Delete without substitution:

~~**4005.1 Automatic sprinkler system.** The storage of distilled spirits and wines shall be protected by an approved automatic sprinkler system as required by Chapter 9.~~

Add new text as follows:

4005.1 Palletized storage of distilled spirits in wooden barrels. The palletized storage of distilled spirits shall be protected by an *approved automatic sprinkler system* installed throughout the building in accordance with Section 903.3.1.1 as modified in this section.

4005.1.1 Storage height. Palletized storage arrays of barrels stored on-end shall be limited to a maximum of 7 pallets high.

4005.1.2 Flue spaces. Flue spaces with a minimum width of 6 inches (152 mm) shall be maintained between adjacent pallets.

4005.1.3 Loading aisles. Palletized storage that is provided with a defined loading aisle between pallet storage areas shall be arranged using one of the following:

1. Draft curtains, installed in accordance with Section 4005.1.3.1, shall be provided along the side of palletized storage facing the loading aisle to separate the quick response sprinklers and standard response sprinklers.
2. A trench drain shall be provided on each side of the loading aisle, arranged to capture any spilled distilled spirits in the aisle space and remove them from the building to prevent spills from spreading into the barrel storage area.
3. Barrels shall be banded on each pallet to prevent barrels from falling off pallets during transportation and loading into the storage racks.

4005.1.3.1 Draft curtains. Where installed in accordance with Section 4005.1.3, Item 1, draft curtains shall be designed and construction in accordance with Sections 4005.1.3.1.1 through 4005.1.3.1.3.

4005.1.3.1.1 Construction. Draft curtains shall be constructed of sheet metal, lath and plaster, gypsum board or other approved noncombustible materials that provide equivalent performance to resist the passage of smoke. Joints and connections shall be designed to resist the passage of smoke.

4005.1.3.1.2 Location. Draft curtains shall be located along loading aisles serving storage areas.

4005.1.3.1.3 Depth. Draft curtains shall extend vertically downward from the ceiling for a minimum distance of 20 percent of the ceiling height measured from the floor, with a minimum depth of 6 feet (1829 mm).

4005.1.4 Automatic sprinkler system design. Storage heights and automatic sprinkler densities for palletized on-end barrels shall in accordance with Table 4005.1.4 and Sections 4005.1.4.1 through 4005.1.4.6.

TABLE 4005.1.4
Palletized Storage of Distilled Spirits with up to 75% Alcohol by Volume in Wooden Barrels

Protection Area	Sprinkler System Type	Maximum Ceiling Height (feet)	Maximum Storage Height	Ceiling Sprinkler Protection		
				Response / Nominal Temperature Rating / Orientation	K-factor gpm/psi ^{1/2}	Design ^a # of Sprinklers @ Pressure (psi)
Barrel Storage	Wet-pipe	30	24 feet or	QR / 165°F / Pendent	14.0	12 @ 18
	Dry-pipe		7 barrels	SR / 286°F / Upright	16.8	24 @ 13
	Wet-pipe	30	1 barrel	Any / 165°F / Any	11.2	30 @ 7
	Dry-pipe		SR / 286°F / Upright	11.2	50 @ 7	
	Wet-pipe	30	2 barrels	SR / 286°F / Any	11.2	50 @ 29
Loading Aisle w/ Draft Curtain	Wet-pipe or Dry-pipe	30	NA	SR / 286°F / Any	5.6	100 @ 13
					≥ 8.0	100 @ 7
Loading Aisle w/ Trench Drains or Banded Barrels or No Permanent Loading Aisle	Provide the barrel storage design across the entire roof area (i.e., storage area and loading aisle)					

For SI: 1 foot = 304.8 mm; 1 pound per square inch (psi) = 6.895 kPa; K-Factor of 1 gpm/psi^{0.5} = 14.395 L/min/bar^{0.5}; °C = [(°F)-32]/1.8.

Notes: QR = quick response sprinkler; SR = standard response sprinkler.

a. Sprinklers shall have a maximum coverage area of 100 square feet (9.3 m²).

4005.1.4.1 Protected product. The storage and automatic sprinkler requirements in Table 4005.1.4 apply to alcohol-water mixtures greater than 20 percent and up to 75 percent alcohol by volume in wooden barrel sizes not exceeding 130 gallons (492 L).

4005.1.4.2 Hose stream allowance. The automatic sprinkler design shall include a 500 gallons per minute (1900 L/min) hose stream allowance.

4005.1.4.3 Water supply duration. The automatic sprinkler system water supply duration, including hose stream demand, shall be a minimum of one hour.

4005.1.4.4 Automatic sprinkler system balancing. Where a permanent loading aisle is provided with a separate automatic sprinkler system on the ceiling, the barrel storage automatic sprinkler design and the loading aisle automatic sprinkler design are not required to be balanced at the point of connection.

4005.1.4.5 Dry pipe sprinkler systems. Where dry-pipe sprinkler systems are installed, the sprinkler system shall be designed to deliver water to the most remote 4 sprinklers within 40 seconds.

4005.1.4.6 Small distilled spirits facilities. Fire protection for palletized storage of distilled spirits in small distilled spirits facilities not greater than 7,500 square feet (697 m²) is permitted to be in accordance with Sections 4005.1.4.6.1 through 4005.1.4.6.3.

4005.1.4.6.1 Ceiling clearance. The clearance from the top of storage to the deflector of the automatic sprinklers at the ceiling shall be a minimum of 18 inches (457 mm) and a maximum of 10 feet (3048 mm).

4005.1.4.6.2 Automatic sprinkler coverage area. The automatic sprinkler coverage area shall not exceed 80 square feet (7.4 m²) per sprinkler.

4005.1.4.6.3 Fire protection scheme. The storage arrangement and automatic sprinkler system design shall be in accordance with Table 4005.1.4.6.3.

TABLE 4005.1.4.6.3
PALLETIZED STORAGE OF DISTILLED SPIRITS IN WOODEN BARRELS IN SMALL DISTILLED SPIRITS FACILITIES

<u>Protection Area</u>	<u>Sprinkler System Type</u>	<u>Maximum Ceiling Height</u> <u>(feet)</u>	<u>Maximum Storage Height</u> <u>(feet)</u>	<u>Ceiling Sprinkler Protection</u>			
				<u>Response / Temperature Rating / Orientation</u>	<u>K-factor</u> <u>(gpm/psi^{1/2})</u>	<u>Sprinkler Density</u> <u>(gpm/ft²)</u>	<u>Area</u> <u>(square feet)</u>
Barrel Storage	Wet-pipe	24	12	SR / 286°F / Any	≥ 11.2	0.35	4000
				SR / 165°F / Any	≥ 11.2	0.35	7500

For SI: 1 foot = 304.8 mm; 1 pound per square inch (psi) = 6.895 kPa; K-Factor of 1 gpm/psi^{0.5} = 14.395 L/min/bar^{0.5}; °C = [(°F)-32]/1.8; 1 gallon per minute per square foot = 40.75 L/min/m².

Notes: SR = standard response sprinkler.

4005.2 Rack storage in wooden barrels. The rack storage of distilled spirits and wine greater than 20 percent alcohol shall be protected by an approved automatic sprinkler system installed throughout in accordance with Section 903.3.1.1 and Sections 4005.2.1 through 4005.2.3.5.2.

4005.2.1 Flues spaces for on-side wooden barrels. Rack storage for on-side wooden barrels shall be provided with a minimum width of 8 inches (203 mm) between adjacent rows of barrels.

4005.2.1.1 Elevated walkways. Where provided, elevated walkways between barrels shall be constructed in accordance with one of the following:

1. Noncombustible materials that are 50 percent open.
2. Noncombustible materials that are open less than 50 percent provided the walkway has a maximum width of 1 foot (0.3 m) and a minimum gap of 3 inches (76 mm) is provided between the walkway and the barrel storage.
3. Combustible materials and provided with a row of automatic sprinklers directly beneath each walkway.

4005.2.2 Flues spaces for on-end wooden barrels. Rack storage arrangements with on-end wooden barrels shall be provided with transverse and longitudinal flue spaces with a minimum width of 6 inches (15 cm).

4005.2.3 Fire protection for rack storage. Rack storage arrangements of alcohol-water mixtures up to 75 percent alcohol in wooden barrel with sizes not exceeding 130 gallons (492 L) shall be protected in accordance with Sections 4005.2.3.1 through 4005.2.3.5.2.

4005.2.3.1 Hose stream allowance. The automatic sprinkler system design shall include a 500 gallons per minute (1900 L/min) hose stream allowance.

4005.2.3.2 Water supply duration. The automatic sprinkler system water supply duration, including hose stream demand, shall be a minimum of one hour.

4005.2.3.3 Dry-pipe automatic sprinkler system. Where dry-pipe automatic sprinkler systems are installed, the automatic sprinkler system shall be designed to deliver water to the most remote 4 sprinklers within 40 seconds.

4005.2.3.4 Ceiling automatic sprinkler systems. The automatic sprinkler systems installed at the ceiling shall be designed with a minimum density of 0.2 gallons per minute per square foot (0.8 L/min) with an operating area of 2,000 square feet (186 m²).

4005.2.3.5 Automatic sprinkler system balancing. The automatic sprinkler system installed at the ceiling and the in-rack sprinkler system shall be balanced at the point of connection.

4005.2.3.6 Automatic sprinkler system design. The design of the automatic sprinkler system at the ceiling and the in-rack sprinkler system shall be in accordance with Table 4005.2.3.6.

TABLE 4005.2.3.6
RACK STORAGE OF DISTILLED SPIRITS IN WOODEN BARRELS

<u>Barrel Arrangement</u>	<u>Sprinkler System Type</u>	<u>Maximum Ceiling Height (feet)</u>	<u>Maximum Storage Height</u>	<u>Minimum Aisle Width (feet)</u>	<u>Ceiling Sprinkler Protection</u>			<u>In-Rack Sprinkler Protection</u>			
					<u>Response / Nominal Temperature Rating / Orientation</u>	<u>K-factor (gpm/psi^{1/2})</u>	<u>Design, # of Sprinklers @ Pressure (psi)</u>	<u>Layout</u>	<u>Response / Nominal Temperature Rating</u>	<u>K-factor (gpm/psi^{1/2})</u>	<u>Desi # of Sprin @ Press (psi)</u>
<u>On-Side</u>	<u>Wet</u>	<u>40</u>	<u>33 feet / 9 barrels</u>	<u>NA</u>	<u>QR / 165°F / Pendent</u>	<u>14.0</u>	<u>12 @ 37</u>	<u>None</u>			
								<u>Figures</u>			<u>6 @ 4</u>
	<u>Dry</u>	<u>40</u>	<u>33 feet / 9 barrels</u>	<u>NA</u>	<u>SR / 286°F / Any</u>	<u>≥ 11.2</u>	<u>20 @ 7</u>	<u>4005.2.3.6(1) and 4005.2.3.6(2)</u>	<u>QR / 165°F / Any</u>	<u>8.0 (115)</u>	<u>or 12 @</u>
											<u>[more one le of in-racks]</u>
<u>On-End</u>	<u>Wet</u>	<u>30</u>	<u>25 feet / 5 barrels</u>	<u>8</u>	<u>SR / 286°F / Upright</u>	<u>16.8</u>	<u>24 @ 25</u>	<u>None</u>			
								<u>Figures</u>			<u>6 @ 4</u>
	<u>Dry</u>	<u>40</u>	<u>33 feet / 9 barrels</u>	<u>NA</u>	<u>SR / 286°F / Upright</u>	<u>≥ 11.2</u>	<u>20 @ 7</u>	<u>4005.2.3.6(1) and 4005.2.3.6(2)</u>	<u>QR / 165°F / Upright</u>	<u>8.0 (115)</u>	<u>Or 12 @</u>
											<u>[more one le of in-racks]</u>
<u>On-End</u>	<u>Wet</u>	<u>30</u>	<u>25 feet / 5 barrels</u>	<u>8</u>	<u>SR / 286°F / Any</u>	<u>≥ 11.2</u>	<u>50 @ 7</u>	<u>Figures</u>			<u>6 @ 4</u>
								<u>4005.2.3.6(3), 4005.2.3.6(4), 4005.2.3.6(5) and 4005.2.3.6(6)</u>	<u>QR / 165°F / Any</u>	<u>≥ 8.0 (115)</u>	<u>[one l or 12 @</u>
	<u>Dry</u>	<u>40</u>	<u>33 feet / 9 barrels</u>	<u>NA</u>	<u>SR / 286°F / Upright</u>	<u>≥ 11.2</u>	<u>20 @ 7</u>	<u>4005.2.3.6(1) and 4005.2.3.6(2)</u>	<u>QR / 165°F / Upright</u>	<u>8.0 (115)</u>	<u>Or 12 @</u>
											<u>[more one le of in-racks]</u>

For SI: 1 foot = 304.8 mm; 1 pound per square inch (psi) = 6.895 kPa; K-Factor of 1 gpm/psi^{0.5} = 14.395 L/min/bar^{0.5}; °C = [(°F)-32]/1.8; 1 gallon per minute per square foot = 40.75 L/min/m².

Notes: QR – quick response sprinkler; SR – standard response sprinkler.

a. Sprinklers shall have a maximum coverage area of 100 square feet (9.3 m²).

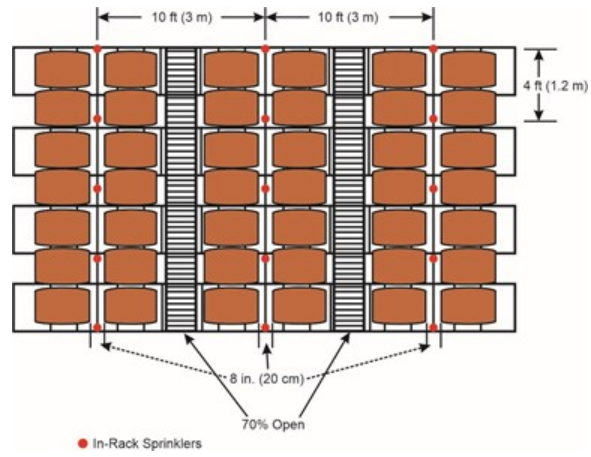


Figure 4005.2.3.6(1)
In-rack sprinkler layout for wooden barrels on their sides (plan view)

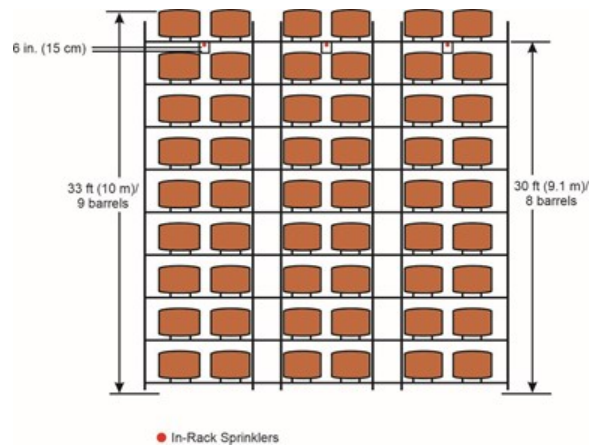


FIGURE 4005.2.3.6(2)

IN-RACK SPRINKLER LAYOUT FOR WOODEN BARRELS ON THEIR SIDES (ELEVATION VIEW)

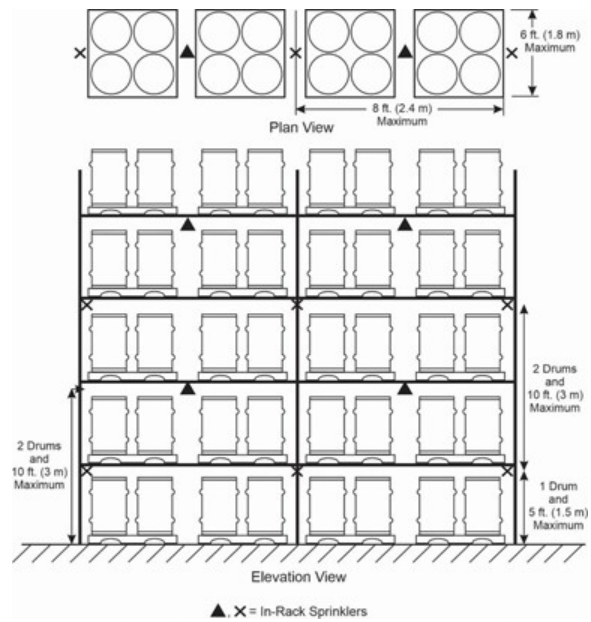


FIGURE 4005.2.3.6(3)
IN-RACK SPRINKLER LAYOUT FOR SINGLE ROW RACK OF ON-END WOODEN BARRELS

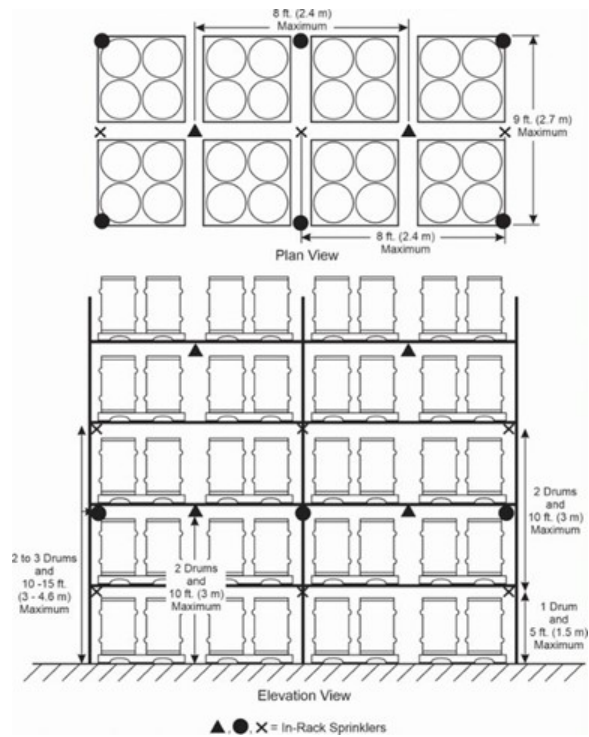


FIGURE 4005.2.3.6(4)
IN-RACK SPRINKLER LAYOUT FOR DOUBLE ROW RACK OF ON-END WOODEN BARRELS

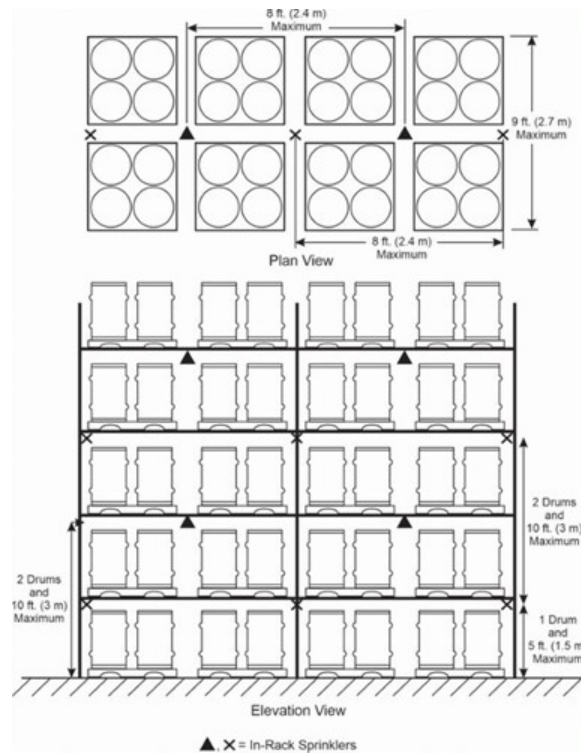


FIGURE 4005.2.3.6(5)
IN-RACK SPRINKLER LAYOUT FOR DOUBLE ROW RACK OF ON-END WOODEN BARRELS

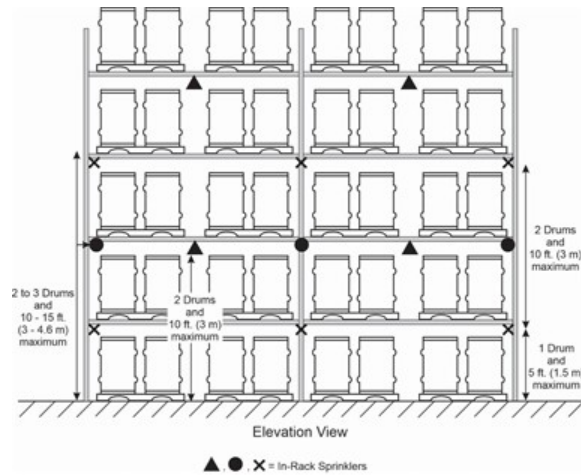


FIGURE 4005.2.3.6(6)
IN-RACK SPRINKLER LAYOUT FOR MULTIPLE ROW RACK OF ON-END WOODEN BARRELS

4005.3 Wine 20 percent or less alcohol content. The storage of wine in barrels with an alcohol content of 20 percent or less shall be protected by an approved automatic sprinkler system installed throughout in accordance with Section 903.3.1.1.

Revise as follows:

~~4005.2~~ **4005.4 Portable fire extinguishers.** *Approved* portable fire extinguishers shall be provided in accordance with Section 906.

F186-21 Part II

IBC: 306.2, 306.3, 311.2, 311.3

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org); Mike Nugent, Chair, representing ICC Building Code Action Committee (bcac@iccsafe.org)

2021 International Building Code

SECTION 306 FACTORY GROUP F.

Revise as follows:

306.2 Moderate-hazard factory industrial, Group F-1. Factory industrial uses that are not classified as Factory Industrial F-2 Low Hazard shall be classified as F-1 Moderate Hazard and shall include, but not be limited to, the following:

- Aircraft (manufacturing, not to include repair)
- Appliances
- Athletic equipment
- Automobiles and other motor vehicles
- Bakeries
- Beverages: over ~~16 percent~~ 20 percent alcohol content
- Bicycles
- Boats
- Brooms or brushes
- Business machines
- Cameras and photo equipment
- Canvas or similar fabric
- Carpets and rugs (includes cleaning)
- Clothing
- Construction and agricultural machinery
- Disinfectants
- Dry cleaning and dyeing
- Electric generation plants
- Electronics
- Energy storage systems (ESS) in dedicated use buildings
- Engines (including rebuilding)
- Food processing establishments and commercial kitchens not associated with restaurants, cafeterias and similar dining facilities more than 2,500 square feet (232 m²) in area
- Furniture
- Hemp products
- Jute products
- Laundries
- Leather products
- Machinery
- Metals
- Millwork (sash and door)
- Motion pictures and television filming (without spectators)
- Musical instruments
- Optical goods
- Paper mills or products
- Photographic film
- Plastic products
- Printing or publishing
- Recreational vehicles
- Refuse incineration
- Shoes
- Soaps and detergents
- Textiles
- Tobacco
- Trailers
- Upholstering
- Water/sewer treatment facilities
- Wood; distillation

- Woodworking (cabinet)

306.3 Low-hazard factory industrial, Group F-2. Factory industrial uses that involve the fabrication or manufacturing of noncombustible materials that during finishing, packing or processing do not involve a significant fire hazard shall be classified as F-2 occupancies and shall include, but not be limited to, the following:

- Beverages: up to and including ~~16 percent~~ 20 percent alcohol content
- Brick and masonry
- Ceramic products
- Foundries
- Glass products
- Gypsum
- Ice
- Metal products (fabrication and assembly)

SECTION 311 STORAGE GROUP S.

Revise as follows:

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:

- *Aerosol products*, Levels 2 and 3
- Aircraft hangar (storage and repair)
- Bags: cloth, burlap and paper
- Bamboos and rattan
- Baskets
- Belting: canvas and leather
- Beverages over ~~16 percent~~ 20 percent alcohol content
- 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* specified in Table 307.1(1) (see Section 406.8)
- Photo engravings
- Resilient flooring
- *Self-service storage facility* (mini-storage)
- Silks
- Soaps
- Sugar
- Tires, bulk storage of
- Tobacco, cigars, cigarettes and snuff
- Upholstery and mattresses
- Wax candles

311.3 Low-hazard storage, Group S-2. Storage Group S-2 occupancies include, among others, buildings used for the storage of noncombustible materials such as products on wood pallets or in paper cartons with or without single thickness divisions; or in paper wrappings. Such products are permitted to have a negligible amount of plastic *trim*, such as knobs, handles or film wrapping. Group S-2 storage uses shall include, but not be limited to, storage of the following:

- Asbestos
- Beverages up to and including ~~16 percent~~ 20 percent alcohol

- Cement in bags
- Chalk and crayons
- Dairy products in nonwaxed coated paper containers
- Dry cell batteries
- Electrical coils
- Electrical motors
- Empty cans
- Food products
- Foods in noncombustible containers
- Fresh fruits and vegetables in nonplastic trays or containers
- Frozen foods
- Glass
- Glass bottles, empty or filled with noncombustible liquids
- *Gypsum board*
- Inert pigments
- Ivory
- Meats
- Metal cabinets
- Metal desks with plastic tops and *trim*
- Metal parts
- Metals
- Mirrors
- Oil-filled and other types of distribution transformers
- Public parking garages, open or enclosed
- Porcelain and pottery
- Stoves
- Talc and soapstones
- Washers and dryers

Reason Statement: This proposal provides guidance for storage and associated fire protection of alcoholic beverages both in warehouse and in small distillery facilities.

One of the conceptual changes is the threshold at which the percentage of alcohol results in a higher classification of hazard. Traditionally, beverages with an alcohol content greater than 16% were considered to present a higher level of hazard and were therefore placed into Group F-1 for manufacturing and packaging and Group S-1 for storage. Recent testing by FM Global demonstrates that the 16% threshold was too conservative and the threshold is being revised to 20%. Even recent revisions to Ch 32 list beverages in glass or ceramic containers with up to 20% alcohol content as a Class I commodity. The alcohol content does not raise the flammability of the liquid to an extent where additional levels of protection are necessary, and for the most part can be considered nonflammable or noncombustible. As a result, the manufacturing, packaging and storage of beverages with an alcohol content up to 20% will be classified as Group F-2 or S-2 as appropriate. This results in revisions to IBC Chapter 3 and the IFC occupancy definitions in Chapter 2.

The fire protection section provides specific sprinkler system design criteria. The requirements are based on the storage configuration:

- Palletized storage in Section 4005.1
- Rack storage in Section 4005.2

Palletized storage is then provided with design options in Section 4005.1.3:

- Provide draft curtains along the loading aisles
- Provide trench drains along each side of the loading aisles
- Provide straps to secure the barrels to the pallet
- There is a 4th option, which is to not provide a loading aisle at all. As stated in the charging sentence "palletized storage provided with a defined loading aisle..." In other words, the building or room is solid storage; it will have walkways to access the barrels but will not have a forklift loading aisle.

Each of these three designs provides a method of mitigating the spread of liquid or fire during a fire incident. These three protection features are again reference in Table 4005.1.4, and have an impact on the fire sprinkler system design.

The fire sprinkler design criteria is core of this code change. Table 4005.1.4 provides criteria for sprinkler system densities, storage heights and sprinkler selection. This design criteria is based on full-scale fire testing conducted by FM Global and presented in FM Data Sheet 7-29.

Section 4005.1.4 provides for a reduced level of sprinkler protection. Because of reduced level of protection, this section is limited to facilities no

greater than 7,500 square feet and with a ceiling height of no more than 24 feet. The intent of this reduction is to allow the small distilleries with a reasonable level of protection based on the reduced fire load per square foot and limited size.

Rack storage is covered in Section 4005.2. This section contains specific requirements again based on storage method:

- Barrels stored on their side
- Barrels stored on-end

The difference in configuration results in different sprinkler design criteria in Table 4005.2.3.6. Rack storage is allowed up to 33 feet in height. Figures have been included to depict the in-rack sprinkler locations.

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

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents 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 and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC.

Bibliography: FM Global Property Loss Prevention Data Sheet 7-29, Ignitable Liquid Storage in Portable Containers, October 2020
Factory Mutual Insurance Company, Johnson, RI

Cost Impact: The code change proposal will not increase or decrease the cost of construction

Chapter 40 of the Fire Code already requires an approved fire sprinkler system for new distilleries and storage facilities for distilled spirits. This code change does not increase that requirement but will provide guidance and consistency in how jurisdictions apply the fire sprinkler requirement.

F187-21

IFC: APPENDIX N, SECTION N101, N101.1, N101.1.1, N101.1.2, N101.2, N101.3, SECTION N102, N102.1, SECTION 202, SECTION N103, N103.1, N103.2, N103.3, SECTION N104, N104.1, N104.2, SECTION N105, N105.1, N105.2, N105.3, N105.4, N105.5, N105.6, SECTION N106, N106.1, N106.2, SECTION N107, N107.1, N107.1.1, N107.2, N107.3, N107.3.1, N107.3.2, N107.3.2.1, N107.3.2.2, N107.3.2.3, N107.3.2.4, N107.3.3, N107.3.4, N107.3.4.1, N107.3.4.2, N107.3.4.3, N107.3.5, N107.4, N107.5, N107.5.1, N107.5.2, N107.5.3, N107.5.4, N107.5.5, N107.6, SECTION N108, N108.1, N108.2, N108.3, SECTION N109, N109.1, TABLE N109.1

Proponents: Michael O'Brian, Chair, representing FCAC (fcac@iccsafe.org)

2021 International Fire Code

Revise as follows:

APPENDIX CHAPTER 41 INDOOR TRADE SHOWS AND EXHIBITIONS

SECTION ~~N101-1~~ 4101 GENERAL.

~~N101-1~~ 4101.1 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 4001.1.1 ~~N101-1-1~~ or 4001.1.2 ~~N101-1-2~~ is applicable.

~~N101-1-1~~ 4101.1.1 Nonsprinklered buildings. In a building that is not equipped throughout with an *automatic sprinkler system*, the aggregate exhibit area must be less than 1,500 square feet (139 m²) of floor area and meet both of the following conditions:

1. The exhibit area does not include any covered or multiple-level exhibits or booths.
2. Not fewer than two remote *exits* or *exit access* doors in compliance with Chapter 10 are provided.

~~N101-1-2~~ 4101.1.2 Sprinklered buildings. In a building that is equipped throughout with an *automatic sprinkler system* with a minimum design density of ordinary hazard Group 1, the aggregate exhibit area must be less than 4,500 square feet (418 m²) of floor area and meet both of the following conditions:

1. The exhibit area does not include any covered or multiple-level exhibits or booths.
2. Not fewer than two remote *exits* or *exit access* doors in compliance with Chapter 10 are provided.

~~N101-2~~ 4101.2 Permit required. An operational permit for trade shows and exhibitions shall be required as set forth in Section 105.5.15.

~~N101-3~~ 4101.3 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 widths of *exits* and *aisles*.
3. The locations of *exit* signs.
4. The total square footage (square meters) 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 multiple-level booths.
9. *Construction documents* for any covered or multiple-level booths.
10. The storage locations and quantities of any highly combustible goods.
11. The location and type of any vehicle displays, where applicable.

SECTION ~~N102-1~~ 4102 DEFINITIONS.

~~N102-1~~ 4102.1 Definitions. For the purpose of this appendix, certain terms are defined as follows:

COOKING. Heating food products to a temperature of 145°F (63°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.

MULTIPLE-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.

Revise as follows:

SECTION ~~N403~~ 4103 PUBLIC SAFETY FOR EVENTS.

~~N403-1~~ 4103.1 Fire safety and evacuation plan. A fire safety and evacuation plan shall be provided in accordance with Section 404.2.

Exception: Where the *fire code official* determines that the nature of the exhibition, display or the activities therein does not pose an increased hazard to public safety.

~~N403-2~~ 4103.2 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 *owner's* authorized agent shall provide one or more *fire watch* personnel in accordance with Section 403.11.1.

~~N403-3~~ 4103.3 Crowd managers. Where events involve a gathering of more than 1,000 people, trained crowd managers shall be provided in accordance with Section 403.11.3.

SECTION ~~N404~~ 4104 INTERIOR FINISH AND DECORATIVE MATERIALS.

~~N404-1~~ 4104.1 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.

~~N404-2~~ 4104.2 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.
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 not less than Class B in accordance with Section 803.

SECTION ~~N405~~ 4105 MULTIPLE-LEVEL BOOTHS.

~~N405-1~~ 4105.1 Construction documents. *Construction documents* for all multiple-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.

~~N405-2~~ 4105.2 Structural design. Multiple-level booths shall be designed and constructed in accordance with Chapter 16 of the International Building Code.

~~N405-3~~ 4105.3 Means of egress. Upper levels of multiple-level booths with an *occupant load* greater than 10 persons shall have not fewer than two *exits* or *exit access* that are separated in accordance with Section 1007.1.1.

~~N405-4~~ 4105.4 Automatic sprinkler systems. An *approved automatic sprinkler system* in accordance with Section 903.3.1.1 shall be provided in multiple-level booths exceeding 400 square feet (37.2 m²) in floor area per level.

~~N405-5~~ 4105.5 Inspection. Inspection to verify that multiple-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*.

~~N405-6~~ 4105.6 Fire alarm and detection. Each multiple-level booth with a floor area exceeding 120 square feet (11.1 m²) on any level shall be provided with an *approved* fire alarm system in accordance with Section 907.2.

SECTION ~~N406~~ 4106 COVERED BOOTHS.

~~N406-1~~ 4106.1 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 square feet (9.3 m²) in floor area per level.

~~N406-2~~ 4106.2 Fire alarm and detection. Each covered booth with a floor area exceeding 120 square feet (11.1 m²) on any level shall be provided with an *approved* fire alarm system in accordance with Section 907.2.

SECTION ~~N407~~ 4107 DISPLAY AND STORAGE OF HAZARDOUS AND COMBUSTIBLE MATERIALS.

~~N407-1~~ 4107.1 Hazardous materials. The display of hazardous materials shall comply with Section 314 and Chapters 50 through 67. The storage of hazardous materials in indoor trade shows and exhibition areas shall be prohibited.

~~N407-1-1~~ 4107.1.1 Display near exit. The display of hazardous materials within 5 feet (1524 mm) of an *exit* shall be prohibited.

~~N107-2~~ **4107.2 Storage of combustible materials.** Storage of combustible materials shall comply with Section 315.

~~N107-3~~ **4107.3 Vehicles.** The display of liquid- or gas-fueled vehicles, boats or other motor craft in indoor trade shows and exhibition areas shall comply with Sections 314.4 and 4107.3.1 ~~N107-3.1~~ through 4107.3.3 ~~N107-3.3~~.

~~N107-3.1~~ **4107.3.1 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~~ **4107.3.2 Vehicle fuel.** Vehicle fuel shall comply with Sections 4107.3.2.1 ~~N107-3.2.1~~ through 4107.3.2.4 ~~N107-3.2.4~~.

~~N107-3.2.1~~ **4107.3.2.1 Fueling within the structure.** Vehicles shall not be fueled or defueled within the structure.

~~N107-3.2.2~~ **4107.3.2.2 Vehicle fuel tanks.** Vehicle fuel tanks shall contain not more than one quarter of the tank capacity or 5 gallons (18.93 L) of fuel, whichever is less.

~~N107-3.2.3~~ **4107.3.2.3 Vehicle fuel systems.** Vehicle fuel systems shall be inspected for leaks prior to the vehicle being brought into the structure.

~~N107-3.2.4~~ **4107.3.2.4 Vehicle fuel tank openings.** Vehicle fuel tank openings shall be locked and sealed to prevent the escape of vapors.

~~N107-3.3~~ **4107.3.3 Obstruction by vehicles.** Vehicles shall not be located in such a manner that they obstruct a *means of egress*.

~~N107-3.4~~ **4107.3.4 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 4107.3.4.1 ~~N107-3.4.1~~ through 4107.3.4.3 ~~N107-3.4.3~~.

~~N107-3.4.1~~ **4107.3.4.1 Shutoff valves.** Shutoff 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~~ **4107.3.4.2 Battery hot lead.** The hot lead of the battery shall be disconnected.

~~N107-3.4.3~~ **4107.3.4.3 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 comply with Section 3107.15.

~~N107-3.5~~ **4107.3.5 Competitions or demonstrations.** Competitions or demonstrations using any type of vehicle shall comply with Section 3107.15.5.

~~N107-4~~ **4107.4 Fueled equipment other than vehicles.** Fueled equipment other than vehicles shall comply with Section 313.

~~N107-5~~ **4107.5 LP-gas containers.** Liquefied petroleum (LP) gas containers shall comply with Sections 4107.5.1 ~~N107-5.1~~ through 4107.5.5 ~~N107-5.5~~ and Chapter 61.

~~N107-5.1~~ **4107.5.1 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~~ **4107.5.2 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, cylinders shall be separated from each other by a minimum of 20 feet (6096 mm).

~~N107-5.3~~ **4107.5.3 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 and with the applicable requirements of the International Fuel Gas Code.

~~N107-5.4~~ **4107.5.4 Securing of LP-gas containers.** Portable LP-gas containers shall be securely fastened in place to prevent unauthorized movement.

~~N107-5.5~~ **4107.5.5 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*.

~~N107-6~~ **4107.6 Cooking and open-flame devices.** All cooking equipment and any open-flame devices shall comply with the requirements of Section 308 of this code and with Chapter 5 of the International Mechanical Code. Cooking equipment shall be separated from combustible material display or storage by a horizontal distance of not less than 5 feet (1524 mm).

SECTION ~~N108~~ 4108 MEANS OF EGRESS.

~~N108-1~~ **4108.1 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 and with Sections 4108.2 ~~N108-2~~ and 4108.3 ~~N108-3~~.

~~N108-2~~ **4108.2 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~~ **4108.3 Aisles and corridors.** *Aisles* and *corridors* within the exhibit area shall be kept free of obstructions when the public is present. Storage of any kind in *aisles* or *corridors* within the exhibit area is not permitted.

Delete without substitution:

SECTION N109 REFERENCED STANDARDS.

N109.1 General. See Table N109.1 for standards that are referenced in various sections of this appendix. Standards are listed by the standard identification with the effective date, standard title, and the section or sections of this appendix that reference the standard.

TABLE N109.1
REFERENCED STANDARDS

STANDARD ACRONYM	STANDARD NAME	SECTIONS HEREIN REFERENCED
IBC—21	International Building Code	N105.2
IFGC—21	International Fuel Gas Code	N107.5.3
IMC—21	International Mechanical Code	N107.6

Reason Statement: This appendix, on Trade Shows and Exhibitions, has now been in the code for two cycles and it addresses a specific type of activity that has the potential to create fire safety concerns. For example, the temporary booths that are used during these temporary trade shows can often contain a variety of unregulated materials and there is evidence that the walls of such booths are not typically considered interior finish, but they should be. Also, the use of gas containers without proper regulatory control and the potential presence of vehicles in these trade shows should be addressed in a mandatory fashion. As the code stands, each jurisdiction is entitled, of course, to enforce the appendix, but the application on a consistent basis for all IFC users would be beneficial.

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 and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: <https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/>

Cost Impact: The code change proposal will increase the cost of construction

This will increase the cost of construction/compliance because an activity that is potentially unregulated will now require regulation, and some potential testing.

F187-21

F188-21

IFC: 105.5.53 (New), 105.5.54 (New), 105.5.55 (New), CHAPTER 41 (New), 4101.1 (New), 4101.2 (New), 4101.3 (New), 4101.4 (New), 4101.4.1 (New), 4101.4.2 (New), 4101.4.3 (New), 3107.12.7, 3107.13, 3107.13.1, 3107.13.2, 3107.13.3, 4101.6.4 (New), 4101.7 (New), 4101.8 (New), 4101.9 (New), 4101.10.1 (New), 4101.10 (New), SECTION 4102 (New), 603.9.1, 603.9, 603.9.2, 603.9.3, 603.9.4, 603.9.5, SECTION 4103 (New), 605.5, 605.5.1, 605.5.2, 605.5.2.2, 605.5.2.2.1, 605.5.2.2.2, 605.5.2.2.3, 605.5.2.2.4, 605.5.2.1, 605.5.2.1.1, 605.5.2.1.2, 605.5.2.1.3, 605.5.2.1.4, 605.5.2.3, 605.5.2.3.1, 605.5.2.3.2, 605.5.2.3.3, 605.5.2.3.4, SECTION 4104 (New), 4104.1 (New), 308.1.4, 4104.3 (New), 3107.12.6, 3107.12.5, 3107.12.4, SECTION 4105 (New), 4105.1 (New), 4105.1.1 (New), 4105.1.2 (New), 4105.1.3 (New), 4105.1.6 (New), 4105.1.5 (New), SECTION 319, 319.1, 319.2, 319.3, 319.4, 319.4.1, 319.4.2, 319.5, 319.6, 319.7, 319.7.1, 319.7.2, 319.7.3, 319.7.4, 319.7.5, 319.7.5.1, 319.7.5.2, 319.8, 319.8.1, 319.8.2, 319.8.3, 319.8.4, 319.8.5, 319.9, 319.9.1, 319.9.1.1, 319.9.1.2, 319.9.1.3, 319.9.2, 319.9.3, 319.9.4, 319.10, 319.10.1, 319.10.2, 319.10.3, 308.1.5, 313.1, 605.1, 3107.12

Proponents: Timothy Spears, South San Joaquin County Fire Authority, representing California Fire Chiefs Association
(tim.spears@cityoftracy.org)

2021 International Fire Code

Add new text as follows:

105.5.53 Temporary heating or cooking in tents or membrane structures. An operational permit is required to operate temporary heating or cooking equipment within tents or membrane structures.

105.5.54 Temporary heating or cooking in wildfire risk areas. Where required by local regulations, an operational permit is required to operate temporary heating or cooking equipment in wildfire risk areas

105.5.55 Temporary heating for construction sites. An operational permit is required to operate temporary heating equipment in structures during the course of construction, alteration or demolition.

CHAPTER 41 **TEMPORARY HEATING AND COOKING OPERATIONS**

4101.1 General. The provisions of this chapter shall apply to the use, operation, testing and maintenance of mobile and portable equipment and devices used for temporary heating and cooking. Temporary heating and cooking operations with open flames shall also comply with any additional applicable requirements in Section 308.

Exception: Temporary heating devices used in the course of construction, alteration and demolition of structures shall comply with Section 3304.

Revise as follows:

4101.2 Permits. Operational permits shall be obtained as set forth in Section 105.5.

Add new text as follows:

4101.3 Listed Equipment. Mobile and portable equipment and devices used for temporary heating and cooking shall be listed and labeled. The installation, maintenance and use of equipment and devices shall be in accordance with their listing and the manufacturer's instructions.

4101.4 Operation and Maintenance. The building owner or the equipment owner/operator shall operate and maintain the equipment in accordance with the manufacturer's operating instructions and this section.

4101.4.1 Wildfire Risk Area. Temporary heating and cooking operations shall be in accordance with applicable local wildfire risk area regulations

4101.4.2 Attendance. Mobile and portable heating and cooking equipment shall be constantly attended while in use and until cooled to a safe temperature.

4101.4.3 Fire extinguishers. Not fewer than one portable fire extinguisher complying with Section 906 with a minimum 4-A rating or other approved on-site fire-extinguishing equipment shall be available for immediate utilization.

Revise as follows:

~~3107.12.7~~ **4101.5 Electrical heating and cooking equipment.** Electrical cooking and heating equipment shall comply with NFPA 70 and this chapter.

~~3107.13~~ **4101.6 LP-gas.** The storage, handling and use of LP-gas and LP-gas equipment shall be in accordance with Sections ~~3107.13.1 through 3107.13.3~~ 4101.6.1 through 4101.6.4

~~3107.13.1~~ **4101.6.1 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*.

~~3107-13.2~~ **4101.6.2 Location of containers.** LP-gas containers and tanks shall be located outside in accordance with Table 6104.3. Pressure relief devices shall be pointed away from the ~~tent or membrane structure~~ any building or structure and shall be in accordance with Chapter 61.

~~3107-13.3~~ **4101.6.3 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 secured to prevent unauthorized movement.

Add new text as follows:

4101.6.4 Refueling. Exchanging of LP containers shall be conducted in accordance with Chapter 61. Liquid transfer of LP gas shall be in accordance with Chapter 7 of NFPA 58.

4101.7 Oil-fired Heaters. Oil-fired cooking and heating equipment shall comply with Section 605 and this chapter.

4101.8 Refueling of Flammable and Combustible Liquid Fueled Equipment. Refueling operations for liquid fueled equipment or devices shall be conducted in accordance with section 5705 and all of the following:

- 1 Refueling operations for liquid fueled equipment or devices shall be conducted by trained personnel in accordance with the manufacturer's instructions and this code.
- 2 The equipment or device shall be turned off and allowed to cool prior to refueling.
- 3 Operations shall be conducted in a well-ventilated area, at a minimum of 10 feet from any building or structure.

Revise as follows:

4101.9 Cooking Operations. Portable cooking equipment using combustible oils or solids shall comply with all of the following:

- 1 A noncombustible lid shall be immediately available. The lid shall be of sufficient size to cover the cooking well completely.
- 2 Equipment shall be placed on a non-combustible surface
- 3 A portable fire extinguisher for protection appropriate to the cooking media shall be provided at a location approved by the fire code official

4101.10.1 Correction of Unsafe Conditions. The fire code official shall be authorized to require the owner, the owner's authorized agent, operator or user of the equipment to abate or cause to be abated or corrected such unsafe operations or conditions either by removal, repair, rehabilitation, disposal or other approved corrective action in compliance with this code.

4101.10 Hazard abatement. Operations or conditions deemed unsafe or hazardous by the fire code official shall be abated. Equipment and devices that are modified or damaged and constitute an electrical shock or fire hazard shall not be used.

Add new text as follows:

SECTION 4102 PORTABLE ELECTRICAL HEATING APPLIANCES.

Revise as follows:

~~603-9-1~~ **4102.1.1 Listed and labeled.** Only *listed* and *labeled* portable, electric space heaters shall be used.

~~603-9-4~~ **4102.1 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 in accordance with Sections 603.9.1 through 603.9.5.

~~603-9-2~~ **4102.1.2 Power supply.** Portable, electric space heaters shall be plugged directly into an *approved* receptacle.

~~603-9-3~~ **4102.1.3 Extension cords.** Portable, electric space heaters shall not be plugged into extension cords.

~~603-9-4~~ **4102.1.4 Prohibited areas.** Portable, electric space heaters shall not be operated within 3 feet (914 mm) of any combustible materials. Portable, electric space heaters shall be operated only in locations for which they are *listed*.

~~603-9-5~~ **4102.1.5 Group I-2 occupancies and ambulatory care facilities.** Where used in Group I-2 and ambulatory care facilities, portable, electric space heaters shall be limited to those having a heating element that cannot exceed a temperature of 212°F (100°C), and such heaters shall only be used in nonsleeping staff and employee areas.

Add new text as follows:

SECTION 4103 PORTABLE FUEL-FIRED HEATING APPLIANCES.

Revise as follows:

~~605-5~~ **4103.1 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 and ambulatory care facilities.

Exceptions:

1. Portable unvented fuel-fired heaters *listed* in accordance with UL 647 are permitted to be used in one- and two-family dwellings, where operated and maintained in accordance with the manufacturer's instructions.
2. Portable outdoor gas-fired heating appliances in accordance with Section ~~605.5.2~~ 4103.1.2

~~605.5.1~~ **4103.1.1 Prohibited locations.** Unvented fuel-fired heating equipment shall not be located in, or obtain combustion air from, any of the following rooms or spaces: sleeping rooms, bathrooms, toilet rooms or storage closets.

~~605.5.2~~ **4103.1.2 Portable outdoor gas-fired heating appliances.** Portable gas-fired heating appliances located outdoors shall be in accordance with Sections ~~605.5.2.1 through 605.5.2.3.4~~, 4103.1.2.1 through 4103.1.2.4

~~605.5.2.2~~ **4103.1.2.1 Use and operation.** Portable outdoor gas-fired heating appliances shall be used and operated in accordance with Sections ~~605.5.2.2.1 through 605.5.2.2.4~~, 4103.1.2.1.4

~~605.5.2.2.1~~ **4103.1.2.1.1 Listing and approval.** Only *listed* and *approved* portable outdoor gas-fired heating appliances utilizing a fuel gas container that is integral to the appliance shall be used. Portable outdoor gas-fired heating appliances shall be *listed* and *labeled* in accordance with ANSI Z83.26/CSA 2.37.

~~605.5.2.2.2~~ **4103.1.2.1.2 Use and maintenance.** Portable outdoor gas-fired heating appliances shall be used and maintained in accordance with the manufacturer's instructions.

~~605.5.2.2.3~~ **4103.1.2.1.3 Tip-over switch.** Portable outdoor gas-fired heating appliances shall be equipped with a tilt or tip-over switch that automatically shuts off the flow of gas if the appliance is tilted more than 15 degrees (0.26 rad) from the vertical.

~~605.5.2.2.4~~ **4103.1.2.1.4 Guard against contact.** The heating element or combustion chamber of portable outdoor gas-fired heating appliances shall be provided with a permanent integral guard ~~permanently guarded~~ so as to prevent accidental contact by persons or material.

~~605.5.2.1~~ **4103.1.2.2 Location.** Portable outdoor gas-fired heating appliances shall be used and located in accordance with Sections ~~605.5.2.1.1 through 605.5.2.1.4~~, 4103.1.2.2.1 through 4103.1.2.2.4

~~605.5.2.1.1~~ **4103.1.2.2.1 Prohibited locations.** The storage or use of portable outdoor gas-fired heating appliances is prohibited in any of the following locations, except where permitted by Chapter 61, or where the appliance is used in accordance with its listing:

1. Inside of any occupancy where connected to the fuel gas container.
2. Inside of tents, canopies and membrane structures.
3. On exterior balconies.

Exception: As permitted in Chapter 61.

~~605.5.2.1.2~~ **4103.1.2.2.2 Clearance to buildings.** Portable outdoor gas-fired heating appliances shall be located not less than 5 feet (1524 mm) from buildings.

~~605.5.2.1.3~~ **4103.1.2.2.3 Clearance to combustible materials.** Portable outdoor gas-fired heating appliances shall not be located beneath, or closer than 5 feet (1524 mm) to combustible decorations and combustible overhangs, awnings, sunshades or similar combustible attachments to buildings. Portable gas-fired heating appliances used within tents, canopies, or membrane structures shall not be located within 10 (3048 mm) feet of combustible materials.

~~605.5.2.1.4~~ **4103.1.2.2.4 Proximity to exits.** Portable outdoor gas-fired heating appliances shall not be located within 5 feet (1524 mm) of *exits* or *exit discharges*. Portable gas-fired heating appliances used within tents, canopies, or membrane structures shall not be located within 10 feet (3048 mm) of exits or exit discharges.

~~605.5.2.3~~ **4103.1.2.3 Gas containers.** Fuel gas containers for portable outdoor gas-fired heating appliances shall comply with Sections ~~605.5.2.3.1 through 605.5.2.3.4~~, 4103.1.2.3.1 through 4103.1.2.3.4

~~605.5.2.3.1~~ **4103.1.2.3.1 Approved containers.** Only *approved* DOTn or ASME gas containers shall be used.

~~605.5.2.3.2~~ **4103.1.2.3.2 Container replacement.** Replacement of fuel gas containers in portable outdoor gas-fired heating appliances shall not be conducted while the public is present.

~~605.5.2.3.3~~ **4103.1.2.3.3 Container capacity.** The maximum individual capacity of gas containers used in connection with portable outdoor gas-fired heating appliances shall not exceed 20 pounds (9 kg).

~~605.5.2.3.4~~ **4103.1.2.3.4 Indoor storage prohibited.** Gas containers shall not be stored inside of buildings except in accordance with Section 6109.9.

Add new text as follows:

SECTION 4104 PORTABLE FUEL-FIRED COOKING APPLIANCES.

4104.1 Portable Fuel-Fired Cooking Appliances. Portable fuel-fired cooking appliances shall be permitted to be used in all occupancies in accordance with this section.

Revise as follows:

~~308-1.4~~ **4104.2 Open-flame cooking devices.** Charcoal burners and other open-flame cooking devices shall not be operated on combustible balconies or within 10 feet (3048 mm) of combustible construction.

Exceptions:

1. One- and two-family *dwelling*s.
2. Where buildings, balconies and decks are protected by an *automatic sprinkler system*.
3. LP-gas cooking devices having LP-gas container with a water capacity not greater than 2¹/₂ pounds [nominal 1 pound (0.454 kg) LP-gas capacity].

Add new text as follows:

4104.3 Indoor Cooking. Portable fuel-fired cooking appliances used indoors shall not be located within 10 feet (3048 mm) of exits or combustible materials.

Revise as follows:

~~3107-12.6~~ **4104.4 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; any building or structure of combustible construction, or of any potential ignition source.~~

~~3107-12.5~~ **4104.5 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).

~~3107-12.4~~ **4104.6 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*.

Add new text as follows:

SECTION 4105 PORTABLE ELECTRICAL COOKING APPLIANCES.

4105.1 Portable Electrical Cooking Appliances. Portable electric cooking appliances shall be permitted to be used in all occupancies in accordance with Sections 4105.1.1 through 4105.1.5.

4105.1.1 Listed and Labeled. Portable electric cooking appliances shall be listed and labeled, and shall be used in accordance with their listing and the manufacturer's instructions.

4105.1.2 Power Supply. Portable electric cooking appliances shall be plugged directly into an approved receptacle or connected to a relocatable power tap rated 20 amps.

4105.1.3 Extension Cords. Portable electric cooking appliances shall not be plugged into extension cords.

4105.1.6 Prohibited Areas. Portable electric cooking appliances shall not be operated within 3 feet (914 mm) of any combustible materials or in H occupancies. Portable electric cooking appliances shall be operated only in locations for which they are listed.

4105.1.5 Temporary Connections. Where portable electric cooking appliances are used for temporary operations, the appliance shall be disconnected from the power supply when not in use.

Revise as follows:

SECTION ~~319~~ 4106 MOBILE FOOD PREPARATION VEHICLES.

~~319-1~~ **4106.1 General.** Mobile food preparation vehicles that are equipped with appliances that produce smoke or grease-laden vapors shall comply with this section.

~~319-2~~ **4106.2 Permit required.** Permits shall be required as set forth in Section 105.5.

~~319-3~~ **4106.3 Exhaust hood.** Cooking equipment that produces grease-laden vapors shall be provided with a kitchen exhaust hood in accordance with Section 606.

~~319-4~~ **4106.4 Fire protection.** Fire protection shall be provided in accordance with Sections ~~319.4.1 and 319.4.2;~~ 4106.4.1 and 4106.4.2

~~319.4.1~~ 4106.4.1 Fire protection for cooking equipment. Cooking equipment shall be protected by automatic fire-extinguishing systems in accordance with Section 904.13.

~~319.4.2~~ 4106.4.2 Fire extinguisher. Portable fire extinguishers shall be provided in accordance with Section 906.4.

~~319.5~~ 4106.5 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 the 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~~ 4106.6 Cooking oil storage containers. Cooking oil storage containers within mobile food preparation vehicles shall have a maximum aggregate volume not more than 120 gallons (454 L), and shall be stored in such a way as to not be toppled or damaged during transport.

~~319.7~~ 4106.7 Cooking oil storage tanks. Cooking oil storage tanks within mobile food preparation vehicles shall comply with Sections ~~319.7.1 through 319.7.5.2~~ 4106.7.1 through 4106.7.5.2

~~319.7.1~~ 4106.7.1 Metallic storage tanks. Metallic cooking oil storage tanks shall be ~~listed~~ in accordance with UL 80 or UL 142, and shall be installed in accordance with the tank manufacturer's instructions.

~~319.7.2~~ 4106.7.2 Nonmetallic storage tanks. Nonmetallic cooking oil storage tanks shall be installed in accordance with the tank manufacturer's instructions and shall comply with both 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~~ 4106.7.3 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~~ 4106.7.4 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~~ 4106.7.5 Tank venting. Normal and emergency venting shall be provided for cooking oil storage tanks.

~~319.7.5.1~~ 4106.7.5.1 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~~ 4106.7.5.2 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~~ 4106.8 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~~ 4106.8.1 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 (91 kg) propane capacity.

~~319.8.2~~ 4106.8.2 Protection of container. LP-gas containers installed on the vehicle shall be securely mounted and restrained to prevent movement.

~~319.8.3~~ 4106.8.3 LP-gas container construction. LP-gas containers shall be manufactured in compliance with the requirements of NFPA 58.

~~319.8.4~~ 4106.8.4 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~~ 4106.8.5 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 the manufacturer's instructions.

~~319.9~~ 4106.9 CNG systems. Where CNG systems provide fuel for cooking appliances, such systems shall comply with Sections ~~319.9.1 through 319.9.4~~ 4106.9.1 through 4106.9.4.

~~319.9.1~~ 4106.9.1 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~~ 4106.9.1.1 through 4106.9.1.3.

~~319.9.1.1~~ 4106.9.1.1 Maximum aggregate volume. The maximum aggregate capacity of CNG containers transported on the vehicle shall not exceed 1,300 pounds (590 kg) water capacity.

~~319.9.1.2~~ 4106.9.1.2 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~~ **4106.9.1.3 CNG container construction.** CNG containers shall be an NGV-2 cylinder.

~~319.9.2~~ **4106.9.2 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~~ **4106.9.3 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~~ **4106.9.4 Methane alarms.** A *listed* methane gas alarm shall be installed within the vehicle in accordance with manufacturer's instructions.

~~319.10~~ **4106.10 Maintenance.** Maintenance of systems on mobile food preparation vehicles shall be in accordance with Sections ~~319.10.1~~ **4106.10.1** through ~~319.10.3~~ **4106.10.3**.

~~319.10.1~~ **4106.10.1 Exhaust system.** The exhaust system, including hood, grease-removal devices, fans, ducts and other appurtenances, shall be inspected and cleaned in accordance with Section 606.3.

~~319.10.2~~ **4106.10.2 Fire protection systems and devices.** *Fire protection systems* and devices shall be maintained in accordance with Section 901.6.

~~319.10.3~~ **4106.10.3 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 US Department of Transportation to requalify LP-gas cylinders, to ensure that system components are free from damage, suitable for the intended service and not subject to leaking. CNG containers shall be inspected every 3 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.

308.1.5 Location near combustibles. Open flames such as from candles, ~~and~~ lanterns, ~~kerosene heaters and gas-fired heaters~~ shall not be located on or near decorative material or similar combustible materials.

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.
4. Fuel-fired portable heating and cooking equipment stored, operated, or repaired in accordance with Chapter 41.

605.1 General. The design, construction, installation, operation, alteration, repair and maintenance of nonportable gas-fired appliances and systems shall comply with the provisions of this section and the *International Fuel Gas Code*. The design, construction, installation, operation, alteration, repair and maintenance of nonportable solid fuel-fired and oil-fired appliances and systems shall comply with the provisions of this section and the *International Mechanical Code*. ~~The construction and use of portable fuel-fired appliances not connected to a fixed fuel piping system, such as blow torches, melting pots and weed burners, shall comply with this section.~~

3107.12 Heating and cooking equipment. Temporary

~~H~~ heating and cooking equipment shall be in accordance with Chapter 41. Permanent heating and cooking equipment shall be in accordance with Chapter 6 and Sections 3107.12.1 through 3107.12.7.3.

Reason Statement: During the COVID 19 Pandemic, it was noted by many fire and building officials that the code requirements surrounding temporary heating and cooking, especially in tents and canopies was disjointed and often confusing. In addition, some types of heating and cooking appliances were not adequately covered. Adding to the confusion is the rewrite of Chapter 6 to align with things that occur in buildings, making those things that occur in tents and membrane structures less applicable to Chapter 6 provisions. It was felt that relocating all temporary heating and cooking should be relocated to a new chapter 41. This involved moving things from Chapter 3, 6, and 31 all to a new location.

The group did not move any requirements for temporary heating on construction sites as it was felt that having all requirements for fire safety during construction co-located was better from a usability standpoint.

The requirements found in the new Chapter 41 are largely not new, just relocations. And while there are some new sections, they are intended to be in line with existing text relocated here.

Specifically, the following things are new:

3 new operational permits are being proposed. One deals with cooking and heating in tents. One deals with the use of temporary heating and cooking in designated wildfire hazard zones, and the last deals with temporary heating and cooking at construction sites.

The general section, 4101, contains a pointer to 308 to make sure those requirements are utilized appropriately. The additional requirements are largely taken from other sections to provide code continuity with other sections. For example, 4101.3 is taken from language in 3304.1. 4101.4 is taken from section 605, and 307.5.

Several operational requirements found in 3107 have been relocated to the new chapter.

Items on oil filled heaters and refueling of fuel fired appliances have been based on 3304 language.

4101.9 is copied from section 3106.

The hazard abatement language in the new 4101.10 is taken from 601 and 313.1.1.

Section 4102 is all relocated from 603.9.

Section 4103 is all relocated from 605.5. There is a change in language in 4103.1.2.1.4 to clear up ambiguous language from the current code.

4103.1.2.2.1 has a new pointer to Chapter 31 in the main section rather than as an exception in the same section.

The new language in 4103.1.2.2.3 and 4103.1.2.2.4 are taken from 3107.12.3 to remain consistent with those sections.

Section 4104 applies to portable fuel-fired equipment. A new section 4104.3 was introduced for indoor cooking, but is consistent with 3107.12.3.

the change in 4104.4 is intended to clarify that this should apply to all structures, not just tents and membrane structures.

4105 is for portable electrical cooking appliances. This was largely pulling from other sections such as 603.9. 4105.1.2 is intended to allow for the safe use of crockpots and other appliances with intermittent loads. We also clarified that cooking should not occur in H occupancies. This use should be moved to a B occupancy portion of the building. 4105.1.5 is intended to ensure that an appliance cannot accidentally be cycled back on.

319, another form of temporary cooking would be relocated to the new chapter as well. There are no changes proposed here, only renumbering.

The last portion of the proposal modifies existing language in other chapters to point to the new chapter, and to modify the scoping provisions of those sections.

605.1 is modified to point to chapter 41 for temporary activities

313 is changed to refer to the new Chapter 41 and to remove the reference to cooking in the charging language.

308.1.5 is modified to remove those things covered in the new chapter.

And 3107.12 is modified to refer the user to chapter 41 for temporary heating and cooking, and stay there for permanent heating and cooking that might occur here.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

This proposal moves existing requirements from other locations to a new common chapter. New language is also taken from other places, and is largely covered by listings and instructions from manufacturers.

F189-21

IFC: 5001.1, 5701.2

Proponents: Elley Klausbruckner, Klausbruckner & Associates, Inc., representing Klausbruckner & Associates, Inc.

2021 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, medicines, foodstuff, cosmetics and commercial or institutional products containing not more than 50 percent by volume of water-miscible liquids and with the remainder of the solutions not being flammable, provided that such materials are packaged in individual containers not exceeding 1.3 gallons (5 L).
2. Alcoholic beverages in retail or wholesale sales occupancies, provided that 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 manufacturer's 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 608).
7. Stationary storage battery systems regulated by Section 1207.
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 manufacturer's original consumer packaging in Group M occupancies.
10. The storage of beer, distilled spirits and wines in 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. Specific provisions for flammable liquids in motor fuel-dispensing facilities, repair garages, airports and marinas in Chapter 23.
13. 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 605. For abandonment of fuel oil tanks, Chapter 57 applies.
14. Storage and display of aerosol products complying with Chapter 51.
15. Storage and use of *flammable* or *combustible liquids* that do not have a fire point when tested in accordance with ASTM D92, not otherwise regulated by this code.
16. *Flammable* or *combustible 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, not otherwise regulated by this code.
17. Commercial cooking oil storage tank systems located within a building and designed and installed in accordance with Section 607 and NFPA 30.
18. Class IIIB Liquids in containers with a flashpoint at or above 450°F (121°C) that are not pumped or heated above 150°F (65°C), in a building equipped throughout with an automatic sprinkler system and where protected as follows:
 - 18.1 Class IV ordinary combustible commodity in metal containers.
 - 18.2 High Hazard ordinary combustible commodity in plastic containers, and separated from ordinary combustibles by a minimum of 10'.

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 605. For abandonment of fuel oil tanks, this chapter applies.
5. Refrigeration systems (see Section 608).
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 D92.
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 beer, distilled spirits and wines in barrels and casks.
11. Commercial cooking oil storage tank systems located within a building and designed and installed in accordance with Section 607 and NFPA 30.
12. 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 manufacturer's instructions and label directions.
13. The off-site transportation of *flammable or combustible liquids* where in accordance with Department of Transportation (DOT) regulation.
14. Class IIIB Liquids in containers with a flashpoint at or above 450°F (121°C) that are not pumped or heated above 150°F (65°C), in a building equipped throughout with an automatic sprinklered building and where protected as follows:
 - 14.1 Class IV ordinary combustible commodity in metal containers.
 - 14.2 High Hazard ordinary combustible commodity in plastic containers, and separated from ordinary combustibles by a minimum of 10'.

Reason Statement: Table 5003.1.1(1) footnote f, allows unlimited quantities of Class IIIB liquids in buildings throughout with an approved fire sprinkler system in accordance with Section 903.3.1.1 (i.e. NFPA 13). In a recent informal interpretation by ICC staff, an issue came up that may affect how users view Class IIIB Liquids in sprinklered buildings. The staff interpretation stated that if Class IIIB liquids are allowed in unlimited quantities, if the building is protected per NFPA 13, and if NFPA 13 references NFPA 30 (e.g. 2019 Edition of NFPA 13, Section 26.2), then you continue the referenced sections through to the end (i.e. Class IIIB liquids have to be protected per NFPA 30). The issue that arises from this is for some threshold quantities, NFPA 30 requirements for Class IIIB Liquids (i.e. control area, 2019 Edition of NFPA 30, Table 16.5.2.3) have similar requirements for Class IIIA in an H-Occupancy (i.e. IFC Table 5704.3.6.3(4)). To this end, the proponent is proposing an exception for at least the higher flashpoint IIIB Liquids (>450 °F). The proposed exception is based on FM Data Sheet 7-29 for protection of "atypical ignitable liquids". FM Data Sheet 7-29, further describes "atypical ignitable liquids" with the following statement:

"Based on the results of several research test programs, FM Global has defined a closed-cup flash point threshold at which liquids will not support fire spread across an unheated liquid pool. This does not mean these liquids will not burn; in fact, they still represent a severe fire hazard when stored in small plastic containers or larger containers with cardboard packaging, and when they are heated above 150°F (65°C) or pumped." Please note that once ignited, these liquids are still capable of high heat release, which is why protection in accordance with Class IV commodity (for liquids in metal containers) and High Hazard/Group A Plastics commodity (for liquids in plastic containers) is proposed, similar to what is required in FM Data Sheet 7-29, Sections 2.1.3.

While this fix does not solve all issues associated with how to protect unlimited quantities of IIIB liquids in a sprinklered building, it does address some of the issues with IIIB Liquids with higher than normal flashpoint.

Bibliography: 1. NFPA 30, 2018 Edition, Table 16.5.2.3
2. Factory Mutual Data Sheet 7-29, Sections

Cost Impact: The code change proposal will not increase or decrease the cost of construction. Depending on how protection of Class IIIB liquids have been interpreted, it is unsure as to whether this will increase or decrease the cost of construction.

F190-21

IFC: 5001.1

Proponents: Dave Frable, representing Self (dave.frable@gsa.gov)

2021 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, medicines, foodstuff, cosmetics and commercial or institutional products containing not more than 50 percent by volume of water-miscible liquids and with the remainder of the solutions not being flammable, provided that such materials are packaged in individual containers not exceeding 1.3 gallons (5 L).
2. Alcoholic beverages in retail or wholesale sales occupancies, provided that 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 manufacturer's 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 608).
7. Stationary storage battery systems regulated by Section 1207.
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 manufacturer's original consumer packaging in Group M occupancies.
10. The storage of beer, distilled spirits and wines in barrels and casks.
11. The use, storage, or both of ~~wall-mounted~~ dispensers containing alcohol-based hand rubs classified as Class I or II liquids where in accordance with Section 5705.5.
12. Specific provisions for flammable liquids in motor fuel-dispensing facilities, repair garages, airports and marinas in Chapter 23.
13. 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 605. For abandonment of fuel oil tanks, Chapter 57 applies.
14. Storage and display of aerosol products complying with Chapter 51.
15. Storage and use of *flammable* or *combustible liquids* that do not have a fire point when tested in accordance with ASTM D92, not otherwise regulated by this code.
16. *Flammable* or *combustible 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, not otherwise regulated by this code.
17. Commercial cooking oil storage tank systems located within a building and designed and installed in accordance with Section 607 and NFPA 30.

Reason Statement: The intent of this proposal is to address issues that have arisen during the COVID-19 pandemic concerning the use, storage, or both of alcohol based hand sanitizers (ABHS) dispensers distributed within occupancies. The current text only addresses the use of wall-mounted dispensers containing ABHS. This proposal revises the current text to address the use, storage, or both of ABHS dispensers.

Bibliography: N/A

Cost Impact: The code change proposal will not increase or decrease the cost of construction

This proposal is focused upon operational and use requirements and does not affect the cost of construction. The provisions are simply more reflective of how ABHS is being used as affected by COVID19.

F191-21

IFC: TABLE 5003.1.1(1), TABLE 5003.1.1(2), TABLE 5003.1.1(3), TABLE 5003.1.1(4); IBC: TABLE 307.1(1), TABLE 307.1(2)

Proponents: Tanner Fairrington, Medford Fire-Rescue, representing Medford Fire-Rescue

2021 International Fire Code

Revise as follows:

TABLE 5003.1.1(1)
MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A PHYSICAL HAZARD^{a, j, m, n, p}

MATERIAL	CLASS	GROUP WHEN THE MAXIMUM ALLOWABLE QUANTITY IS EXCEEDED	STORAGE ^b			USE-CLOSED SYSTEMS ^b			USE-OPEN SYSTEMS ^b	
			Solid pounds (cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds (cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds (cubic feet)	Liquid gallons (pounds)
Combustible dust	NA	H-2	See Note q	NA	NA	See Note q	NA	NA	See Note q	NA
Combustible fibers ^q	Loose	H-3	(100)	NA	NA	(100)	NA	NA	(20)	NA
	Baled ^o		(1,000)			(1,000)			(200)	
Combustible liquid ^{c, i}	II	H-2 or H-3	NA	120 ^{d, e}	NA	NA	120 ^d	NA	NA	30 ^d
	IIIA	H-2 or H-3		330 ^{d, e}			330 ^d			80 ^d
	IIIB	NA		13,200 ^{e, f}			13,200 ^f			3,300 ^f
CryogenicFlammable	NA	H-2	NA	45 ^d	NA	NA	45 ^d	NA	NA	10 ^d
CryogenicInert	NA	NA	NA	NA	NL	NA	NA	NL	NA	NA
CryogenicOxidizing	NA	H-3	NA	45 ^d	NA	NA	45 ^d	NA	NA	10 ^d
Explosives	Division 1.1	H-1	1 ^{e, g}	(1) ^{e, g}	NA	0.25 ^g	(0.25) ^g	NA	0.25 ^g	(0.25) ^g
	Division 1.2	H-1	1 ^{e, g}	(1) ^{e, g}		0.25 ^g	(0.25) ^g		0.25 ^g	(0.25) ^g
	Division 1.3	H-1 or H-2	5 ^{e, g}	(5) ^{e, g}		1 ^g	(1) ^g		1 ^g	(1) ^g
	Division 1.4	H-3	50 ^{e, g}	(50) ^{e, g}		50 ^g	(50) ^g		NA	NA
	Division 1.4G	H-3	125 ^{e, l}	NA		NA	NA		NA	NA
	Division 1.5	H-1	1 ^{e, g}	(1) ^{e, g}		0.25 ^g	(0.25) ^g		0.25 ^g	(0.25) ^g
	Division 1.6	H-1	1 ^{e, g}	NA		NA	NA		NA	NA
Flammable gas	Gaseous	H-2	NA	NA	1,000 ^{d, e}	NA	NA	1,000 ^{d, e}	NA	NA
	Liquefied			(150) ^{d, e}	NA		(150) ^{d, e}	NA		
Flammable liquid ^c	IA	H-2 or H-3	NA	30 ^{d, e}	NA	NA	30 ^d	NA	NA	10d
	IB and IC			120 ^{d, e}			120 ^d			30d
Flammable liquid, combination (IA, IB, IC)	NA	H-2 or H-3	NA	120 ^{d, e, h}	NA	NA	120 ^{d, h}	NA	NA	30 ^{d, h}
Flammable solid	NA	H-3	125 ^{d, e}	NA	NA	125 ^d	NA	NA	25 ^d	NA
Inert gas	Gaseous	NA	NA	NA	NL	NA	NA	NL	NA	NA
	Liquefied	NA	NA	NA	NL	NA	NA	NL	NA	NA
Organic peroxide	UD	H-1	1 ^{e, g}	(1) ^{e, g}	NA	0.25 ^g	(0.25) ^g	NA	0.25 ^g	(0.25) ^g
	I	H-2	5 ^{d, e}	(5) ^{d, e}		1 ^d	(1) ^d		1 ^d	(1) ^d
	II	H-3	50 ^{d, e}	(50) ^{d, e}		50 ^d	(50) ^d		10 ^d	(10) ^d
	III	H-3	125 ^{d, e}	(125) ^{d, e}		125 ^d	(125) ^d		25 ^d	(25) ^d
	IV	NA	NL	NL		NL	NL		NL	NL
	V	NA	NL	NL		NL	NL		NL	NL
	4	H-1	1 ^g	(1) ^{e, g}		0.25 ^g	(0.25) ^g		0.25 ^g	(0.25) ^g

Oxidizer	3 ^k	H-2 or H-3	10 ^{d, e}	(10) ^{d, e}	NA	2 ^d	(2) ^d	NA	2 ^d	(2) ^d
	2	H-3	250 ^{d, e}	(250) ^{d, e}		250 ^d	(250) ^d		50 ^d	(50) ^d
	1	NA	4,000 ^{e, f}	(4,000) ^{e, f}		4,000 ^f	(4,000) ^f		1,000 ^f	(1,000) ^f
Oxidizing gas	Gaseous	H-3	NA	NA	1,500 ^{d, e}	NA	NA	1,500 ^{d, e}	NA	NA
	Liquefied			(150) ^{d, e}	NA		(150) ^{d, e}	NA		
Pyrophoric	NA	H-2	4 ^{e, g}	(4) ^{e, g}	50 ^{e, g}	1 ^g	(1) ^g	10 ^{e, g}	0	0
Unstable (reactive)	4	H-1	1 ^{e, g}	(1) ^{e, g}	10 ^{e, g}	0.25 ^g	(0.25) ^g	2 ^{e, g}	0.25 ^g	(0.25) ^g
	3	H-1 or H-2	5 ^{d, e}	(5) ^{d, e}	50 ^{d, e}	1 ^d	(1) ^d	10 ^{d, e}	1 ^d	(1) ^d
	2	H-3	50 ^{d, e}	(50) ^{d, e}	750 ^{d, e}	50 ^d	(50) ^d	750 ^{d, e}	10 ^d	(10) ^d
	1	NA	NL	NL	NL	NL	NL	NL	NL	NL
Water reactive	3	H-2	5 ^{d, e}	(5) ^{d, e}	NA	5 ^d	(5) ^d	NA	1 ^d	(1) ^d
	2	H-3	50 ^{d, e}	(50) ^{d, e}		50 ^d	(50) ^d		10 ^d	(10) ^d
	1	NA	NL	NL		NL	NL		NL	NL

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 maximum allowable quantity listed for storage, including applicable increases.
- 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 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 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 605.4.2.
- j. Quantities in parenthesis indicate quantity units in parenthesis at the head of each column.
- k. A maximum quantity of 220 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.
 3. Gaseous fuels in piping systems and fixed appliances regulated by the *International Fuel Gas 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 104.8.2.

TABLE 5003.1.1(2)
MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A HEALTH HAZARD^{a, c, f, h, i}

MATERIAL	STORAGE ^b			USE-CLOSED SYSTEMS ^b			USE-OPEN SYSTEMS ^b	
	Solid pounds ^{d, e}	Liquid gallons (pounds) ^{d, e}	Gas cubic feet at NTP (pounds) ^d	Solid pounds ^d	Liquid gallons (pounds) ^d	Gas cubic feet at NTP (pounds) ^d	Solid pounds ^d	Liquid gallons (pounds) ^d
Corrosives	5,000	500	Gaseous 810 ^e Liquefied (150)	5,000	500	Gaseous 810 ^e Liquefied (150)	1,000	100
Highly toxics	10	(10)	Gaseous 20 ^g Liquefied (4) ^g	10	(10)	Gaseous 20 ^g Liquefied (4) ^g	3	(3)
Toxics	500	(500)	Gaseous 810 ^e Liquefied (150) ^e	500	(500)	Gaseous 810 ^e Liquefied (150) ^e	125	(125)

For SI: 1 cubic foot = 0.02832 m³, 1 pound = 0.454 kg, 1 gallon = 3.785 L.

- a. For use of control areas, see Section 5003.8.3.
- b. The aggregate quantity in use and storage shall not exceed the maximum allowable quantity listed for storage., including applicable increases.
- c. 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 and 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, gas cabinets or exhausted enclosures. Where Note d applies, the increase for both notes shall be applied accumulatively.
- f. 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.
- g. Allowed only where stored in approved exhausted gas cabinets or exhausted enclosures.
- h. Quantities in parentheses indicate quantity units in parentheses at the head of each column.
- i. For gallons of liquids, divide the amount in pounds by 10 in accordance with Section 5003.1.2.

TABLE 5003.1.1(3)
MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A PHYSICAL HAZARD IN AN
OUTDOOR CONTROL AREA^{a, b, c, d}

Portions of table not shown remain unchanged.

MATERIAL	CLASS	STORAGE ^b			USE-CLOSED SYSTEMS ^b			USE-OPEN SYSTEMS ^b	
		Solid pounds (cubic feet)	Liquid gallons (pounds) ^d	Gas cubic feet at NTP	Solid pounds (cubic feet)	Liquid gallons (pounds) ^d	Gas cubic feet at NTP	Solid pounds (cubic feet)	Liquid gallons (pounds) ^d
Flammable gas	Gaseous Liquefied	Not Applicable	Not Applicable (300)	3,000 Not Applicable	Not Applicable	Not Applicable (150)	1,500 Not Applicable	Not Applicable	Not Applicable
Flammable solid	Not Applicable	500	Not Applicable	Not Applicable	250	Not Applicable	Not Applicable	50	Not Applicable
Inert Gas	Gaseous Liquefied	Not Applicable Not Applicable	Not Applicable Not Applicable	Not Limited Not Limited Not Limited	Not Applicable Not Applicable Not Applicable	Not Applicable Not Applicable Not Applicable	Not Limited Not Limited Not Limited	Not Applicable Not Applicable Not Applicable	Not Applicable Not Applicable Not Applicable
Cryogenic inert	Not Applicable	Not Applicable	Not Applicable	Not Limited	Not Applicable	Not Applicable	Not Limited	Not Applicable	Not Applicable
Organic peroxide	Unclassified Detonable	1	(1)	Not Applicable	0.25	(0.25)	Not Applicable	0.25	(0.25)
Organic peroxide	I	20	(20)	Not Applicable	10	(10)	Not Applicable	2	(2)
	II	200	(200)		100	(100)		20	(20)
	III	500	(500)		250	(250)		50	(50)
	IV	Not Limited	Not Limited		Not Limited	Not Limited		Not Limited	Not Limited
	V	Not Limited	Not Limited		Not Limited	Not Limited		Not Limited	Not Limited
Oxidizer	4	2	(2)	Not Applicable	1	(1)	Not Applicable	0.25	(0.25)
	3	40	(40)		20	(20)		4	(4)
	2	1,000	(1,000)		500	(500)		100	(100)
	1	Not Limited	Not Limited		Not Limited	Not Limited		Not Limited	Not Limited
Oxidizing gas	Gaseous Liquefied	Not Applicable	Not Applicable (600)	6,000 Not Applicable	Not Applicable	Not Applicable (300)	1,500 Not Applicable	Not Applicable	Not Applicable
Pyrophoric materials	Not Applicable	8	(8)	100	4	(4)	10	0	0
Unstable (reactive)	4	2	(2)	20	1	(1)	2	0.25	(0.25)
	3	20	(20)	200	10	(10)	10	1	(1)
	2	200	(200)	1,000	100	(100)	250	10	(10)
	1	Not Limited	Not Limited	1,500	Not Limited	Not Limited	Not Limited	Not Limited	Not Limited
Water reactive	3	20	(20)	Not Applicable	10	(10)	Not Applicable	1	(1)
	2	200	(200)		100	(100)		10	(10)
	1	Not Limited	Not Limited		Not Limited	Not Limited		Not Limited	Not Limited

For SI: 1 pound = 0.454 kg, 1 gallon = 3.785 L, 1 cubic foot = 0.02832 m³.

- For gallons of liquids, divide the amount in pounds by 10 in accordance with Section 5003.1.2.
- The aggregate quantities in storage and use shall not exceed the maximum allowable quantity ~~listed~~ for storage- including applicable increases.
- The aggregate quantity of nonflammable solid and nonflammable or noncombustible liquid hazardous materials allowed in outdoor storage per single property under the same ownership or control used for retail or wholesale sales is allowed to exceed the maximum allowable quantity per control area where such storage is in accordance with Section 5003.11.
- Quantities in parentheses indicate quantity units in parentheses at the head of each column.

TABLE 5003.1.1(4)
MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A HEALTH HAZARD IN AN OUTDOOR CONTROL AREA^{a, b, c, f}

MATERIAL	STORAGE			USE-CLOSED SYSTEMS			USE-OPEN SYSTEMS	
	Solid pounds	Liquid gallons (pounds)	Gas cubic feet at NTP (pounds)	Solid pounds	Liquid gallons (pounds)	Gas cubic feet at NTP (pounds)	Solid pounds	Liquid gallons (pounds)
Corrosives	20,000	2,000	Gaseous 1,620 Liquefied (300)	10,000	1,000	Gaseous 810 Liquefied (150)	1,000	100
Highly toxics	20	(20)	Gaseous 40 ^d Liquefied (8) ^d	10	(10)	Gaseous 20 ^d Liquefied (4) ^d	3	(3)
Toxics	1,000	(1,000) ^e	Gaseous 1,620 Liquefied (300)	500	50 ^e	Gaseous 810 Liquefied (150)	125	(125) ^e

For SI: 1 cubic foot = 0.02832 m³, 1 pound = 0.454 kg, 1 gallon = 3.785 L, 1 pound per square inch absolute = 6.895 kPa, °C = (°F – 32)/1.8.

- For gallons of liquids, divide the amount in pounds by 10 in accordance with Section 5003.1.2.
- The aggregate quantities in storage and use shall not exceed the maximum allowable quantity ~~listed for storage~~, including applicable increases.
- The aggregate quantity of nonflammable solid and nonflammable or noncombustible liquid hazardous materials allowed in outdoor storage per single property under the same ownership or control used for retail or wholesale sales is allowed to exceed the maximum allowable quantity per control area where such storage is in accordance with Section 5003.11.
- Allowed only where used in approved exhausted gas cabinets, exhausted enclosures or under fume hoods.
- The maximum allowable quantity per control area for toxic liquids with vapor pressures in excess of 1 psia at 77°F shall be the maximum allowable quantity per control area listed for highly toxic liquids.
- Quantities in parentheses indicate quantity units in parentheses at the head of each column.

2021 International Building Code

Revise as follows:

TABLE 307.1(1)
MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A PHYSICAL HAZARD^{a, j, m, n, p}

MATERIAL	CLASS	GROUP WHEN THE MAXIMUM ALLOWABLE QUANTITY IS EXCEEDED	STORAGE ^b			USE-CLOSED SYSTEMS ^b			USE-OPEN SYSTEMS ^b	
			Solid pounds(cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds(cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds(cubic feet)	Liquid gallons (pounds)
Combustible dust	NA	H-2	See Note q	NA	NA	See Note q	NA	NA	See Note q	NA
Combustible fiber ^q	Loose	H-3	(100)	NA	NA	(100)	NA	NA	(20)	NA
	Baled ^o		(1,000)			(1,000)			(200)	
Combustible liquid ^{c, i}	II	H-2 or H-3	NA	120 ^{d, e}	NA	NA	120 ^d	NA	NA	30 ^d
	IIIA	H-2 or H-3		330 ^{d, e}			330 ^d			80 ^d
	IIIB	NA		13,200 ^{e, f}			13,200 ^f			3,300 ^f
Cryogenic flammable	NA	H-2	NA	45 ^d	NA	NA	45 ^d	NA	NA	10 ^d
Cryogenic inert	NA	NA	NA	NA	NL	NA	NA	NL	NA	NA
Cryogenic oxidizing	NA	H-3	NA	45 ^d	NA	NA	45 ^d	NA	NA	10 ^d
Explosives	Division 1.1	H-1	1 ^{e, g}	(1) ^{e, g}	NA	0.25 ^g	(0.25) ^g	NA	0.25 ^g	(0.25) ^g
	Division 1.2	H-1	1 ^{e, g}	(1) ^{e, g}		0.25 ^g	(0.25) ^g		0.25 ^g	(0.25) ^g
	Division 1.3	H-1 or H-2	5 ^{e, g}	(5) ^{e, g}		1 ^g	(1) ^g		1 ^g	(1) ^g
	Division 1.4	H-3	50 ^{e, g}	(50) ^{e, g}		50 ^g	(50) ^g		NA	NA
	Division 1.4G	H-3	125 ^{e, l}	NA		NA	NA		NA	NA
	Division 1.5	H-1	1 ^{e, g}	(1) ^{e, g}		0.25 ^g	(0.25) ^g		0.25 ^g	(0.25) ^g
	Division 1.6	H-1	1 ^{e, g}	NA		NA	NA		NA	NA
Flammable gas	Gaseous	H-2	NA	NA	1,000 ^{d, e}	NA	NA	1,000 ^{d, e}	NA	NA
	Liquefied			(150) ^{d, e}	NA		(150) ^{d, e}	NA		
Flammable liquid ^c	IA	H-2 or H-3	NA	30 ^{d, e}	NA	NA	30 ^d	NA	NA	10 ^d
	IB and IC			120 ^{d, e}			120 ^d			30 ^d
Flammable liquid, combination (IA, IB, IC)	NA	H-2 or H-3	NA	120 ^{d, e, h}	NA	NA	120 ^{d, h}	NA	NA	30 ^{d, h}
Flammable solid	NA	H-3	125 ^{d, e}	NA	NA	125 ^d	NA	NA	25 ^d	NA
Inert gas	Gaseous	NA	NA	NA	NL	NA	NA	NL	NA	NA
	Liquefied	NA	NA	NA	NL	NA	NA	NL	NA	NA
Organic peroxide	UD	H-1	1 ^{e, g}	(1) ^{e, g}	NA	0.25 ^g	(0.25) ^g	NA	0.25 ^g	(0.25) ^g
	I	H-2	5 ^{d, e}	(5) ^{d, e}		1 ^d	(1) ^d		1 ^d	(1) ^d
	II	H-3	50 ^{d, e}	(50) ^{d, e}		50 ^d	(50) ^d		10 ^d	(10) ^d
	III	H-3	125 ^{d, e}	(125) ^{d, e}		125 ^d	(125) ^d		25 ^d	(25) ^d
	IV	NA	NL	NL		NL	NL		NL	NL

	V	NA	NL	NL		NL	NL		NL	NL
Oxidizer	4	H-1	1 ^g	(1) ^{e, g}	NA	0.25 ^g	(0.25) ^g	NA	0.25 ^g	(0.25) ^g
	3 ^k	H-2 or H-3	10 ^{d, e}	(10) ^{d, e}		2 ^d	(2) ^d		2 ^d	(2) ^d
	2	H-3	250 ^{d, e}	(250) ^{d, e}		250 ^d	(250) ^d		50 ^d	(50) ^d
	1	NA	4,000 ^{e, f}	(4,000) ^{e, f}		4,000 ^f	(4,000) ^f		1,000 ^f	(1,000) ^f
Oxidizing gas	Gaseous	H-3	NA	NA	1,500 ^{d, e}	NA	NA	1,500 ^{d, e}	NA	NA
	Liquefied			(150) ^{d, e}	NA		(150) ^{d, e}	NA		
Pyrophoric	NA	H-2	4 ^{e, g}	(4) ^{e, g}	50 ^{e, g}	1 ^g	(1) ^g	10 ^{e, g}	0	0
Unstable (reactive)	4	H-1	1 ^{e, g}	(1) ^{e, g}	10 ^{e, g}	0.25 ^g	(0.25) ^g	2 ^{e, g}	0.25 ^g	(0.25) ^g
	3	H-1 or H-2	5 ^{d, e}	(5) ^{d, e}	50 ^{d, e}	1 ^d	(1) ^d	10 ^{d, e}	1 ^d	(1) ^d
	2	H-3	50 ^{d, e}	(50) ^{d, e}	750 ^{d, e}	50 ^d	(50) ^d	750 ^{d, e}	10 ^d	(10) ^d
	1	NA	NL	NL	NL	NL	NL	NL	NL	NL
Water reactive	3	H-2	5 ^{d, e}	(5) ^{d, e}	NA	5 ^d	(5) ^d	NA	1 ^d	(1) ^d
	2	H-3	50 ^{d, e}	(50) ^{d, e}		50 ^d	(50) ^d		10 ^d	(10) ^d
	1	NA	NL	NL		NL	NL		NL	NL

For SI: 1 cubic foot = 0.028 m³, 1 pound = 0.454 kg, 1 gallon = 3.785 L.

NL = Not Limited; NA = Not Applicable; UD = Unclassified Detonable.

- a. For use of control areas, see Section 414.2.
- b. The aggregate quantity in use and storage shall not exceed the maximum allowable quantity specified for storage, including applicable increases.
- c. The quantities of alcoholic beverages in retail and wholesale sales occupancies shall not be limited provided the liquids are packaged in individual containers not exceeding 1.3 gallons. In retail and wholesale sales occupancies, the quantities of medicines, foodstuffs 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 automatic sprinkler system in accordance with Section 903.3.1.1. Where Note e also applies, the increase for both notes shall be applied cumulatively.
- e. Maximum allowable quantities shall be increased 100 percent when stored in approved storage cabinets, day boxes, gas cabinets, gas rooms or exhausted enclosures or in listed safety cans in accordance with Section 5003.9.10 of the International Fire Code. Where Note d also applies, the increase for both notes shall be applied cumulatively.
- f. Quantities shall not be limited in a building equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.
- g. Allowed only in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.
- h. Containing not more than the maximum allowable quantity per control area of Class IA, IB or IC flammable liquids.
- i. The maximum allowable quantity shall not apply to fuel oil storage complying with Section 605.4.2 of the International Fire Code.
- j. Quantities in parentheses indicate quantity units in parentheses at the head of each column.
- k. A maximum quantity of 220 pounds of solid or 22 gallons of liquid Class 3 oxidizers is allowed when such materials are necessary for maintenance purposes, operation or sanitation of equipment when the storage containers and the manner of storage are approved.
- l. Net weight of the 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 of the International Fire Code.
- n. For storage and display quantities in Group M and storage quantities in Group S occupancies complying with Section 414.2.5, see Tables 414.2.5(1) and 414.2.5(2).
- 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 the *International Fire Code*.
 3. Gaseous fuels in piping systems and fixed appliances regulated by the *International Fuel Gas 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 of the *International Fire Code*. 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 414.1.3.

TABLE 307.1(2)
MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A HEALTH HAZARD^{a, c, f, h, i}

MATERIAL	STORAGE ^b			USE-CLOSED SYSTEMS ^b			USE-OPEN SYSTEMS ^b	
	Solid pounds ^{d, e}	Liquid gallons (pounds) ^{d, e}	Gas cubic feet at NTP (pounds) ^d	Solid pounds ^d	Liquid gallons (pounds) ^d	Gas cubic feet at NTP (pounds) ^d	Solid pounds ^d	Liquid gallons (pounds) ^d
Corrosives	5,000	500	Gaseous 810 ^e	5,000	500	Gaseous 810 ^e	1,000	100
			Liquefied (150)			Liquefied (150)		
Highly Toxic	10	(10)	Gaseous 20 ^g	10	(10)	Gaseous 20 ^g	3	(3)
			Liquefied (4) ^g			Liquefied (4) ^g		
Toxic	500	(500)	Gaseous 810 ^e	500	(500)	Gaseous 810 ^e	125	(125)
			Liquefied (150) ^e			Liquefied (150) ^e		

For SI: 1 cubic foot = 0.028 m³, 1 pound = 0.454 kg, 1 gallon = 3.785 L.

- For use of control areas, see Section 414.2.
- The aggregate quantity in use and storage shall not exceed the maximum allowable quantity ~~specified~~ for storage: , including applicable increases.
- In retail and wholesale sales occupancies, the quantities of medicines, foodstuffs 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 that such materials are packaged in individual containers not exceeding 1.3 gallons.
- 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.
- Maximum allowable quantities shall be increased 100 percent where stored in approved storage cabinets, gas cabinets or exhausted enclosures as specified in the *International Fire Code*. Where Note d also applies, the increase for both notes shall be applied accumulatively.
- For storage and display quantities in Group M and storage quantities in Group S occupancies complying with Section 414.2.5, see Tables 414.2.5(1) and 414.2.5(2).
- Allowed only where stored in approved exhausted gas cabinets or exhausted enclosures as specified in the *International Fire Code*.
- Quantities in parentheses indicate quantity units in parentheses at the head of each column.
- For gallons of liquids, divide the amount in pounds by 10 in accordance with Section 5003.1.2 of the *International Fire Code*.

Reason Statement: The purpose of this clarification is to reduce confusion when applying the footnotes of the maximum allowable quantity (MAQ) per control area tables of the IBC and IFC. This proposal provides consistency between the the IBC and IFC versions, and to clarifies that the intent of footnote b is for the aggregate MAQ for storage and use combined to be based on the tabular value for storage with applicable increases applied. The current language for footnote "b" of IFC Tables 5003.1.1(1) to (4) indicates the, "...quantity **listed** for storage." while footnote "b" of IBC Tables 307.1(1) & (2) indicates the, "...quantity **specified** for storage." The proposed language removes the terms "listed" and "specified" and adds clarifying language to indicate that the aggregate MAQ for storage and use includes applicable increases. The current language may be misinterpreted to indicate that the aggregate MAQ for storage and use within a control area should be based on the tabular value for storage, without increases applied, which conflicts the allowed increases. For example, the MAQ for a Class IIB Flammable liquid increases from 120 gal to 240 gal in a sprinklered building. For this allowance to occur, the total MAQ's in use in storage must exceed the tabular value for storage. Providing clarity and consistency in the language will help users apply the code correctly.

Bibliography: 2021 International Fire Code
2021 International Building Code

2018 International Fire Code and Commentary

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The cost of construction should not increase, and may decrease as a benefit of the clarification.

F192-21

IFC: TABLE 5003.1.1(1), TABLE 5003.1.1(3), 5003.8.3.5, 5003.8.3.5.4 (New), 5003.11, 5003.11.1, 5003.11.2, 5003.11.3, 5003.11.3.1, 5003.11.3.2, 5003.11.3.3, 5003.11.3.4, 5003.11.3.5, 5003.11.3.7, 5003.11.3.6, 5003.11.3.8, 5003.11.3.9, 5003.11.3.10, 5003.11.3.11, 5003.11.2 (New), TABLE 5003.11.2 (New), 5003.11.2.1 (New); IBC: TABLE 307.1(1), [F] 414.2.5, TABLE 414.2.5(3) (New), 414.2.5.4 (New)

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Fire Code

Revise as follows:

TABLE 5003.1.1(1)

MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A PHYSICAL HAZARD^{a, j, m, n, p}

Portions of table not shown remain unchanged.

MATERIAL	CLASS	GROUP WHEN THE MAXIMUM ALLOWABLE QUANTITY IS EXCEEDED	STORAGE ^b			USE-CLOSED SYSTEMS ^b			USE-OPEN SYSTEMS ^b	
			Solid pounds (cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds (cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds (cubic feet)	Liquid gallons (pounds)
Flammable gas	Gaseous	H-2	NA			NA	NA		NA	NA
	<u>1A and 1B (High BV)</u> ^l			NA	1,000 ^{d, e}			1,000 ^{d, e}		
	<u>1B (Low BV)</u> ^l				<u>162,500</u> ^{d, e}			<u>162,500</u> ^{d, e}		
	Liquefied				NA			NA		
	1A and 1B (High BV) ^r			(150) ^{d, e}			(150) ^{d, e}			
	1B (Low BV) ^r			<u>(10,000)</u> ^{d, e}			<u>(10,000)</u> ^{d, e}			

- For use of control areas, see Section 5003.8.3.
- The aggregate quantity in use and storage shall not exceed the quantity listed for storage.
- 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.
- 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 applies, the increase for both notes shall be applied accumulatively.
- 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 applies, the increase for both notes shall be applied accumulatively.
- Quantities shall not be limited in a building equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1.
- Allowed only in buildings equipped throughout with an approved automatic sprinkler system.
- Containing not more than the maximum allowable quantity per control area of Class IA, Class IB or Class IC flammable liquids.
- The maximum allowable quantity shall not apply to fuel oil storage complying with Section 605.4.2.
- Quantities in parenthesis indicate quantity units in parenthesis at the head of each column.
- A maximum quantity of 220 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.
- 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.
- For gallons of liquids, divide the amount in pounds by 10 in accordance with Section 5003.1.2.
- 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.
- 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.

Liquid or gaseous fuel in fuel tanks on motorized equipment operated in accordance with this code.

Gaseous fuels in piping systems and fixed appliances regulated by the International Fuel Gas Code.

Liquid fuels in piping systems and fixed appliances regulated by the International Mechanical Code.

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 104.8.2.

r "High BV" Category 1B flammable gas has a burning velocity greater than 3.9 in/s (10cm/s). "Low BV" Category 1B flammable gas has a burning velocity of 3.9 in/s (10 cm/s) or less.

TABLE 5003.1.1(3)

MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A PHYSICAL HAZARD IN AN OUTDOOR CONTROL AREA^{a, b, c, d}

Portions of table not shown remain unchanged.

MATERIAL	CLASS	STORAGE ^b			USE-CLOSED SYSTEMS ^b			USE-OPEN SYSTEMS ^b	
		Solid pounds (cubic feet)	Liquid gallons (pounds) ^d	Gas cubic feet at NTP	Solid pounds (cubic feet)	Liquid gallons (pounds) ^d	Gas cubic feet at NTP	Solid pounds (cubic feet)	Liquid gallons (pounds) ^d
Flammable gas	Gaseous	Not Applicable	Not Applicable		Not Applicable	Not Applicable		Not Applicable	Not Applicable
	1A and 1B (High BV) ^e			3,000			1,500		
	1B (Low BV) ^e			195,000			97,500		
	Liquefied					Not Applicable			
	1A and 1B (High BV) ^e		(300)	Not Applicable			(150)		
	1B (Low BV) ^e		(20,000)				(10,000)		

For SI: 1 pound = 0.454 kg, 1 gallon = 3.785 L, 1 cubic foot = 0.02832 m³.

- For gallons of liquids, divide the amount in pounds by 10 in accordance with Section 5003.1.2.
- The aggregate quantities in storage and use shall not exceed the quantity listed for storage.
- The aggregate quantity of nonflammable solid and nonflammable or noncombustible liquid hazardous materials allowed in outdoor storage per single property under the same ownership or control used for retail or wholesale sales is allowed to exceed the maximum allowable quantity per control area where such storage is in accordance with Section 5003.11.
- Quantities in parentheses indicate quantity units in parentheses at the head of each column.
- "High BV" Category 1B flammable gas has a burning velocity greater than 3.9 in/s (10cm/s). "Low BV" Category 1B flammable gas has a burning velocity of 3.9 in/s (10 cm/s) or less.

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~~ 5003.8.3.5.4.

Add new text as follows:

5003.8.3.5.4 Flammable gas. The aggregate quantity of Category 1B flammable gas having a burning velocity of 3.9 in/s (10 cm/s) or less stored and displayed within a single control area of a Group M occupancy, or in an outdoor control area, or stored in a single control area of a Group S occupancy is allowed to exceed the maximum allowable quantities per control area specified in Table 5003.1.1(1) without classifying the building or use as a Group H occupancy, provided the materials are stored and displayed in accordance with Section 5003.11.2.

Revise as follows:

5003.11 Maximum allowable quantity for Group M storage and display and Group S storage. The aggregate quantity of ~~nonflammable solid and nonflammable or noncombustible liquid~~ hazardous materials stored and displayed within a single *control area* of a Group M occupancy, or an outdoor *control area*, or stored in a single *control area* of a Group S occupancy, is allowed to exceed the *maximum allowable quantity per control area* indicated in Section 5003.1 where in accordance with Sections 5003.11.1 and 5003.11.2 ~~through 5003.11.3.11~~.

5003.11.1 Nonflammable solid and nonflammable or noncombustible liquid hazardous materials Maximum allowable quantity per outdoor control area in Group M or S occupancies. The aggregate amount of nonflammable solid and nonflammable or noncombustible liquid hazardous materials stored and displayed within a single *control area* of a Group M occupancy, or an outdoor control area, or stored in a single *control area* of a Group S occupancy shall not exceed the amounts set forth in Table 5003.11.1.

Delete without substitution:

5003.11.2 Maximum allowable quantity per outdoor control area in Group M or S occupancies. The aggregate amount of nonflammable solid and nonflammable or noncombustible liquid hazardous materials stored and displayed within a single *outdoor control area* of a Group M occupancy shall not exceed the amounts set forth in Table 5003.11.1.

Revise as follows:

~~5003.11.3.1~~ **5003.11.1.1 Storage and display.** Storage and display shall be in accordance with Sections ~~5003.11.3.4~~ 5003.1.1.1 through ~~5003.11.3.11~~ 5003.11.1.1.11.

~~5003.11.3.1~~ **5003.11.1.1.1 Density.** Storage and display of solids shall not exceed 200 pounds per square foot (976 kg/m²) of floor area actually occupied by solid merchandise. Storage and display of liquids shall not exceed 20 gallons per square foot (0.50 L/m²) of floor area actually occupied by liquid merchandise.

~~5003.11.3.2~~ **5003.11.1.1.2 Storage and display height.** Display height shall not exceed 6 feet (1829 mm) above the finished floor in display areas of Group M occupancies. Storage height shall not exceed 8 feet (2438 mm) above the finished floor in storage areas of Group M and Group S occupancies.

~~5003.11.3.3~~ **5003.11.1.1.3 Container location.** Individual containers less than 5 gallons (19 L) or less than 25 pounds (11 kg) shall be stored or displayed on pallets, racks or shelves.

~~5003.11.3.4~~ **5003.11.1.1.4 Racks and shelves.** Racks and shelves used for storage or display shall be in accordance with Section 5003.9.9.

~~5003.11.3.5~~ **5003.11.1.1.5 Container type.** Containers shall be *approved* for the intended use and identified as to their content.

~~5003.11.3.7~~ **5003.11.1.1.7 Incompatible materials.** *Incompatible materials* shall be separated in accordance with Section 5003.9.8.

~~5003.11.3.6~~ **5003.11.1.1.6 Container size.** Individual containers shall not exceed 100 pounds (45 kg) for solids or 10 gallons (38 L) for liquids in storage and display areas.

~~5003.11.3.8~~ **5003.11.1.1.8 Floors.** Floors shall be in accordance with Section 5004.12.

~~5003.11.3.9~~ **5003.11.1.1.9 Aisles.** Aisles 4 feet (1219 mm) in width shall be maintained on three sides of the storage or display area.

~~5003.11.3.10~~ **5003.11.1.1.10 Signs.** Hazard identification signs shall be provided in accordance with Section 5003.5.

~~5003.11.3.11~~ **5003.11.1.1.11 Storage plan.** A storage plan illustrating the intended storage arrangement, including the location and dimensions of aisles, and storage racks shall be provided.

Add new text as follows:

5003.11.2 Category 1B flammable gas with low burning velocity. The aggregate quantity of Category 1B flammable gas having a burning velocity of 3.9 in/s (10 cm/s) or less stored and displayed within a single *control area* of a Group M occupancy, or an outdoor control area, or stored in a single control area of a Group S occupancy shall not exceed the amounts set forth in Table 5003.11.2.

TABLE 5003.11.2

MAXIMUM ALLOWABLE QUANTITY OF LOW BURNING VELOCITY CATEGORY 1B FLAMMABLE GAS IN GROUP M AND S OCCUPANCIES PER CONTROL AREA^a

FLAMMABLE GAS CATEGORY	MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA	
	<u>Sprinklered in accordance with Note b</u>	<u>Nonsprinklered</u>
Category 1B (Low BV) ^d		
<u>Gaseous</u>	<u>390,000 cu. ft.</u>	<u>195,000 cu. ft.</u>
<u>Liquefied</u>	<u>40,000 lbs.^c</u>	<u>20,000 lbs.</u>

For SI: 1 pound = 0.454 kg, 1 cu. ft. = 0.028 m³

- a. Control areas shall be separated from each other by not less than a 1-hour fire barrier.
- b. The building shall be equipped throughout with an approved automatic sprinkler system with minimum sprinkler design density of Ordinary Hazard Group 2 in the area where flammable gases are stored or displayed.
- c. Where storage areas exceed 50,000 square feet in area, the maximum allowable quantities area 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. Separation of control areas is not required. The aggregate amount shall not exceed 80,000 pounds.
- d. "Low BV" Category 1B flammable gas has a burning velocity of 3.9 in/s (10 cm/s) or less.

5003.11.2.1 Fire protection and storage arrangements. Fire protection and container storage arrangements for quantities of Category 1B flammable gases permitted by Table 5003.11.2 shall be in accordance with the all of the following:

- 1. Storage of the Category 1B flammable gases on shelves shall not exceed 6 feet (1829 mm) in height, and shelving shall be metal.
- 2. Rack storage, pallet storage or piles of the Category 1B flammable gas greater than 6 feet 6 inches (1981 mm) in height shall be provided with an automatic sprinkler system with a minimum design of Extra Hazard Group 1.
- 3. Combustible commodities shall not be stored above the Category 1B flammable gases.
- 4. Flammable liquids shall be separated from the Category 1B flammable gases by a distance 20 feet (6096 mm). The separation is permitted to be reduced to 10 feet (3048 mm) where secondary containment or diking is provided to retain a flammable liquid spill at a distance of 10 feet (3048 mm) from the Category 1B flammable gas storage.

2021 International Building Code

Revise as follows:

TABLE 307.1(1)

MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A PHYSICAL HAZARD^{a, j, m, n, p}

Portions of table not shown remain unchanged.

MATERIAL	CLASS	GROUP WHEN THE MAXIMUM ALLOWABLE QUANTITY IS EXCEEDED	STORAGE ^b			USE-CLOSED SYSTEMS ^b			USE-OPEN SYSTEMS ^b	
			Solid pounds(cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds(cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds(cubic feet)	Liquid gallons (pounds)
Flammable gas	Gaseous	H-2	NA	NA		NA	NA		NA	NA
	1A and 1B(High BV) ^f				1,000 ^{d,e}			1,000 ^{d,e}		
	1B (Low BV) ^f				162,500 ^{d,e}			162,500 ^{d,e}		
	Liquefied						NA			
	1A and 1B(High BV) ^r			(150) ^{d,e}	(150) ^{d,e}					
	1B (Low BV) ^r			(10,000) ^{d,e}	(10,000) ^{d,e}					

- a. For use of control areas, see Section 414.2.
- b. The aggregate quantity in use and storage shall not exceed the quantity specified for storage.
- c. The quantities of alcoholic beverages in retail and wholesale sales occupancies shall not be limited provided the liquids are packaged in individual containers not exceeding 1.3 gallons. In retail and wholesale sales occupancies, the quantities of medicines, foodstuffs 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 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 when stored in approved storage cabinets, day boxes, gas cabinets, gas rooms or exhausted enclosures or in listed safety cans in accordance with Section 5003.9.10 of the International Fire Code. 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 automatic sprinkler system in accordance with Section 903.3.1.1.
- g. Allowed only in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.
- h. Containing not more than the maximum allowable quantity per control area of Class IA, IB or IC flammable liquids.
- i. The maximum allowable quantity shall not apply to fuel oil storage complying with Section 605.4.2 of the International Fire Code.
- j. Quantities in parentheses indicate quantity units in parentheses at the head of each column.
- k. A maximum quantity of 220 pounds of solid or 22 gallons of liquid Class 3 oxidizers is allowed when such materials are necessary for maintenance purposes, operation or sanitation of equipment when the storage containers and the manner of storage are approved.
- l. Net weight of the 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 of the International Fire Code.
- n. For storage and display quantities in Group M and storage quantities in Group S occupancies complying with Section 414.2.5, see Tables 414.2.5(
- 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 the International Fire Code.
 3. Gaseous fuels in piping systems and fixed appliances regulated by the International Fuel Gas 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 of the International Fire Code. The location of the alcohol-based hand rub (ABHR) dispensers shall be provided in the construction
- 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 414.1.3.
- r. "High BV" Category 1B flammable gas has a burning velocity greater than 3.9 in/s (10 cm/s). "Low BV" Category 1B flammable gas has a burning velocity of 3.9 in/s (10 cm/s) or less.

[F] 414.2.5 Hazardous material 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 414.2.5.1 through ~~414.2.5.3~~ 414.2.5.4.

Add new text as follows:

TABLE 414.2.5(3)
MAXIMUM ALLOWABLE QUANTITY OF LOW BURNING VELOCITY CATEGORY 1B FLAMMABLE GAS IN GROUP M AND S
OCCUPANCIES PER CONTROL AREA ^a

FLAMMABLE GAS CATEGORY	MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA	
	Sprinklered in Accordance with Note b	Nonsprinklered
Category 1B (Low BV) ^e		
Gaseous	390,000 cu. ft.	195,000 cu. ft.
Liquefied	40,000 lbs. ^c	20,000 lbs.

For SI: 1 pound = 0.454 kg, 1 cu. ft. = 0.028 m³

- a. Control areas shall be separated from each other by not less than a 1-hour fire barrier.
- b. The building shall be equipped throughout with an approved automatic sprinkler system with minimum sprinkler design density of Ordinary Hazard Group 2 in the area where flammable gases are stored or displayed.
- c. Where storage areas exceed 50,000 square feet in area, the maximum allowable quantities area 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. Separation of control areas is not required. The aggregate amount shall not exceed 80,000 pounds.
- d. "Low BV" Category 1B flammable gas has a burning velocity of 3.9 in/s (10 cm/s) or less.

414.2.5.4 Flammable gas. The aggregate quantity of Category 1B flammable gas having a burning velocity of 3.9 in/s (10 cm/s) or less stored and displayed within a single control area of a Group M occupancy or stored in a single control area of a Group S occupancy is allowed to exceed the maximum allowable quantities per control area specified in Table 307.1(1) without classifying the building or use as a Group H occupancy, provided the materials are stored and displayed in accordance with the *International Fire Code* and quantities do not exceed the amounts specified in Table 414.2.5(3).

Reason Statement: This change coordinates the requirements for flammable gas with the change in definition to "flammable gas." The change in definition results in two categories of flammable gas, Category 1A and Category 1B. The existing requirements in the code are based on Category 1A flammable gases. As a result, new requirements had to be developed to regulate Category 1B flammable gases. It should be noted that there is a distinction between Category 1B flammable gas based on the burning velocity. The research on this code change is based on a burning velocity of 3.9 in/s (10 cm/s) or less. Higher burning velocity Category 1B flammable gases are not commercially available, hence there is no means of evaluating their performance. The changes to the table for the higher allowable quantities are for the Category 1B low burning velocity flammable gases. There is no change to the Category 1B high burning velocity flammable gases.

A change is necessary to Tables 5003.1.1(1) and 5003.1.1(3) regarding the maximum allowable quantities for control area. The approach that was taken is similar to the approach used in the code for other hazardous materials that have different classes or categories based on the hazard level of the material. The current requirements in the tables will continue to apply to Category 1A flammable gases. This requires the addition of the words "Category 1A and Category 1B (High BV)" to be added in front of the term "flammable gas." The new requirements for "Category 1B (Low BV)" flammable gases are based on a comparative analysis of the hazard of these flammable gases. The approach was to add limitations in the maximum allowable quantity table with a new section added that specifically regulates the requirements for storage in Use Group M and S. It should be noted that other than Use Group H, the predominant storage location of flammable gases is in Use Group M and S buildings. Section 5803.1.1 of the Fire Code will continue to have restrictions on the storage and use of flammable gases in other Use Groups. A new Section 5003.11.2 and Table 5003.11.2 in the Fire Code will add specific requirements for Use Group M and S. A similar Section 414.2.5.3 will be added to the Building Code. In developing these limitations, a comparison of existing requirements was evaluated for other hazardous materials.

The following table provides a comparison between various flammable gases and flammable liquids:

Item	Liquid or Gas	Gas Cat.	Liquid Class	LFL (LEL)	UFL (UEL)	lb per 10,000 cu ft to LFL	Burning Velocity (in/sec)	Heat of Combustion (Btu/lb)	Min. Ignition Energy (mJ)	Deflagration Index K _G (or K _{ST}) ^c (100kPa/s)	Auto Ignition Temp.	Flash Point	Basic MAQ
Propane	Gas	1A		2.1	9.6	5.6	17.9	21,638	0.25	100	920°F		150 lb
Acetylene	Gas	1A		2.5	81		50.4	21,500	0.017	1415	581°F		150 lb
Hydrogen	Gas	1A		4	75	2.1	116.5	60,870	0.019	550	932°F		150 lb
Difluoromethane	Gas	1B		14.4	29.9	192	2.6	4,041	65	11	1,198°F		?
2,3,3,3-tetrafluoro-1-propene	Gas	1B		6.2	12.3	188	0.6	4,601	>1000	8	761°F		?
R454B	Gas	1B		11.8	21.5	880	2.5	4,319	100-300		928°F		?
Trans-1,3,3,3-tetrafluoro-1-propene	Gas	2		Note a	Note a	188	0.5	4,601	62,500	9	694°F		Unlimited
Ammonia	Gas	2		16.7	28	292 ^b	2.8	8,020	100-300	10	1,204°F		Unlimited
Gasoline	Liquid		IB	1.4	7.6	NG ^d	15	20,400	0.8		536°F	-45°F	120 gallons (756 lb)
Propyl Alcohol	Liquid		IC	2.1	13.5	NG ^d	19.6	13,192	0.65		700°F	77°F	120 gallons (809 lb)
Kerosene	Liquid		II	0.7	5.0	NG ^d	15.7	19,862	20		428°F	110-150°F	120 gallons (816 lb)
Diesel (2-D)	Liquid		II	0.6	7.5	NG ^d		18,900			410°F	126-205°F	120 gallons (816 lb)
Linseed Oil	Liquid		IIIA	-	-	NG ^d		16,800			650°F	200°F	330 gallons (2,558 lb)
Ethylene Glycol	Liquid		IIIB	3.2	15.2	NG ^d	15.7	7,297	1.2		770°F	232°F	13,200 gallons (122,232 lb)
Olive Oil	Liquid		IIIB	-	-	NG ^d	7.8	16,663			815°F	437°F	13,200 gallons (100,452 lb)

Note a. No LFL and UFL at 20°C, flame begins at 28°C, classified as flammable refrigerant A2L when used as a refrigerant.

Note b. Ammonia is toxic at 0.56 pounds per 10,000 cubic feet.

Note c. Deflagration index based on NFPA 68. K_G (K_{ST}) is the maximum rate of pressure increase normalized to the volume in which the rate was measured.

Note d. NG is not germane. Any spill can result in ignition. The grouping is not appropriate for comparison purposes.

A survey was conducted by HARDI to determine the amount of refrigerant gas that is stored in facilities today. That information helped to ascertain the quantity of Category 1B Low BV flammable gas that will be stored as Group A2L refrigerant in the near future.

A study from Japan by Tei Saburi, National Institute of Advanced Industrial Science and Technology, indicates that Category 1B (Low BV) flammable gases are most closely aligned with Category 2 flammable gases. As the chart indicates, Category 2 flammable gas has never been regulated in the MAQ table. While Category 2 flammable gas is identified as unlimited, this value could not be justified for Category 1B (Low BV) flammable gas. However, when comparing Category 1A to both Category 1B (Low BV) and Category 2 flammable gas, a much higher MAQ can be established for Category 1B (low BV) than Category 1A since the fire hazard from storage is much lower.

An evaluation of various fire tests on Category 1B (Low BV) flammable gas also helped to establish the MAQ. A conservative value of 10,000 pounds of Category 1B (Low BV) flammable gas was established as the maximum for a nonsprinklered control area. Comparing the deflagration index, Category 1B (Low BV) range from 0.5 to 11 percent of the deflagration index of Category 1A flammable gases. The minimum ignition energy varies by as much as 58,000 times. The heat of combustion is between 6 and 19 percent of Category 1B (Low BV). Thus, the value selected is conservative but agreeable to industry.

With the established base maximum, the value for a control area is double for a sprinklered control area. The special requirements for Use Group M and S are also doubled for a nonsprinklered control area. The maximum allowable quantity is double to 40,000 for a sprinklered control area in a Use Group M or S. The sprinklered control area storage maximum can double again when additional floor area is provided in the control area.

The appendices have been updated to correlate with the revisions to the MAQ table.**If the proposal reclassifying 1B Flammable Gases to association with the Group H-3 occupancy classification is successful, Tables 5003.1.1(1) and 307.1(1) will need to be revised so that the "GROUP WHEN THE MAXIMUM ALLOWABLE QUANTITY IS EXCEEDED" row says "H-2 or H-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 and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: <https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/>

Cost Impact: The code change proposal will decrease the cost of construction

This code change reduces the cost of construction. By modifying the maximum allowable quantities for Category 1B flammable gas, the construction

costs are lowered. The construction costs for Category 1A flammable gas remain unchanged, neither increased nor decreased in the cost of construction.

F192-21

F193-21

IFC: TABLE 5003.1.1(3)

Proponents: Elley Klausbruckner, representing Klausbruckner & Associates, Inc. (jm@klausbruckner.com)

2021 International Fire Code

Revise as follows:

TABLE 5003.1.1(3)
MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A PHYSICAL HAZARD IN AN
OUTDOOR CONTROL AREA^{a, b, c, d}

MATERIAL	CLASS	STORAGE ^b			USE-CLOSED SYSTEMS ^b			USE-OPEN SYSTEMS ^b	
		Solid pounds (cubic feet)	Liquid gallons (pounds) ^d	Gas cubic feet at NTP	Solid pounds (cubic feet)	Liquid gallons (pounds) ^d	Gas cubic feet at NTP	Solid pounds (cubic feet)	Liquid gallons (pounds) ^d
Flammable gas	Gaseous Liquefied	Not Applicable	Not Applicable (300)	3,000 Not Applicable	Not Applicable	Not Applicable (150)	1,500 Not Applicable	Not Applicable	Not Applicable
Flammable solid	Not Applicable	500	Not Applicable	Not Applicable	250	Not Applicable	Not Applicable	50	Not Applicable
Inert Gas	Gaseous	Not Applicable	Not Applicable	Not Limited	Not Applicable	Not Applicable	Not Limited	Not Applicable	Not Applicable
Cryogenic inert	Liquefied Not Applicable	Not Applicable	Not Applicable	Not Limited	Not Applicable	Not Applicable	Not Limited	Not Applicable	Not Applicable
Organic peroxide	Unclassified Detonable	1	(1)	Not Applicable	0.25	(0.25)	Not Applicable	0.25	(0.25)
Organic peroxide	I	20	(20)	Not Applicable	10	(10)	Not Applicable	2	(2)
	II	200	(200)		100	(100)		20	(20)
	III	500	(500)		250	(250)		50	(50)
	IV	Not Limited	Not Limited		Not Limited	Not Limited		Not Limited	Not Limited
	V	Not Limited	Not Limited		Not Limited	Not Limited		Not Limited	Not Limited
Oxidizer	4	2	(2)	Not Applicable	1	(1)	Not Applicable	0.25	(0.25)
	3	40	(40)		20	(20)		4	(4)
	2	1,000	(1,000)		500	(500)		100	(100)
	1	Not Limited	Not Limited		Not Limited	Not Limited		Not Limited	Not Limited
Oxidizing gas	Gaseous Liquefied	Not Applicable	Not Applicable (600)	6,000 Not Applicable	Not Applicable	Not Applicable (300)	1,500 Not Applicable	Not Applicable	Not Applicable
Pyrophoric materials	Not Applicable	8	(8)	100	4	(4)	10	0	0
Unstable (reactive)	4	2	(2)	20	1	(1)	2	0.25	(0.25)
	3	20	(20)	1,000	10	(10)	10	1	(1)
	2	200	(200)	1,500	100	(100)	250	10	(10)
	1	Not Limited	Not Limited	<u>Not Limited</u>	Not Limited	Not Limited	Not Limited	Not Limited	Not Limited
Water reactive	3	20	(20)	Not Applicable	10	(10)	Not Applicable	1	(1)
	2	200	(200)		100	(100)		10	(10)
	1	Not Limited	Not Limited		Not Limited	Not Limited		Not Limited	Not Limited

For SI: 1 pound = 0.454 kg, 1 gallon = 3.785 L, 1 cubic foot = 0.02832 m³.

- For gallons of liquids, divide the amount in pounds by 10 in accordance with Section 5003.1.2.
- The aggregate quantities in storage and use shall not exceed the quantity listed for storage.
- The aggregate quantity of nonflammable solid and nonflammable or noncombustible liquid hazardous materials allowed in outdoor storage per single property under the same ownership or control used for retail or wholesale sales is allowed to exceed the maximum allowable quantity per control area where such storage is in accordance with Section 5003.11.
- Quantities in parentheses indicate quantity units in parentheses at the head of each column.

Reason Statement: It seems inconsistent that MAQs for Unstable Reactive 1 gases is unlimited for indoor storage and limited for outdoor storage. It also seems inconsistent that the MAQs for closed system is unlimited for outdoors, but outdoor storage is limited to 1500 cu ft.

Cost Impact: The code change proposal will decrease the cost of construction

Can't be certain but this change might reduce the cost of construction however these are limits for outdoor storage. The cost of compliance will be reduced.

F193-21

F194-21

IFC: 5003.8.7, 5003.8.7.1, 5003.8.7.2 (New), 5003.8.7.3 (New), 5003.8.7.2

Proponents: Kevin Scott, representing KH Scott & Associates LLC (khscottassoc@gmail.com)

2021 International Fire Code

Revise as follows:

5003.8.7 Hazardous materials storage cabinets. Where storage cabinets are used to increase *maximum allowable quantity per control area* or to comply with this chapter, such cabinets shall be in accordance with Sections 5003.8.7.1 ~~through and 5003.8.7.2, 5003.8.7.4.~~

5003.8.7.1 Construction. The interior of cabinets shall be treated, coated or constructed of materials that are nonreactive with the hazardous material stored. Such treatment, coating or construction shall include the entire interior of the cabinet. Cabinets shall either be *listed* in accordance with UL 1275 as suitable for the intended storage or constructed in accordance with the following:

1. Cabinets shall be of steel having a thickness of not less than 0.0478 inch (1.2 mm) (No. 18 gage). The cabinet, including the door, shall be double walled with a 1¹/₂-inch (38 mm) airspace between the walls. Joints shall be riveted or welded and shall be tight fitting. ~~Doors shall be well fitted, self-closing and equipped with a self-latching device.~~
2. The bottoms of cabinets utilized for the storage of liquids shall be liquid tight to a minimum height of 2 inches (51 mm).

~~Electrical equipment and devices within cabinets used for the storage of hazardous gases or liquids shall be in accordance with NFPA 70.~~

Add new text as follows:

5003.8.7.2 Doors. Doors shall be well fitted, self-closing and equipped with a self-latching device.

5003.8.7.3 Electrical. Electrical equipment and devices within cabinets used for the storage of hazardous gases or liquids shall be in accordance with NFPA 70.

Revise as follows:

~~5003.8.7.2~~ **5003.8.7.4 Warning markings.** Cabinets shall be clearly identified in an *approved* manner with red letters on a contrasting background to read:

HAZARDOUS—KEEP FIRE AWAY

Reason Statement: This proposal clarifies the requirement for self-closing doors on hazardous materials storage cabinets.

Current code language states that the cabinet must either meet the construction requirements of Items 1 and 2, or be listed to UL 1275. If the owner decides to construct a cabinet, it is required to be equipped with a self-closing door. However, if the owner decides to obtain a listed cabinet, a self-closing door is an option. UL 1275 does not require a self-closing door.

UL 1275 provides criteria for testing of self-closing doors when the cabinet is so equipped, but the self-closing door is not a prerequisite for listing.

This proposal relocates the self-closing door requirement to clarify that it applies to a constructed cabinet and the listed cabinet. This format is consistent with the format for flammable liquid storage cabinets in Section 5704.3.2 where it is clear that both listed and constructed cabinets must comply with the self-closing requirement.

Cost Impact: The code change proposal will increase the cost of construction

This proposal will only increase the cost of construction if the current listed hazardous materials storage cabinets are not provided with a self-closing device.

F194-21

F195-21

IFC: 5003.9.9

Proponents: Julie Furr, Rimkus Consulting Group, Inc., representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (jfurr@rimkus.com); Kelly Cobeen, Wiss Janney Elstner Associates, Inc., representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); Michael Mahoney, Federal Emergency Management Agency, representing Federal Emergency Management Agency (mike.mahoney@fema.dhs.gov)

2021 International Fire Code

Revise as follows:

5003.9.9 Shelf storage. Shelving shall be of substantial construction, and shall be braced and anchored in accordance with the seismic design requirements of the *International Building Code* for the seismic design category zone in which the material is located. Shelving shall be treated, coated or constructed of materials that are compatible with the hazardous materials stored. Shelves shall be provided with a lip or guard where used for the storage of individual containers.

Shelf storage of hazardous materials shall be maintained in an orderly manner.

Exceptions:

1. Storage in hazardous material storage cabinets or laboratory furniture specifically designed for such use.
2. Storage of hazardous materials in amounts not requiring a permit in accordance with Section 5001.5.

Reason Statement: "Seismic zone" is an obsolete term no longer reference in the I-Codes. This proposal coordinates the reference to match terminology used in other current I-Codes and standards and in IFC Section 5003.2.8.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposed wording updates obsolete terminology to match current practice.

F195-21

F196-21

IFC: TABLE 5003.11.1; IBC: TABLE 414.2.5(1)

Proponents: William Koffel, representing Axiall Corporation (wkoffel@koffel.com)

2021 International Fire Code

Revise as follows:

TABLE 5003.11.1
MAXIMUM ALLOWABLE QUANTITY PER INDOOR AND OUTDOOR CONTROL AREA IN GROUP M AND S OCCUPANCIES—
NONFLAMMABLE SOLIDS, NONFLAMMABLE AND NONCOMBUSTIBLE LIQUIDS^{d, e, f}

Portions of table not shown remain unchanged.

CONDITION		MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA	
Material ^a	Class	Solids (pounds)	Liquids (gallons)
A. Health-Hazard Materials—Nonflammable and Noncombustible Solids and Liquids			
1. Corrosives ^{b, c}	Not Applicable	9,750	975
2. Highly toxics	Not Applicable	20 ^{b, c}	2 ^{b, c}
3. Toxics ^{b, c}	Not Applicable	1,000 ^k	100
B. Physical-Hazard Materials—Nonflammable and Noncombustible Solids and Liquids			
1. Oxidizers ^{b, c}	4	Not Allowed	Not Allowed
	3	4,350 1,500 ^g	435 150
	2	2,250 ^h	225
	1	18,000 ^{i, j}	1,800 ^{i, j}
2. Unstable (reactives) ^{b, c}	4	Not Allowed	Not Allowed
	3	550	55
	2	1,150	115
	1	Not Limited	Not Limited
3. Water reactives	3 ^{b, c}	550	55
	2 ^{b, c}	1,150	115
	1	Not Limited	Not Limited

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 applies, the increase for both notes shall be applied cumulatively.
- c. Maximum allowable quantities shall be increased 100 percent where stored in approved storage cabinets in accordance with Section 5003.8. Where Note b applies, the increase for both notes shall be applied cumulatively.
- 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.
- k. Maximum allowable quantity of consumer products shall be increased to 10,000 pounds where individual packages are in the original sealed containers from the manufacturer and the toxic classification is exclusively based on the LC₅₀ threshold and no other hazardous materials classifications apply.

2021 International Building Code

Revise as follows:

TABLE 414.2.5(1)
MAXIMUM ALLOWABLE QUANTITY PER INDOOR AND OUTDOOR CONTROL AREA IN GROUP M AND S OCCUPANCIES OF
NONFLAMMABLE SOLIDS AND NONFLAMMABLE AND NONCOMBUSTIBLE LIQUIDS^{d, e, f}

CONDITION		MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA	
Material ^a	Class	Solids (pounds)	Liquids (gallons)
A. Health-hazard materials—nonflammable and noncombustible solids and liquids			
1. Corrosives ^{b, c}	Not Applicable	9,750	975
2. Highly toxics	Not Applicable	20 ^{b, c}	2 ^{b, c}
3. Toxics ^{b, c}	Not Applicable	1,000 ^k	100
B. Physical-hazard materials—nonflammable and noncombustible solids and liquids			
1. Oxidizers ^{b, c}	4	Not Allowed	Not Allowed
	3	4,350 1,500 ^g	445 150
	2	2,250 ^h	225
	1	18,000 ^{i, j}	1,800 ^{i, j}
2. Unstable (reactives) ^{b, c}	4	Not Allowed	Not Allowed
	3	550	55
	2	1,150	115
	1	Not Limited	Not Limited
3. Water reactives	3 ^{b, c}	550	55
	2 ^{b, c}	1,150	115
	1	Not Limited	Not Limited

For SI: 1 pound = 0.454 kg, 1 gallon = 3.785 L.

- a. Hazard categories are as specified in the *International Fire Code*.
- b. Maximum allowable quantities shall be increased 100 percent in buildings that are sprinklered 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 the *International Fire Code*. Where Note b also applies, the increase for both notes shall be applied accumulatively.
- d. See Table 414.2.2 for design and number of control areas.
- e. Allowable quantities for other hazardous material categories shall be in accordance with Section 307.
- f. Maximum quantities shall be increased 100 percent in outdoor control areas.
- g. Maximum amounts 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 amounts 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. The permitted quantities shall not be limited in a building equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.
- j. Quantities are unlimited in an outdoor control area.
- k. Maximum allowable quantities of consumer products shall be increased to 10,000 pounds where individual packages are in the original, sealed containers from the manufacturer and the toxic classification is exclusively based on the LC threshold and no other hazardous materials classifications apply.

Reason Statement: The proposed revision does not change the protection requirements nor the number of containers on a pallet; but rather, allows a small increased capacity per container for solid Class 3 Oxidizers. By allowing the container to be filled, overall there will be fewer plastic containers requiring disposal. The decrease in the number of containers addresses an environmental concern of the retailers and customers. Current practice is to use containers that will hold 60 pounds but the containers are currently only filled to 55 pounds to be consistent with the limit of 1350 pounds. The current practice of 24 containers per pallet equals 1320 pounds. With the increase, the same 24 containers per pallet will now equal 1440 pounds. The change will reduce the number of plastic containers that are discarded by about 9% with no, or minimal, impact on safety. The containers currently used are already UN/DOT approved to contain 60 pounds each of a Class 3 Oxidizer

Cost Impact: The code change proposal will not increase or decrease the cost of construction

The proposed change will have no impact on the cost of construction. By decreasing the number of containers the operational costs related to disposal of the containers will be decreased.

F196-21

F197-21

IFC: 5003.13 (New), 5003.13.1 (New), 5003.13.2 (New), 5003.13.3 (New), 5003.13.4 (New), 5003.13.5 (New); IBC: [F] 307.1

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Fire Code

Add new text as follows:

5003.13 Outdoor Rooftop Storage, use and Handling. Storage, use and handling and use of hazardous materials on top of roofs or canopies shall be classified as rooftop storage or use and shall comply with Sections 5003.13.1 through 5003.13.5.

5003.13.1 Occupancy classification. Quantities of hazardous materials stored, used or handled on top of roofs or canopies shall be classified as rooftop storage or use and shall not be used to determine the occupancy classification of the building.

5003.13.2 Maximum allowable quantity per rooftop or canopy. The storage, use and handling of hazardous materials on top of a roof or canopies shall not exceed the maximum allowable quantity set forth in Tables 5003.1.1(1) and Table 5003.1.1(2). LP Gas storage and use shall be in accordance with Chapter 61.

Exceptions:

1. Pollution control, exhaust treatment and dust collection equipment.
2. Combustible liquids complying with Chapter 57 and NFPA 30.
3. Hydrogen storage at motor fuel dispensing facilities in accordance with Chapter 23.
4. Hazardous materials in closed piping systems complying with this code.
5. Hazardous materials on top of a normally unoccupied exterior equipment platform necessary for operation of mechanical systems or industrial process equipment.
6. Hazardous materials necessary for rooftop swimming pool or hot tub treatment systems, limited to maximum containers size of 50 gallons or 500 pounds of toxic or corrosive materials, and 200 pounds or 20 gallons of oxidizers.
7. Other situations where rooftop storage or use of hazardous materials is necessary for operation of equipment serving the building and is approved.

5003.13.3 Story adjustment. In addition to the quantity limits in 5003.13.2, rooftop storage and use shall be limited to the percentage of maximum allowable quantity identified in Table 5003.8.3.2 based on the number of stories above grade of the building on which the roof is located.

5003.13.4 Other requirements. In addition to the quantity limits of this section, rooftop storage and use shall comply with other applicable requirements of this code for outdoor storage. This section applies to the exceptions identified in 5003.13.2.

5003.13.5 Weather protection. Weather protection provided for sheltering rooftop storage or use it shall comply with Section 414.6.1 of the International Building Code, except that there is no distance required to the building on which it is located.

2021 International Building Code

Revise 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~~ rooftop storage or use and shall comply with the *International Fire Code*.

Reason Statement: In the 2009 IBC a change was made indicating that storage of hazardous materials on top of roofs or canopies shall be classified as outdoor storage. However, the outdoor control area provisions in IFC Chapter 50 were never intended to be applied to rooftops and do not provide any guidance for rooftop storage. Additionally, there is nothing that would limit storage to maximum allowable quantities for outdoor control areas provided the storage meets the outdoor storage provisions of material-specific chapters. In many cases, this allows unlimited storage of hazardous materials on top of roofs or canopies. Furthermore, some outdoor storage provisions require distance set-backs to buildings, and it is unclear how that would be applied if the storage is actually on top of a building.

To resolve these conflicts, this proposal creates a new IFC section which immediately follows the outdoor control area section to provide simple, reasonable and safe limitations for rooftop storage consistent with hazardous materials storage concepts in the IFC. In general, roof or canopy top storage is limited to indoor control area MAQs and further adjusted by the number of stories. However, there are a number of important exceptions to allow for certain limited types of hazardous materials use on roofs or canopies such as refrigeration systems, energy systems, pollution control equipment, closed piping systems, and equipment on unoccupied exterior equipment platforms. A minor change is proposed for IBC 307.1 to

change the fire code reference from outdoor storage to rooftop storage for proper coordination.

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 and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: <https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/>

Cost Impact: The code change proposal will not increase or decrease the cost of construction

This proposal is primarily clarifying how to address hazardous materials storage on rooftops and will not change the cost of construction.

F197-21

F198-21

IFC: 5104.1, 5104.1.1, 5104.2, 5104.3.1, TABLE 5104.3.1, 5104.3.2, 5104.4, 5104.5.1, 5104.5.2, 5106.2.2, 5106.2.3

Proponents: William Koffel, representing Household and Commercial Products Association (wkoffel@koffel.com)

2021 International Fire Code

Revise as follows:

5104.1 General. The inside storage of Level 2 and 3 aerosol, aerosol cooking sprays, and plastic aerosol 3 products, shall comply with Sections 5104.2 through 5104.8 and NFPA 30B. Level 1 aerosol products and those aerosol products covered by Section 5104.1.1 shall be considered to be equivalent to a Class III commodity and shall comply with the requirements for palletized or rack storage in NFPA 13.

5104.1.1 Plastic 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 does not have a fire point where tested in accordance with ASTM D92, and nonflammable propellant.
2. Base product does not sustain combustion as tested in accordance with DOTn 49 CFR Part 173, Appendix H, and nonflammable propellant.
3. Base product contains up to 20 percent by volume (15.8 percent by weight) of ethanol, isopropyl alcohol or a combination thereof 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.

5104.2 Storage in Groups A, B, E, F, I and R. Storage of Level 2 and 3 aerosol and plastic aerosol 3 products in occupancies in Groups A, B, E, F, I and R shall be limited to the following maximum quantities:

1. A net weight of 1,000 pounds (454 kg) of Level 2 aerosol products.
2. A net weight of 500 pounds (227 kg) of Level 3 aerosol and plastic aerosol 3 products.
3. A combined net weight of 1,000 pounds (454 kg) of Level 2 and 3 aerosol, and plastic aerosol 3 products.

The maximum quantity shall be increased 100 percent where the excess quantity is stored in storage cabinets in accordance with Section 5704.3.2.

5104.3.1 Nonsegregated storage. Storage consisting of solid pile, palletized or rack storage of Level 2 and 3 aerosol and plastic aerosol 3 products not segregated into areas utilized exclusively for the storage of aerosol products shall comply with Table 5104.3.1.

TABLE 5104.3.1
NONSEGREGATED STORAGE OF LEVEL 2 AND 3 AEROSOL AND PLASTIC AEROSOL 3 PRODUCTS IN GENERAL PURPOSE
WAREHOUSES^b

AEROSOL LEVEL	MAXIMUM NET WEIGHT PER FLOOR (pounds) ^b			
	Palletized or solid-pile storage		Rack storage	
	Unprotected	Protected ^a	Unprotected	Protected ^a
2	2,500	12,000	2,500	24,000
<u>3 and plastic aerosol 3</u>	1,000	12,000	1,000	24,000
Combination 2, and <u>3 and plastic aerosol 3</u>	2,500	12,000	2,500	24,000

For SI: 1 foot = 304.8 mm, 1 pound = 0.454 kg, 1 square foot = 0.0929 m².

- a. Approved automatic sprinkler system protection and storage arrangements shall comply with NFPA 30B. Sprinkler system protection shall extend 20 feet beyond the storage area containing the aerosol products.
- b. Storage quantities indicated are the maximum permitted in any 50,000-square-foot area.

5104.3.2 Segregated storage. Storage of Level 2 and 3 aerosol and plastic aerosol 3 products segregated into areas utilized exclusively for the storage of aerosol products shall comply with Table 5104.3.2 and Sections 5104.3.2.1 and 5104.3.2.2.

5104.4 Storage in aerosol product warehouses. The total quantity of Level 2 and 3 aerosol , aerosol cooking spray and plastic aerosol 3 products in a warehouse utilized for the storage, shipping and receiving of aerosol products shall not be restricted in structures complying with Sections 5104.4.1 through 5104.4.4.

5104.5.1 Storage rooms of 500 square feet or less. The storage of aerosol products in *flammable liquid* storage rooms less than or equal to 500 square feet (46 m²) in area shall not exceed the following quantities:

1. A net weight of 1,000 pounds (454 kg) of Level 2 aerosol products.
2. A net weight of 500 pounds (227 kg) of Level 3 aerosol and plastic aerosol 3 products.
3. A combined net weight of 1,000 pounds (454 kg) of Level 2 and 3 aerosol and plastic aerosol 3 products.

5104.5.2 Storage rooms greater than 500 square feet. The storage of aerosol products in *flammable liquid* storage rooms greater than 500 square feet (46 m²) in area shall not exceed the following quantities:

1. A net weight of 2,500 pounds (1135 kg) of Level 2 aerosol products.
2. A net weight of 1,000 pounds (454 kg) of Level 3 aerosol and plastic aerosol 3 products.
3. A combined net weight of 2,500 pounds (1135 kg) of Level 2 and 3 aerosol and plastic aerosol 3 products.

The maximum aggregate storage quantity of Level 2 and 3 aerosol and plastic aerosol 3 products permitted in separate inside storage rooms protected by an *approved automatic sprinkler system* in accordance with NFPA 30B shall be 5,000 pounds (2270 kg).

5106.2.2 Aerosol cooking spray product ~~and plastic aerosol 3~~ product storage and fire protection. The storage and handling of aerosol cooking spray products ~~and plastic aerosol 3 products~~ shall comply with this chapter and NFPA 30B.

5106.2.3 Display of aerosol products. Level 2 and 3 aerosol and plastic aerosol 3 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 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 products shall not exceed 8 feet (2438 mm).

Reason Statement: When recognition of plastic aerosol 3 products was added to the IFC some sections were missed. The intent of the proposal is that the requirements for plastic aerosol 3 products should be the same as they are for Level 3 aerosol products.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
For the most part, the proposal is a clarification of how the IFC should apply to plastic aerosol 3 products and is consistent with standard industry practice.

F199-21

IFC: 105.5.2, (New), 5103.2.3, 5104.1, 5104.1.1, 5104.1.2 (New), 5104.1.2, 5104.2, 5104.3.1, TABLE 5104.3.1, 5104.3.2, TABLE 5104.3.2, 5104.4 (New), 5104.4, 5104.5.1, 5104.5.2, 5104.7, TABLE 5104.7, 5105.1, TABLE 5105.1, 5106.1, 5106.2.1, TABLE 5106.2.1, 5106.2.2, 5106.2.3, 5106.3.2, 5106.3.3

Proponents: William Koffel, representing Household and Commercial Products Association (wkoffel@koffel.com)

2021 International Fire Code

Revise as follows:

105.5.2 Aerosol products, aerosol cooking spray products ~~and plastic aerosol 2 and 3 products and plastic aerosol cooking spray products~~. An operational permit is required to manufacture, store or handle an aggregate quantity of Level 2 or Level 3 aerosol products, aerosol cooking spray products ~~or plastic aerosol 2 and 3 products and plastic aerosol cooking spray products~~ in excess of 500 pounds (227 kg) net weight.

Add new definition as follows:

COMPARTMENTED CONTAINER. An aerosol container system in which the propellant is separated from the product being expelled. Examples include but are not limited to bag-in-can (BIC), bag-on-valve (BOV) and piston aerosol products.

Revise as follows:

5103.2.3 Plastic aerosol products. Cartons or outer packaging containing aerosol products in plastic containers greater than 4 fluid ounces (118 ml) shall be clearly marked as follows:

PLASTIC AEROSOL 1, 2, 3 or X

PLASTIC AEROSOL COOKING SPRAY PRODUCT

5104.1 General. The inside storage of Level 2 and 3 aerosol products shall comply with Sections 5104.2 through 5104.8 and NFPA 30B. Level 1 aerosol products and those aerosol products covered by Section 5104.1.1 shall be considered to be equivalent to a Class III commodity and shall comply with the requirements for palletized or rack storage in NFPA 13.

Revise as follows:

5104.1.1 Plastic aerosol 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 does not have a fire point where tested in accordance with ASTM D92, and nonflammable propellant.
2. Base product does not sustain combustion as tested in accordance with DOTn 49 CFR Part 173, Appendix H, and nonflammable propellant.
3. Base product contains up to 20 percent by volume (15.8 percent by weight) of ethanol, isopropyl alcohol or a combination thereof in an aqueous mix, and nonflammable propellant.
4. Base product contains ~~4~~7 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.

Add new text as follows:

5104.1.2 Plastic aerosol 2 products. Plastic aerosol 2 products shall be defined as those that contain a base product contains up to 20 percent by volume (15.8 percent by weight) up to 100% of ethanol, propanol, other water miscible alcohols, or a combination thereof in an aqueous mix, and is packaged in a compartmented container which separates the product from the propellant, as typified by a bag-on-valve package, bag in can, or piston type packaging and the propellant is a nonflammable compressed gas, nonflammable liquified gas, or mixtures thereof.

Revise as follows:

~~5104.1.2~~ 5104.1.3 Plastic aerosol 3 products. Plastic aerosol 3 products shall be defined as those that meet one of the following criteria:

1. Base product does not have a fire point where tested in accordance with ASTM D92, and there is not more than 10 percent by weight flammable propellant.
2. Base product does not sustain combustion as tested in accordance with DOTn 49 CFR 173, Appendix H, and there is not more than 10 percent by weight flammable propellant.

3. Base product contains 50 percent by volume or less of flammable or combustible water-miscible alcohols in an aqueous mix, and there is not more than 10 percent by weight of flammable propellant.

5104.2 Storage in Groups A, B, E, F, I and R. Storage of Level 2 and 3 aerosol products, plastic aerosol 2 products, and plastic aerosol cooking spray products in occupancies in Groups A, B, E, F, I and R shall be limited to the following maximum quantities:

1. A net weight of 1,000 pounds (454 kg) of Level 2 aerosol products.
2. A net weight of 500 pounds (227 kg) of Level 3 aerosol products.
3. A combined net weight of 1,000 pounds (454 kg) of Level 2 and 3 aerosol products, plastic aerosol 2 products, and plastic aerosol cooking spray products.

The maximum quantity shall be increased 100 percent where the excess quantity is stored in storage cabinets in accordance with Section 5704.3.2.

5104.3.1 Nonsegregated storage. Storage consisting of solid pile, palletized or rack storage of Level 2 and 3 aerosol products, plastic aerosol 2 products, and plastic alcohol cooking spray products not segregated into areas utilized exclusively for the storage of aerosol products shall comply with Table 5104.3.1.

TABLE 5104.3.1
NONSEGREGATED STORAGE OF LEVEL 2 AND 3 AEROSOL PRODUCTS, PLASTIC AEROSOL 2 PRODUCTS, AND PLASTIC AEROSOL COOKING SPRAY PRODUCTS IN GENERAL PURPOSE WAREHOUSES^b

AEROSOL LEVEL	MAXIMUM NET WEIGHT PER FLOOR (pounds) ^b			
	Palletized or solid-pile storage		Rack storage	
	Unprotected	Protected ^a	Unprotected	Protected ^a
2	2,500	12,000	2,500	24,000
3	1,000	12,000	1,000	24,000
Combination 2 and 3, <u>plastic aerosol 2 products, and plastic aerosol cooking spray products</u>	2,500	12,000	2,500	24,000

For SI: 1 foot = 304.8 mm, 1 pound = 0.454 kg, 1 square foot = 0.0929 m².

- a. Approved automatic sprinkler system protection and storage arrangements shall comply with NFPA 30B. Sprinkler system protection shall extend 20 feet beyond the storage area containing the aerosol products.
- b. Storage quantities indicated are the maximum permitted in any 50,000-square-foot area.

5104.3.2 Segregated storage. Storage of Level 2 and 3 aerosol products, plastic aerosol 2 products, and plastic aerosol cooking spray products segregated into areas utilized exclusively for the storage of aerosol products shall comply with Table 5104.3.2 and Sections 5104.3.2.1 and 5104.3.2.2.

TABLE 5104.3.2
SEGREGATED STORAGE OF LEVEL 2 AND 3 AEROSOL PRODUCTS AND PLASTIC AEROSOL 2 AND 3 PRODUCTS, PLASTIC
AEROSOL COOKING SPRAY PRODUCTS IN GENERAL PURPOSE WAREHOUSES

STORAGE SEPARATION	MAXIMUM SEGREGATED STORAGE AREA ^a		SPRINKLER REQUIREMENTS
	Percentage of building area (percent)	Area limitation (square feet)	
Separation area ^{e, f}	15	20,000	Notes b, c
Chain-link fence enclosure ^d	20	20,000	Notes b, c
1-hour fire-resistance-rated interior walls	20	30,000	Note b
2-hour fire-resistance-rated interior walls	25	40,000	Note b
3-hour fire-resistance-rated interior walls	30	50,000	Note b

For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929 m².

- a. The maximum segregated storage area shall be limited to the smaller of the two areas resulting from the percentage of building area limitation and the area limitation.
- b. Automatic sprinkler system protection in aerosol product storage areas shall comply with NFPA 30B and be approved. Building areas not containing aerosol product storage shall be equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1.
- c. Automatic sprinkler system protection in aerosol product storage areas shall comply with NFPA 30B and be approved. Sprinkler system protection shall extend a minimum 20 feet beyond the aerosol storage area.
- d. Chain-link fence enclosures shall comply with Section 5104.3.2.1.
- e. A separation area shall be defined as an area extending outward from the periphery of the segregated aerosol product storage area as follows:
 1. The limits of the aerosol product storage shall be clearly marked on the floor.
 2. The separation distance shall be not less than 25 feet and maintained clear of all materials with a commodity classification greater than Class III in accordance with Section 903.3.1.1.
- f. Separation areas shall only be permitted where approved.

Add new text as follows:

5104.4 Plastic aerosol cooking spray product. Plastic aerosol cooking spray products shall be defined as a base product of Extra Virgin Olive Oil pan spray that is packaged in a compartmented container which separates the product from the propellant, as typified by a bag-on-valve package, bag in can, or piston type packaging and the propellant is nonflammable compressed gas, nonflammable liquefied gas or mixtures thereof.

Revise as follows:

5104.4 5104.5 Storage in aerosol product warehouses. The total quantity of Level 2 and 3 aerosol products, plastic aerosol 2 products, and plastic aerosol cooking spray products in a warehouse utilized for the storage, shipping and receiving of aerosol products shall not be restricted in structures complying with Sections 5104.4.1 through 5104.4.4.

~~5104.5.1~~ 5104.6.1 Storage rooms of 500 square feet or less. The storage of aerosol products in *flammable liquid* storage rooms less than or equal to 500 square feet (46 m²) in area shall not exceed the following quantities:

1. A net weight of 1,000 pounds (454 kg) of Level 2 aerosol products.
2. A net weight of 500 pounds (227 kg) of Level 3 aerosol products.
3. A combined net weight of 1,000 pounds (454 kg) of Level 2 and 3 aerosol products, plastic aerosol 2 products, and plastic aerosol cooking spray products.

~~5104.5.2~~ 5104.6.2 Storage rooms greater than 500 square feet. The storage of aerosol products in *flammable liquid* storage rooms greater than 500 square feet (46 m²) in area shall not exceed the following quantities:

1. A net weight of 2,500 pounds (1135 kg) of Level 2 aerosol products.
2. A net weight of 1,000 pounds (454 kg) of Level 3 aerosol products.

3. A combined net weight of 2,500 pounds (1135 kg) of Level 2 and 3 aerosol products, plastic aerosol products, and plastic aerosol cooking spray products.

The maximum aggregate storage quantity of Level 2 and 3 aerosol products, plastic aerosol 2 products, and plastic aerosol cooking spray products permitted in separate inside storage rooms protected by an *approved automatic sprinkler system* in accordance with NFPA 30B shall be 5,000 pounds (2270 kg).

~~5104.7~~ 5104.8 Storage in Group M occupancies. Storage of Level 2 and 3 aerosol products, aerosol cooking spray products and plastic aerosol 2 and 3 products and plastic aerosol cooking spray products in occupancies in Group M shall comply with Table ~~5104.7~~ 5104.8. Retail display shall comply with Section 5106.

TABLE ~~5104.7~~ 5104.8

**MAXIMUM QUANTITIES OF LEVEL 2 AND 3 AEROSOL PRODUCTS, AEROSOL COOKING SPRAY PRODUCTS, ~~AND PLASTIC AEROSOL~~
2 AND 3 PRODUCTS AND PLASTIC AEROSOL COOKING SPRAY PRODUCTS IN RETAIL STORAGE AREAS**

MAXIMUM NET WEIGHT PER FLOOR (pounds)			
Floor	Nonsegregated storage ^{a, b}	Segregated storage	
		Storage cabinets ^b	Separated from retail area ^c
Basement	Not Permitted	Not Permitted	Not Permitted
Ground	2,500	5,000	Note d
Upper	500	1,000	Note d

For SI: 1 pound = 0.454 kg, 1 square foot = 0.0929 m².

- 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.

5105.1 General. The outside storage of Level 2 and 3 aerosol products ~~and plastic aerosol~~ 2 and 3 products and plastic aerosol cooking spray products, including storage in temporary storage trailers, shall be separated from exposures in accordance with Table 5105.1.

TABLE 5105.1
DISTANCE TO EXPOSURES FOR OUTSIDE STORAGE OF LEVEL 2 AND 3 AEROSOL PRODUCTS, ~~AND~~ PLASTIC AEROSOL 2 AND 3
PRODUCTS AND PLASTIC AEROSOL COOKING SPRAY PRODUCTS

EXPOSURE	MINIMUM DISTANCE FROM AEROSOL STORAGE (feet) ^a
Buildings	50
Exit discharge to a public way	50
Lot lines	20
Other outside storage	50
Public alleys, public ways, public streets	20

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

- a. The minimum separation distance indicated is not required where exterior walls having a 2-hour fire-resistance rating without penetrations separate the storage from the exposure. The walls shall extend not less than 30 inches above and to the sides of Level 2 and 3 aerosol products and plastic aerosol 3 products.

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, aerosol cooking spray products, ~~and plastic aerosol 2 and 3 products~~ and plastic aerosol cooking spray products.

5106.2.1 Maximum quantities in retail display areas. Aerosol products, aerosol cooking spray products, ~~and plastic aerosol 2 and 3 products~~ and plastic 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.

TABLE 5106.2.1

MAXIMUM QUANTITIES OF LEVEL 2 AND 3 AEROSOL PRODUCTS, AEROSOL COOKING SPRAY PRODUCTS, AND PLASTIC AEROSOL 2 AND 3 PRODUCTS AND PLASTIC AEROSOL COOKING SPRAY PRODUCTS IN RETAIL DISPLAY AREAS

MAXIMUM NET WEIGHT PER FLOOR (pounds) ^b			
Floor	Unprotected ^a	Protected in accordance with Section 5106.2 ^{a, c}	Protected in accordance with Section 5106.3 ^c
Basement	Not Allowed	500	500
Ground	2,500	10,000	10,000
Upper	500	2,000	Not Allowed

For SI: 1 pound = 0.454 kg, 1 square foot = 0.0929 m².

- The total quantity shall not exceed 1,000 pounds net weight in any one 100-square-foot retail display area.
- Per 25,000-square-foot retail display area.
- Minimum Ordinary Hazard Group 2 wet-pipe automatic sprinkler system throughout the retail sales occupancy.

5106.2.2 Aerosol cooking spray product, and plastic aerosol 2 and 3 product, and plastic aerosol cooking spray product storage and fire protection. The storage and handling of aerosol cooking spray products, and plastic aerosol 2 and 3 products, and plastic aerosol cooking spray products shall comply with this chapter and NFPA 30B.

5106.2.3 Display of aerosol products. Level 2 and 3 aerosol products, plastic aerosol 2 products, and plastic aerosol cooking spray 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 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 products shall not exceed 8 feet (2438 mm).

5106.3.2 Automatic sprinkler protection. Aerosol product, and plastic aerosol 2 and 3 product, and plastic aerosol cooking spray product display and merchandising areas shall be protected by an *automatic sprinkler system* based on the requirements set forth in Tables 6.4.2.7(a) through 6.4.2.7(l) of NFPA 30B and the following:

- 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.
- Where using the cartoned aerosol products tables of NFPA 30B, uncartoned or display-cut Level 2 and 3 aerosol products and plastic aerosol 3 products shall not be permitted more than 6 feet (1829 mm) above the finished floor.
- The design area for Level 2 and 3 aerosol products and plastic aerosol 3 products shall extend not less than 20 feet (6096 mm) beyond the Level 2 and 3 aerosol product and plastic aerosol 3 product display and merchandising areas.
- 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, and plastic aerosol 2 and 3 product, and plastic aerosol cooking spray product areas. Separation of Level 2 and 3 aerosol product areas, or plastic aerosol 2 and 3 product areas, or plastic aerosol cooking spray product areas shall comply with the following:

- Level 2 and 3 aerosol product or plastic aerosol 3 p. Product display and merchandising areas shall be separated from each other by not less than 25 feet (7620 mm). See Table 5106.2.1.
- Level 2 and 3 aerosol product or plastic aerosol 3 p. 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:
 - Segregating areas from each other by horizontal distance of not less than 25 feet (7620 mm).
 - Isolating areas from each other by a noncombustible partition extending not less than 18 inches (457 mm) above the merchandise.
 - In accordance with Section 5106.5.
- Where Item 2.2 is used to separate Level 2 or 3 aerosol products, or plastic aerosol 2 and 3 products, and plastic aerosol cooking spray 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.

Reason Statement: Full scale fire tests are being conducted to determine the appropriate protection criteria for plastic aerosol 2 products and plastic aerosol cooking spray products.

Where plastic aerosol 3 products should be included in these sections but are not, that is addressed by a separate editorial proposed change. This change is technical in nature and the requirements will be determined upon completion of the fire test program.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal provides protection criteria that is not currently contained in the International Fire Code.

F199-21

F200-21

IFC: SECTION 5306, 5306.2, 5306.5, 5306.5.1 (New)

Proponents: John Williams, Chair, representing Healthcare Committee (ahc@iccsafe.org)

2021 International Fire Code

SECTION 5306 MEDICAL GASES.

Revise as follows:

5306.2 Interior supply location. Medical gases shall be located in areas dedicated to the storage of such gases without other storage or uses. Rooms containing medical gases shall be labeled in accordance with NFPA 99. 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.

5306.5 Medical gas systems and equipment. Medical gas systems and equipment shall be installed, tested and *labeled* in accordance with NFPA 99 and the general provisions of this chapter. Existing medical gas systems and equipment shall be used and maintained in accordance with the use, maintenance, inspection and testing provisions of NFPA 99 for medical gas systems and equipment.

Add new text as follows:

5306.5.1 Medical gas cylinders. Operation and management of medical gas cylinders shall be in accordance with NFPA 99.

Reason Statement: Provide additional clarity for signs on rooms and management of medical gas cylinders as required by NFPA 99. In order to meet federal conditions of participation health care facilities must comply with system and equipment according to the requirements listed in NFPA 99, Health Care Facilities Code (K901, K902, K903, K904, K905, K911, K906, K907, K, K909 and K931).

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change aligns with existing federal requirements for the healthcare industry.

F200-21

F201-21

IFC: CHAPTER 56, SECTION 5601, 5601.1

Proponents: Dave Frable, representing Self (dave.frable@gsa.gov)

2021 International Fire Code

CHAPTER 56 EXPLOSIVES AND FIREWORKS

SECTION 5601 GENERAL.

Revise as follows:

5601.1 Scope. The provisions of this chapter shall govern the possession, manufacture, storage, handling, sale and use of *explosives*, *explosive materials*, fireworks and small arms ammunition.

Exceptions:

1. The Armed Forces of the United States, Coast Guard or National Guard.
2. *Explosives* in forms prescribed by the official United States Pharmacopoeia.
3. The possession, storage and use of small arms ammunition where packaged in accordance with DOTn packaging requirements.
4. The possession, storage and use of not more than 1 pound (0.454 kg) of commercially manufactured sporting black powder, 20 pounds (9 kg) of smokeless powder and 10,000 small arms primers for hand loading of small arms ammunition for personal consumption.
5. The use of *explosive materials* by federal, state and local regulatory, law enforcement and fire agencies acting in their official capacities.
6. Special industrial *explosive* devices that in the aggregate contain less than 50 pounds (23 kg) of *explosive materials*.
7. The possession, storage and use of blank industrial-power load cartridges where packaged in accordance with DOTn packaging regulations.
8. Transportation in accordance with DOTn 49 CFR Parts 100–185.
9. Items preempted by federal regulations.
10. The possession, storage and use of explosives and explosive materials by federal law enforcement agencies acting in their official capacities in Group B occupancies complying with Section 5604 of the *International Fire Code*.

Reason Statement: Some Federal Law Enforcement Agencies by the nature of their mission have a need to possess, store and use explosives and explosive materials at or near their base of operation. For example, Federal Law Enforcement Agencies utilizing canine teams to provide explosive detection have a need to possess, store and use explosive canine training aids and Federal Law Enforcement Agencies that confiscate explosives and explosive materials during their daily activities also need storage areas near their base operations to store these types of explosive materials. However, following the prescriptive storage requirements in Chapter 56 for explosive materials would prohibit the possession and storage of these types of explosive materials within spaced leased by the Federal Government in commercial office buildings as well as in Federally-owned office buildings and in some cases prohibit such storage on Federally-owned property. This proposed code change attempts to address this issue by including an additional exception that would permit Federal Law Enforcement Agencies acting in their official capacities to possess, store and use explosives and explosive materials in Group B occupancies complying with Section 5604 in the International Fire Code.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

This proposal is focused upon operational and use requirements and does not affect the cost of construction. In fact the proposal provides more flexibility in the application of the code.

F201-21

F202-21

IFC: 5604.5.1.1

Proponents: Dave Frable, representing Self (dave.frable@gsa.gov)

2021 International Fire Code

Revise as follows:

5604.5.1.1 Use. The use of indoor magazines for storage of *explosives* and *explosive materials* shall be limited to Federal law enforcement agencies acting in their official capacities in Group B occupancies and occupancies of Group F, H, M or S, and research and development laboratories.

Reason Statement: Several Federal Law Enforcement Agencies by the nature of their mission have a need to possess, store and use explosives and explosive materials at or near their base of operation. For example, Federal Law Enforcement Agencies utilizing canine teams to provide explosive detection have a need to possess, store and use explosive canine training aids and Federal Law Enforcement Agencies that confiscate explosive materials during their daily activities also need storage areas near their base operations to store these types of explosives and explosive materials. However, following the prescriptive storage requirements in Chapter 56 for explosive materials would prohibit the storage of these types of explosive materials within spaced leased by the Federal Government in commercial office buildings as well as in Federally-owned office buildings and in some cases prohibit such storage on Federally-owned property. This proposed code change attempts to address this issue by permitting the storage of explosives and explosive materials by Federal Law Enforcement Agencies acting in their official capacities in Group B occupancies.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

This proposal is focused upon operational and use requirements and does not affect the cost of construction. In fact the proposal provides more flexibility in the application of the code.

F202-21

F203-21

IFC: 5704.2.9.6.1, 5706.2.4.4, 5806.2, 6104.2

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Fire Code

Revise as follows:

5704.2.9.6.1 Locations where above-ground tanks are prohibited. Storage of Class I and II liquids in above-ground tanks outside of buildings is prohibited within the limits established by law ~~as the limits of districts in which such storage is prohibited [JURISDICTION TO SPECIFY]~~ as set forth in the fire code adoption ordinance or other regulation adopted by the jurisdiction [see "Adoption" on Page vii].

5706.2.4.4 Locations where above-ground tanks are prohibited. The storage of Class I and II liquids in above-ground tanks is prohibited within the limits established by law ~~as the limits of districts in which such storage is prohibited [JURISDICTION TO SPECIFY]~~ as set forth in the fire code adoption ordinance or other regulation adopted by the jurisdiction [see "Adoption" on Page vii].

5806.2 Limitations. Storage of flammable *cryogenic fluids* in stationary containers outside of buildings is prohibited within the limits established by law ~~as the limits of districts in which such storage is prohibited [JURISDICTION TO SPECIFY]~~ as set forth in the fire code adoption ordinance or other regulation adopted by the jurisdiction [see "Adoption" on Page vii].

6104.2 Maximum capacity within established limits. Storage of liquefied petroleum gas, for the protection of heavily populated or congested areas, shall not exceed an aggregate capacity in any one installation of 2,000 gallons (7570 L) within the limits established by law restricting the storage of liquefied petroleum gas for the protection of heavily populated or congested areas, the aggregate capacity of any one installation shall not exceed a water capacity of 2,000 gallons (7570 L) [JURISDICTION TO SPECIFY] as set forth in the fire code adoption ordinance or other regulation adopted by the jurisdiction [see "Adoption" on Page vii].

Exception: In particular installations, this capacity limit shall be determined by the *fire code official*, after consideration of special features such as topographical conditions, nature of occupancy, and proximity to buildings, capacity of proposed LP-gas containers, degree of fire protection to be provided and capabilities of the local fire department.

Reason Statement: The proposed revisions provide clarity with respect to how to apply the existing provisions that restrict the installation of certain hazardous materials based on location within a jurisdiction. It also helps tie the fire code to other regulations adopted by the jurisdiction that might restrict permissible hazardous materials installations. Previously, Section 3 of the model adoption ordinance in the preamble of the code was tied to these sections and provided guidance on how to declare such restricted locations. However, the model adoption ordinance was deleted after the 2015 edition of the IFC and replaced in the 2018 edition with a preamble section on "Adoption," which is less specific.

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 and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: <https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/>

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The intent of the proposal is simply to provide more clarity in code application.

F203-21

F204-21

IFC: 5704.2.13.1.4, 5704.2.14, 5704.2.14.1, 5704.2.14.2

Proponents: Kevin Duerr-Clark, representing New York State Department of State (kevin.duerr-clark@dos.ny.gov); Chad Sievers, representing NYS Dept. of State (chad.sievers@dos.ny.gov)

2021 International Fire Code

Revise as follows:

5704.2.13.1.4 Tanks abandoned in place. Tanks abandoned in place shall be as follows:

- ~~1. *Flammable and combustible liquids* shall be removed from the tank and connected piping. The entire contents of the tank and related piping shall be emptied, cleaned, and purged of all vapor. The contents of the storage tank and related piping shall be removed from the premises or property and disposed of in accordance with applicable local, state, or federal rules and regulations.~~
2. The suction, inlet, gauge, vapor return and vapor lines shall be disconnected and either be permanently removed, capped, plugged, or filled with concrete.
3. Underground tanks shall be filled completely with an *approved* inert solid material. Above-ground tanks may either be filled with an approved inert solid material or if not filled with an *approved* inert solid material then the vent line shall remain open and intact.
~~The tank shall be filled completely with an *approved* inert solid material.~~
4. Remaining underground piping shall be capped or plugged.

Exception: Piping that is reused for the installation of a new tank and meets the applicable requirements for the new installation shall be allowed to remain where approved by the fire code official.

5. A record of tank size, location and date of abandonment shall be retained.
6. All exterior above-grade fill piping shall be permanently removed when tanks are abandoned or removed, or the oil fill pipe shall be filled with concrete.
7. Tanks with automatic delivery shall have the supplier or suppliers notified in writing a minimum of 24 hours prior to the abandonment, instructing them to discontinue deliveries.

5704.2.14 Removal and disposal of tanks. Removal and disposal of tanks shall comply with Sections 5704.2.14.1 and 5704.2.14.2.

Revise as follows:

5704.2.14.1 Removal. Removal of above-ground and underground tanks shall be in accordance with all of the following:

- ~~1. *Flammable and combustible liquids* shall be removed from the tank and connected piping. The entire contents of the tank and related piping shall be emptied, cleaned, purged of all vapor, and inerted.~~
2. Piping at tank openings that is not to be used further shall be disconnected.
3. Piping shall be removed from the ground.

Exception Exceptions:

1. Piping is allowed to be abandoned in place where the *fire code official* determines that removal is not practical. Abandoned piping shall be capped and safeguarded as required by the *fire code official*.
2. Piping that is reused for the installation of a new tank and meets the applicable requirements for the new installation shall be allowed to remain where *approved by the fire code official*.
4. Tank openings shall be capped or plugged, leaving a 1/8-inch to 1/4-inch-diameter (3.2 mm to 6.4 mm) opening for pressure equalization.
5. Tanks shall be purged of vapor and inerted prior to removal.
6. All exterior above-grade fill and vent piping shall either be permanently removed or filled with concrete.

Exception: Piping associated with bulk plants, terminal facilities and refineries.

7. Tanks with automatic delivery shall have the supplier or suppliers notified in writing a minimum of 24 hours prior to the removal, instructing them to discontinue deliveries.

5704.2.14.2 Disposal. ~~Tanks shall be disposed of in accordance with federal, state and local regulations.~~ The tank and related piping.

and the contents of the tank and related piping shall be removed from the premises and disposed of in accordance with applicable local, state, or federal rules and regulations

Reason Statement: This change provides some additional clarity on proper removal and disposal of the materials within tanks that are abandoned in place and those removed and disposed of. It is also attempting to clarify scenarios where either reuse of existing piping is necessary for replacement tank installations, or for when removal of all piping would be unnecessarily onerous. Lastly, it requires property owner notification to suppliers when the tank is abandoned or removed. This was done to help minimize the chances of a supplier attempting to fill a tank that has been abandoned or removed, resulting in a spill and costly remediation.

Cost Impact: The code change proposal will not increase or decrease the cost of construction. These changes provide some more flexibility in the abandonment and removal of tanks while clarifying what would already be required by local, state, and federal laws. The only potential small cost, which is not a construction cost, would be the cost to the property owner to notify the suppliers. Depending on the method of notification (electronic such as email, or a mailed letter), the cost would be marginal.

F204-21

F205-21

IFC: 5705.5, 5705.5.1

Proponents: Jonathan Roberts, representing UL LLC (jonathan.roberts@ul.com)

2021 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~~ located 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~~ located 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 obstruct required means of egress or be placed within 3 feet (914 mm) of an open flame, heating device or other ignition source.
- 5 6. 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:
 - 56.1. 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.
 - 56.2. 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 6.2.1. Any activations of the dispenser shall only occur when an object is placed within 4 inches (98 mm) of the sensing device.
 - 5 6.2.2. 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 6.2.3. An object placed within the activation zone and left in place will cause only one activation.
- 6 7. Storage and use of alcohol-based hand rubs shall be in accordance with the applicable provisions of Sections 5704 and 5705.
- 7 8. 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.

5705.5.1 Corridor installations. In addition to the provisions of Section 5705.5, where ~~wall-mounted~~ dispensers containing alcohol-based hand rubs are ~~installed~~ located in *corridors* or rooms and areas open to the *corridor*, they shall be in accordance with all of the following:

1. Level 2 and 3 aerosol containers shall not be allowed in *corridors*.
2. The maximum capacity of each Class I or II liquid dispenser shall be 41 ounces (1.21 L) and the maximum capacity of each Level 1 aerosol dispenser shall be 18 ounces (0.51 kg).
3. The maximum quantity allowed in a *corridor* within a *control area* shall be 10 gallons (37.85 L) of Class I or II liquids or 1135 ounces (32.2 kg) of Level 1 aerosols, or a combination of Class I or II liquids and Level 1 aerosols not to exceed, in total, the equivalent of 10 gallons (37.85 L) or 1,135 ounces (32.2 kg) such that the sum of the ratios of the liquid and aerosol quantities divided by the allowable quantity of liquids and aerosols, respectively, shall not exceed one.
4. The minimum *corridor* width shall be 72 inches (1829 mm).
5. Projections into a *corridor* shall be in accordance with Section 1003.3.3.

Reason Statement: Pandemics such as the Covid-19 virus have led to an increased need to provide hand sanitizer dispensers. This proposal removes the term "wall-mounted" in the scope of this section in order to cover all dispensers, including wall mounted and floor supported dispensers. It is not intended to apply to individual personal use hand sanitizers.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

It introduces an option for floor supported hand sanitizers to be used.

F205-21

F206-21

IFC: 5705.5, 5705.5.1 (New), 5705.5.2 (New), 5705.5.3 (New), 5705.5.4 (New)

Proponents: Dave Frable, representing Self (dave.frable@gsa.gov)

2021 International Fire Code

Revise as follows:

5705.5 Alcohol-based hand rubs classified as Class I or II liquids. The use ~~and storage of wall-mounted~~ dispensers containing alcohol-based hand rubs (ABHR) classified as Class I or II liquids shall be in accordance with Sections 5705.5.1 through 5705.5.4 ~~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.~~

Add new text as follows:

5705.5.1 Personal-use dispensers. ABHR dispensers for personal-use is limited to one dispenser of ABHR, not greater than 16 ounces in volume, per occupant.

5705.5.2 Multi-use dispensers. ABHR wall-mounted dispensers and freestanding ABHR stations and stands 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. Dispensers installed in occupancies with carpeted floors shall only be permitted in areas equipped throughout with an *approved automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2.

5705.5.3 Indoor Storage. Indoor storage of ABHR shall meet the following requirements:

1. Storage of ABHR shall not be permitted in a basement.
2. Storage of ABHR in excess of 10 gallons shall be stored in flammable liquid storage cabinets that meet the requirements in 5704.3.2.
3. Storage of 10 gallons of ABHR or less shall be in a safe manner away from electrical receptacles and other ignition sources.
4. Storage of ABHR shall be located within a control area.
 - 4.1. Control areas are defined by compartments that are created by fire resistance-rated construction.
 - 4.2. The quantity of ABHR permitted is based on floor location within a building is a percentage of the maximum quantity permitted. See IFC Tables 5003.1.1(1) and 5003.8.3.2.

5705.5.4 Outdoor Storage. Outdoor storage of quantities of ABHR shall meet the requirements in NFPA 30.

Reason Statement: The intent of this proposal is to address issues that have arisen during the COVID-19 pandemic concerning the use, storage, or both of alcohol based hand rubs (ABHR) dispensers distributed within all types of occupancies, specifically Group B occupancies. As currently written, the current text in Section 5705.5 only addresses the use of wall-mounted dispensers containing ABHR. The current text in this section also appears to be originally written for only health care occupancies.

This proposal revises the current text to address the use, storage, or both of all types of ABHR dispensers. The subject proposed new requirements are based on current GSA Fire Safety Guidance regarding alcohol-based hand sanitizer use and storage requirements.

The subject proposed new requirements also addresses both personal-use and multi-use dispensers in lieu of just wall-mounted dispensers. In addition, proposed new language also addresses both indoor and outdoor storage requirements based on current requirements in NFPA 30 which seem to be more appropriate for this type of flammable liquid.

Bibliography: NFPA 30, Flammable and Combustible Liquids Code

Cost Impact: The code change proposal will not increase or decrease the cost of construction

This proposal is focused upon operational and use requirements and does not affect the cost of construction. The provisions are simply more reflective of how ABHR is being used as affected by COVID19.

F207-21

IFC: 5705.5.1

Proponents: Dave Frable, representing Self (dave.frable@gsa.gov)

2021 International Fire Code

Revise as follows:

5705.5.1 Corridor installations. In addition to the provisions of Section 5705.5, where wall-mounted dispensers and freestanding ABHR stations and stands containing alcohol-based hand rubs are installed in ~~corridors or rooms and areas open to the corridor~~, they shall be in accordance with all of the following:

1. Level 2 and 3 aerosol containers shall not be allowed in *corridors*.
2. The maximum capacity of each Class I or II liquid dispenser shall be 41 ounces (1.21 L) and the maximum capacity of each Level 1 aerosol dispenser shall be 18 ounces (0.51 kg).
3. The maximum quantity allowed in a *corridor* within a *control area* shall be 10 gallons (37.85 L) of Class I or II liquids or 1135 ounces (32.2 kg) of Level 1 aerosols, or a combination of Class I or II liquids and Level 1 aerosols not to exceed, in total, the equivalent of 10 gallons (37.85 L) or 1,135 ounces (32.2 kg) such that the sum of the ratios of the liquid and aerosol quantities divided by the allowable quantity of liquids and aerosols, respectively, shall not exceed one.
4. ~~The minimum corridor width shall be 72 inches (1829 mm).~~
- 5 4. Projections into a *corridor* shall be in accordance with Section 1003.3.3.

Reason Statement: The intent of this proposal is to address issues that have arisen during the COVID-19 pandemic concerning the use alcohol based hand rubs (ABHR) dispensers distributed within all types of occupancies. The current text in this section was originally written around health care occupancies.

The current text only addresses the use of wall-mounted dispensers containing ABHR in corridors. This proposal revises the current text to include freestanding ABHR stations and stands. In addition, the proposal eliminates the need to address rooms or areas open to the corridor since these areas pose a very low risk and have become an enforcement issue. Lastly, the proposal eliminates the minimum corridor width of 72 inches since this appears to be more of a health care occupancy requirement.

Bibliography: N/A

Cost Impact: The code change proposal will not increase or decrease the cost of construction

This proposal is focused upon operational and use requirements and does not affect the cost of construction. The provisions are simply more reflective of how ABHR is being used as affected by COVID19.

F207-21

F208-21

IFC: 5706.5

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Fire Code

Revise as follows:

5706.5 Bulk transfer and process transfer operations. Bulk transfer and process transfer operations shall be *approved* and be in accordance with Sections 5706.5.1 through 5706.5.3.3 ~~5706.5.4.5~~. Motor fuel-dispensing facilities shall comply with Chapter 23.

Reason Statement: This corrects a reference error. 5706.5.3.3 is the last section in the process transfer requirements. 5607.5.4 is the first section in the tank vehicle fueling 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 and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: <https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/>

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal merely corrects a cross reference.

F208-21

F209-21

IFC: 5706.5.4

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Fire Code

Revise as follows:

5706.5.4 Dispensing from tank vehicles and tank cars. ~~Dispensing from tank cars into the fuel tanks of motor vehicles shall be prohibited.~~
Dispensing from tank vehicles ~~and tank cars~~ into the fuel tanks of motor vehicles shall be prohibited unless allowed by and conducted in accordance with Sections 5706.5.4.1 through 5706.5.4.5.

Reason Statement: Sections 5706.5.4.5.1 through 5706.5.4.5.6 and 5707 do not allow dispensing from tank cars into fuel tanks of motor vehicles. This proposal clarifies tank cars cannot be used to fuel motor 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 and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: <https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/>

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposal merely clarifies existing code requirements.

F209-21

F210-21

IFC: 5706.5.4

Proponents: Kevin Duerr-Clark, representing New York State Department of State (kevin.duerr-clark@dos.ny.gov); Chad Sievers, representing NYS Dept. of State (chad.sievers@dos.ny.gov)

2021 International Fire Code

Revise as follows:

5706.5.4 Dispensing from tank vehicles and tank cars. Dispensing from tank vehicles and tank cars into the fuel tanks of motor vehicles shall be prohibited unless allowed by and conducted in accordance with Sections 5706.5.4.1 through 5706.5.4.5 or where permitted and approved in accordance with Section 5707 of this code.

Reason Statement: Section 5707 specifically addresses on-demand mobile fueling operations, while 5706.5.4 is more generally dispensing from tank vehicles or tank cars into motor vehicles. However, with no clear distinction between the two types of operations or a tank vehicle vs a mobile fueling vehicle, these two sections could appear to have conflicting allowances. This proposal simply eliminates that potential conflict by providing a pointer from 5706.5.4 to 5707.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change proposal is an editorial code change and is only meant to clarify the code and eliminate contradictions in the code.

F210-21

F211-21

IFC: 5706.5.4.1

Proponents: Kevin Duerr-Clark, representing New York State Department of State (kevin.duerr-clark@dos.ny.gov); Chad Sievers, representing NYS Dept. of State (chad.sievers@dos.ny.gov)

2021 International Fire Code

Revise as follows:

5706.5.4.1 Marine craft and special equipment. Liquids intended for use as motor fuels are allowed to be transferred from tank vehicles into the fuel tanks of marine craft and special equipment where *approved* by the *fire code official*, and where:

1. The tank vehicle's specific function is that of supplying fuel to fuel tanks.
2. The operation is not performed where the public has access or where there is unusual exposure to life and property.
3. The dispensing line does not exceed 50 feet (15 240 mm) in length.
4. The dispensing nozzle is *approved*.
5. The operation shall be in accordance with Sections 2310.4.1 and 2310.4.2 except where *approved* in accordance with Section 5707.

Reason Statement: This proposal ties together Section 2310.4, Section 5706.5.4, and Section 5707 for fueling marine craft from tank vehicles or mobile fueling vehicles. Without this tie, there is the appearance of conflicting provisions where a Class I would not be permitted under 2310.4, but potentially permitted under 5707, and silent in 5706.5.4.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
There is no anticipated cost of construction increase. This is simply a coordination of related code sections.

F211-21

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Fire Code

Revise as follows:

5706.5.4.5 Commercial, industrial, governmental or manufacturing. Dispensing of Class I, 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 approved ~~permitted~~, provided that 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 that 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 on 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 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.
7. 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.
8. 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.
9. A portable fire extinguisher with a minimum rating of 40:BC shall be provided on the vehicle with signage clearly indicating its location.
10. The dispensing nozzles and hoses shall be of an *approved* and *listed* type.
11. The dispensing hose shall not be extended from the reel more than 100 feet (30 480 mm) in length.
12. 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.
13. 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 that, when activated, immediately causes flow of fuel from the tank vehicle to cease.

14. 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.
15. 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.
16. The tank vehicle dispensing equipment shall be constantly attended and operated only by designated personnel who are trained to handle and dispense motor fuels.

17. Fuel dispensing shall be prohibited within 25 feet (7620 mm) of any source of ignition.
18. The engines of vehicles being fueled shall be shut off during dispensing operations.
19. Nighttime fueling operations shall only take place in adequately lighted areas.
20. The tank vehicle shall be positioned with respect to vehicles being fueled to prevent traffic from driving over the delivery hose.
21. During fueling operations, tank vehicle brakes shall be set, chock blocks shall be in place and warning lights shall be in operation.
22. Motor vehicle fuel tanks shall not be topped off.
23. The dispensing hose shall be properly placed on an *approved* reel or in an *approved* compartment prior to moving the tank vehicle.
24. The *fire code official* and other appropriate authorities shall be notified when a reportable spill or unauthorized discharge occurs.
25. 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.

Reason Statement: Section 5706.5.4.5 covers fleet fueling operations, which require an operating permit to be conducted. This proposal does two things, adds Class I liquids to the fuels that can be dispensed, and replaces “where permitted” (an undefined term), with “where approved”, which clarifies that the fire code official needs to approve the mobile fueling to be conducted at various facilities and sites.

We understand that fleet fueling of Class I liquids, in addition to Class II or III liquids, has already been accepted in many state codes (e.g., Ohio State Fire Code & Oregon State Fire Code), and this is consistent with NFPA 30A, Section 9.6. However, like all fleet fueling operations, fleet fueling of Class I liquids is only allowed when approved by the fire code official, and is covered by an operational permit per Section 105.6.16.

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 and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: <https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/>

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal expands the fuels that can be dispensed at these operations so will not increase cost of compliance.

F212-21

F213-21

IFC: 5706.6.1.10

Proponents: James Russell Brauksieck, representing self (brauksieck.james@epa.gov)

2021 International Fire Code

Revise as follows:

5706.6.1.10 Hose connections. Delivery of *flammable liquids* to underground tanks with a capacity of more than 1,000 gallons (3785 L) shall be made by means of *approved* liquid and vapor-tight connections between the delivery hose and tank fill pipe. Where underground tanks are equipped with any type of vapor recovery system, all connections required to be made for the safe and proper functioning of the particular vapor recovery process shall be made. Such connections shall be made liquid and vapor tight and remain connected throughout the unloading process. Vapors shall not be discharged at grade level during delivery. At the conclusion of the unloading process, the delivery hose shall be disconnected from the tank fill pipe and vapor recovery process shall be disconnected from the tank.

Reason Statement: Delivery hoses that are left connected to fill pipes at the conclusion of a delivery should be considered part of the underground tank system (based on the definition of system in chapter 2) and would need to meet the requirements for aboveground piping. Since delivery hoses do not meet the standards for aboveground piping, the delivery hose needs to be properly emptied and disconnected from the fill pipe.

Bibliography: I don't have one as this is original material

Cost Impact: The code change proposal will not increase or decrease the cost of construction

The code change proposal will not increase or decrease the cost of construction

This is an operational requirement. There would be a small increase in time to complete a delivery when having to make the connections to the fill pipe as compared to when the transfer hose is not disconnected.

F213-21

F214-21

IFC: 105.5.18, 5707.1.1, 5707.3.1, 5707.3.3

Proponents: Andrew Klein, representing Booster Fuels (andrew@asklein.com)

2021 International Fire Code

Revise as follows:

105.5.18 Flammable and combustible liquids. An operational permit is required:

1. To use or operate a pipeline for the transportation within facilities of *flammable* or *combustible liquids*. This requirement shall not apply to the off-site transportation in pipelines regulated by the Department of Transportation (DOTn) nor does it apply to piping systems.
2. To store, handle or use Class I liquids in excess of 5 gallons (19 L) in a building or in excess of 10 gallons (37.9 L) outside of a building, except that a permit is not required for the following:
 - 2.1. The storage or use of Class I liquids in the fuel tank of a motor vehicle, aircraft, motorboat, mobile power plant or mobile heating plant, unless such storage, in the opinion of the *fire code official*, would cause an unsafe condition.
 - 2.2. The storage or use of paints, oils, varnishes or similar flammable mixtures where such liquids are stored for maintenance, painting or similar purposes for a period of not more than 30 days.
3. To store, handle or use Class II or Class IIIA liquids in excess of 25 gallons (95 L) in a building or in excess of 60 gallons (227 L) outside a building, except for fuel oil used in connection with oil-burning equipment.
4. To store, handle or use Class IIIB liquids in tanks or portable tanks for fueling motor vehicles at motor fuel-dispensing facilities or where connected to fuel-burning equipment.

Exception: Fuel oil and used motor oil used for space heating or water heating.

5. To remove Class I or II liquids from an underground storage tank used for fueling motor vehicles by any means other than the *approved*, stationary on-site pumps normally used for dispensing purposes.
6. To operate tank vehicles, equipment, tanks, plants, terminals, wells, fuel-dispensing stations, refineries, distilleries and similar facilities where *flammable* and *combustible liquids* are produced, processed, transported, stored, dispensed or used.
7. To place temporarily out of service (for more than 90 days) an underground, protected above-ground or above-ground *flammable* or *combustible liquid* tank.
8. To change the type of contents stored in a *flammable* or *combustible liquid* tank to a material that poses a greater hazard than that for which the tank was designed and constructed.
9. To manufacture, process, blend or refine *flammable* or *combustible liquids*.
10. To engage in the dispensing of liquid fuels into the fuel tanks of motor vehicles at commercial, industrial, governmental or manufacturing establishments in accordance with Section 5706.5.4 or to engage in on-demand mobile fueling operations in accordance with Section 5707.
11. To utilize a site for the dispensing of liquid fuels from tank vehicles into the fuel tanks of motor vehicles, marine craft and other special equipment at commercial, industrial, governmental or manufacturing establishments in accordance with Section 5706.5.4 ~~or, where required by the fire code official, to utilize a site for on-demand mobile fueling operations in accordance with Section 5707.~~

5707.1.1 Approval required. Mobile fueling operations shall not be conducted without first obtaining a *permit* and approval from the *fire code official*. ~~Mobile fueling operations shall occur only at approved locations. The fire code official is authorized to approve individual locations or geographic areas where mobile fueling is allowed.~~

5707.3.1 Safety and emergency response plan. Mobile fueling operators shall have an approved written safety and emergency response plan that establishes policies and procedures for fire safety, spill prevention and control, personnel training and compliance with other applicable requirements of this code. At a minimum, the plan shall ensure that operators take into consideration the following prior to commencing fueling:

1. Location of all buildings and structures.
2. Location of lot lines or property lines.
3. Location of electric car chargers and solar photovoltaic parking lot canopies.
4. Location of appurtenances on-site and their use or function.
5. Uses adjacent to the lot lines of the site.
6. Locations of storm drain openings and adjacent waterways or wetlands.

7. Information regarding slope, natural drainage, curbing and impounding.
8. How a spill will be kept on the site property.

Delete without substitution:

5707.3.3 Site plan. ~~Where required by the fire code official, a site plan shall be developed for each location or area at which mobile fueling occurs. The site plan shall be in sufficient detail to indicate the following:-~~

- ~~1. All buildings and structures.~~
- ~~2. Lot lines or property lines.~~
- ~~3. Electric car chargers.~~
- ~~4. Solar photovoltaic parking lot canopies.~~
- ~~5. Appurtenances on site and their use or function.~~
- ~~6. All uses adjacent to the lot lines of the site.~~
- ~~7. Fueling locations.~~
- ~~8. Locations of all storm drain openings and adjacent waterways or wetlands.~~
- ~~9. Information regarding slope, natural drainage, curbing and impounding.~~
- ~~10. How a spill will be kept on the site property.~~
- ~~11. Scale of the site plan.~~

Reason Statement: Permitting each site at which on-demand mobile fueling occurs has proven to be impractical, time consuming and expensive with no added safety value. This proposal takes out the site-permitting requirements and places the responsibility of fueling onto the mobile fueling operator, similar to a hot-work permit. The mobile fueling operator will still have to have a valid operator permit, at which time jurisdictions can ensure that comprehensive training and safety plans are provided. Fire code officials can still enforce the code if they see violations, pulling the operator permit if necessary. This provides greater incentive to operators to operate within the limitations of the Code while reducing unnecessary paperwork and time spent on site permits.

Cost Impact: The code change proposal will decrease the cost of construction

This code change will decrease the cost of operations by reducing paperwork and downtime while waiting for permits. It will have no effect on construction costs.

F214-21

F215-21

IFC: 5707.1.1

Proponents: Andrew Klein, representing Booster Fuels (andrew@asklein.com)

2021 International Fire Code

Revise as follows:

5707.1.1 Approval required. Mobile fueling operations shall not be conducted without first obtaining a *permit* and approval from the *fire code official*. The *fire code official* is authorized to accept a valid operational permit issued in a different jurisdiction. Mobile fueling operations shall occur only at *approved* locations. The *fire code official* is authorized to approve individual locations or geographic areas where mobile fueling is allowed.

Reason Statement: There is no safety reason for a mobile fueling operator to have to obtain an operational permit in every jurisdiction. If a jurisdiction chooses, it should be allowed to accept another jurisdiction's valid operational permit as proof that the operator conforms to code requirements. Washington State has passed a law permitting reciprocity, allowing jurisdictions to accept a neighboring operational permit as either a permanently valid permit or as a temporary permit to use during the issuance of the local operational permit. This allows for a seamless start of local operations by the mobile fueling company.

Cost Impact: The code change proposal will decrease the cost of construction
This proposal has the potential to decrease the cost of operations by streamlining the permitting process. There is no effect on construction cost.

F215-21

F216-21

IFC: 5707.1.1, 5707.1.2 (New)

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Fire Code

Revise as follows:

5707.1.1 Approval required. Mobile fueling operations shall not be conducted without first obtaining ~~a permit and approval from the fire code official~~
~~an operational permit in accordance with Section 105.5.18. Mobile fueling operations shall occur only at approved locations. The fire code official is~~
~~authorized to approve individual locations or geographic areas where mobile fueling is allowed.~~

Add new text as follows:

5707.1.2 Location. Mobile fueling operations shall occur only at approved locations. The fire code official is authorized to approve individual locations or geographic areas where mobile fueling is allowed.

Reason Statement: This proposal provides a reference to the operational permit section, and editorially breaks Section 5707.1.1 into two separate sections, which each cover different requirements. As shown the language appears new in Section 5707.1.2 however it is simply the deleted language from Section 5707.1.1.

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 and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: <https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/>

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal just provides clarification to existing requirements.

F216-21

F217-21

IFC: 5707.2.1 (New)

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Fire Code

Add new text as follows:

5707.2.1 Trailers. On-demand mobile fueling shall not be conducted using tanks or containers mounted on or carried on a trailer.

Reason Statement: The intent of Section 5707 is to cover fueling of motor vehicles from a mobile fueling vehicle with a fixed chassis with an integral (single or compartmented) tank, or from safety cans and containers mounted on a fixed chassis vehicle. It is not the intent to allow either chassis mounted tanks on a trailer, or safety cans and containers to be carried on a trailer.

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 and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: <https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/>

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This just provides clarification that trailers cannot be used for on-demand mobile fueling operations.

F217-21

F218-21

IFC: 5707.2.1

Proponents: Pierson Stoecklein, On behalf of Shell TapUp, representing On behalf of Shell TapUp (pstoecklein@shawstrategiesdc.com)

2021 International Fire Code

Revise as follows:

5707.2.1 Mobile fueling vehicle classifications. An on-demand mobile fueling vehicle shall be characterized as one of the following:

1. **Tier 1 mobile fueling vehicle.** A tank vehicle that complies with NFPA 385 and that has chassis-mounted tanks where the aggregate capacity does not exceed 2,800 gallons (10599 L) ~~1,600 gallons (6057 L)~~.
2. **Tier 2 mobile fueling vehicle.** A vehicle with one or more chassis-mounted tanks or containers that do not exceed 110 gallons (416 L) in capacity with an aggregate capacity that does not exceed 800 gallons (3028 L) or the weight capacity of the vehicle in accordance with DOTn.
3. **Tier 3 mobile fueling vehicle.** A vehicle that carries a maximum aggregate capacity of 60 gallons (227 L) of motor fuel in metal safety cans *listed* in accordance with UL 30 or other *approved* metal containers, each not to exceed 5 gallons (19 L) in capacity.

Reason Statement: The 1600-gallon aggregate limit on the maximum capacity of a Tier 1 mobile fueling vehicle does not reflect the industry standard size for a mid-volume tank truck (approx. 2800 gallons). Other than the fuel capacity differences, all Tier 1 mobile fueling vehicles are also required to comply with the requirements of Section 5706.6, and NFPA 385. The safety record for on-demand fueling operations the past few years should justify an increased fuel vehicle capacity, provided the size of the vehicles themselves do not pose obstruction and other difficulties.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
None.

F218-21

F219-21

IFC: 5707.2.1

Proponents: Andrew Klein, representing Booster Fuels (andrew@asklein.com)

2021 International Fire Code

Revise as follows:

5707.2.1 Mobile fueling vehicle classifications. An on-demand mobile fueling vehicle shall be characterized as one of the following:

1. **Tier 1 mobile fueling vehicle.** A tank vehicle that complies with NFPA 385 and that has chassis-mounted tanks where the aggregate capacity does not exceed ~~4,600~~ 4,500 gallons (~~6057~~ 17,034 L).
2. **Tier 2 mobile fueling vehicle.** A vehicle with one or more chassis-mounted tanks or containers that do not exceed 110 gallons (416 L) in capacity with an aggregate capacity that does not exceed 800 gallons (3028 L) or the weight capacity of the vehicle in accordance with DOTn.
3. **Tier 3 mobile fueling vehicle.** A vehicle that carries a maximum aggregate capacity of 60 gallons (227 L) of motor fuel in metal safety cans *listed* in accordance with UL 30 or other *approved* metal containers, each not to exceed 5 gallons (19 L) in capacity.

Reason Statement: The 1600-gallon aggregate limit on the maximum capacity of a Tier 1 mobile fueling vehicle does not reflect the industry standard size for a mid-volume tank truck (approx. 2800 to 4500 gallons). Other than the fuel capacity differences, all Tier 1 mobile fueling vehicles are also required to comply with the requirements of Section 5706.6, and NFPA 385. The safety record for on-demand fueling operations the past few years should justify an increased fuel vehicle capacity, provided the size of the vehicles themselves do not pose obstruction and other difficulties.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

This code change proposal expands what equipment can be used by 3rd-party companies and in no way affects construction costs.

F219-21

F220-21

IFC: 5307.3.2

Proponents: Michael O'Brian, representing Code Savvy Consultants (mobrian@codesavvyconsultants.com)

2021 International Fire Code

Revise as follows:

5307.3.2 Gas detection system. Where ventilation is not provided in accordance with Section 5307.3.1, a gas detection system complying with Section 916 shall be provided in rooms or indoor areas and in below-grade outdoor locations with insulated carbon dioxide systems. Carbon dioxide sensors shall be provided within 12 inches (305 mm) of the floor in the area where the gas is expected to accumulate or other *approved* locations. The system shall be designed as follows:

1. Activates an audible and visible supervisory alarm at a normally attended location upon detection of a carbon dioxide concentration of 5,000 ppm (9000 mg/m³).
2. Activates an audible and visible alarm within the room or immediate area where the system is installed upon detection of a carbon dioxide concentration of 30,000 ppm (54 000 mg/m³).

Reason Statement: The intent of this code proposal is to provide a simple pointer to section 916 when Gas Detection is previously required in the absence of ventilation as it relates to carbon dioxide systems used in beverage systems overs 100 pounds. This text requirement is similar to that found in 5307.4.3 for gas detection systems in carbon dioxide enrichment systems. Gas detection systems are required for many different applications in the code.

IFC 916 includes basic requirements for all gas detection systems and covers construction documents, equipment, power connections, emergency and standby power, 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 that are installed in a small operation up to those in large industrial facilities. Gas detection system equipment that can comply with these requirements is commercially available.

Cost Impact: The code change proposal will not increase or decrease the cost of construction. The code implies this requirement and is a simple pointer to the technical requirements for the system.

F220-21

F221-21

IFC: 5707.3.3

Proponents: Pierson Stoecklein, On behalf of Shell TapUp, representing On behalf of Shell TapUp (pstoecklein@shawstrategiesdc.com)

2021 International Fire Code

Revise as follows:

5707.3.3 Site plan. Where required by the *fire code official* a site plan shall be developed for each location or area at which mobile fueling occurs. Unless special circumstances exist, a site plan shall not be required for mobile fueling locations less than 3 acres in aggregate square area. The site plan shall be in sufficient detail to indicate the following:

1. All buildings and structures.
2. *Lot lines* or property lines.
3. Electric car chargers.
4. Solar photovoltaic parking lot canopies.
5. Appurtenances on-site and their use or function.
6. All uses adjacent to the *lot lines* of the site.
7. Fueling locations.
8. Locations of all storm drain openings and adjacent waterways or wetlands.
9. Information regarding slope, natural drainage, curbing and impounding.
10. How a spill will be kept on the site property.
11. Scale of the site plan.

Reason Statement: Although a mobile fueling location must be “approved”, whether a site plan is required is entirely discretionary. Requiring a site plan in every instance, therefore, would be far more stringent than and thus inconsistent with the model code and there are several additional policy and practical reasons why such a stringent requirement is neither necessary nor practical:

Increased demand within a jurisdiction could necessitate hundreds of individual approval requests per month. Authorizing the fire code official to approve mobile fueling within broad areas within the county, rather than requiring approval of each individual location (i.e., physical address), avoids adding undue strain on already limited regulatory resources.

The process of the mobile fueling operator producing and the fire code official verifying the accuracy of the site plan, does very little if anything to ensure future adherence to specific, agreed upon policies and procedures (e.g., during fueling remaining a specified minimum distance from potential sources of ignition such as high-voltage electrical equipment). Instead, whether such policies and procedures will be adhered to in the future depends largely upon whether the mobile fueling operator is committed to policing its own actions and abiding by the various training guidelines and other operational restrictions which can be set forth in a single, city-wide operational permit. This is a much better use of resources for all parties and should yield exactly the same outcome with respect to public safety, albeit far more efficiently, as would have been achieved via a piecemeal site permitting process.

Requiring approval by individual location/address (a concept that was drawn from the decades-old fleet fueling model) subjects each customer, regardless of size, to a costly, annual administrative permit fee (in some cases without regard to significant differences between lot/site size) as well as site plan preparation costs. Because this is prohibitive for customers/locations that do not demand particularly high fuel volumes, permitting based exclusively upon individual location/address has a disproportionately adverse impact on many small businesses and/or single-family residential customers (in jurisdictions where residential fueling is allowed).

Shell proposes a more balanced and feasible approach whereby the fire code official would maintain the ultimate authority to require a site plan upon any finding of “special circumstances” but the code would otherwise revert to a rebuttable presumption that special circumstances are not present and that a site plan therefore is not necessary for locations less than 3 acres.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

This proposal reduces unnecessary administrative burden of site inspections by eliminating the site plan requirement in instances where a site does not present atypical geographic, safety or environmental characteristics and where operational and equipment requirements provide sufficient assurance of public health and safety.

F221-21

F222-21

IFC: 5707.3.3, 5707.3.3.1 (New), 5707.3.3.2 (New)

Proponents: Andrew Klein, representing Booster Fuels (andrew@asklein.com)

2021 International Fire Code

Revise as follows:

5707.3.3 Site permits plan. Where a site permitting process is required by the local jurisdiction, a two-tiered system shall be developed by the *fire code official* based on local provisions as necessitated by zoning laws, environmental laws, public safety considerations, and site characteristics. Every site shall be classified as Tier 1 or Tier 2.
~~Where required by the fire code official, a site plan shall be developed for each location or area at which mobile fueling occurs. The site plan shall be in sufficient detail to indicate the following:-~~

- ~~1. All buildings and structures.~~
- ~~2. Lot lines or property lines.~~
- ~~3. Electric car chargers.~~
- ~~4. Solar photovoltaic parking lot canopies.~~
- ~~5. Appurtenances on site and their use or function.~~
- ~~6. All uses adjacent to the lot lines of the site.~~
- ~~7. Fueling locations.~~
- ~~8. Location of all storm drain openings and adjacent waterways or wetlands.~~
- ~~9. Information regarding slope, natural drainage, curbing and impounding.~~
- ~~10. How a spill will be kept on the site property.~~
- ~~11. Scale of the site plan.~~

Add new text as follows:

5707.3.3.1 Tier 1 sites. Tier 1 sites are those that do not fall into the category of Tier 2 sites. Fueling shall be permitted on Tier 1 sites 3 business days after written notification is provided to the fire code official. The *fire code official* may impose additional conditions at a future date if warranted.

5707.3.3.2 Tier 2 Sites. Tier 2 sites are those that present atypical geographical, safety or environmental concerns based on site characteristics. Mobile fueling operations at Tier 2 sites shall not commence prior to written permission by the *fire code official* or permit issuance. The *fire code official* is authorized to require the development of a site plan in sufficient detail to indicate, but not be limited to, the following:

1. All buildings and structures.
2. Lot lines or property lines.
3. Electric car chargers.
4. Solar photovoltaic parking lot canopies.
5. Appurtenances on-site and their use or function.
6. All uses adjacent to the lot lines of the site.
7. Fueling locations.
8. Location of all storm drain openings and adjacent waterways or wetlands.
9. Information regarding slope, natural drainage, curbing and impounding.
10. How a spill will be kept on the site property.
11. Scale of the site plan.

Reason Statement: Washington State is amending its code to classify sites into one of two categories based on safety concerns. This allows a code official to designate site characteristics that determine its tier classification. This results in streamlined permitting and a more efficient use of staff time. Washington State developed this 2-tier system through a collaboration between industry and enforcement officials.

Cost Impact: The code change proposal will decrease the cost of construction

This code change proposal has the potential to decrease the cost of operations for mobile fueling providers, because fueling operations can commence sooner at Tier 1 sites. This proposal does not affect construction costs.

F223-21

IFC: 5707.4

Proponents: Andrew Klein, representing Booster Fuels (andrew@asklein.com)

2021 International Fire Code

Revise as follows:

5707.4 Mobile fueling setbacks. ~~During fueling, the mobile Mobile fueling vehicle vehicles and the point of connection to the vehicle being fueled shall have the setbacks specified in Sections 5707.4.1 through 5707.4.3. not be located on public streets, public ways or inside buildings. Fueling on the roof level of parking structures or other buildings is prohibited.~~

Reason Statement: Subsection 5707.4 deals with setback requirements for on-demand mobile fueling. This revision makes that clear and takes out unnecessary language that has been amended out upon adoption in a number of locations. This is a change in language only and does not permit street fueling or fueling within or on buildings.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

This code change only revises language to be consistent with how it is often adopted within a jurisdiction and does not increase cost.

F223-21

F224-21

IFC: 5707.5 (New)

Proponents: Andrew Klein, representing Booster Fuels (andrew@asklein.com)

2021 International Fire Code

Add new text as follows:

5707.5 On-street fueling. Mobile fueling shall be prohibited on public streets and public ways.

Exception: The fire code official is authorized to permit fueling on public streets and public ways where mobile fueling operations comply with Section 5707 and all of the following:

1. The mobile fueling vehicle shall be positioned with respect to the vehicle being fueled to prevent traffic from driving over the delivery hose.
2. The mobile fueling vehicle shall be positioned with respect to the vehicle being fueled to prevent the obstruction of a pedestrian walkway or bicycle lane.
3. The mobile fueling operator adheres to any time-of-day or day-of-week limitations in the permit.

Reason Statement: This proposal brings the 2024 IFC into alignment with the 2021 edition of NFPA 30A. The ability for a fire code official to permit on-street fueling was codified in the 2021 edition of NFPA 30A. This code change proposal introduces identical requirements.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change proposal does not affect the cost of construction.

F224-21

F225-21

IFC: 5707.5 (New), 5707.5.1 (New), 5707.5.2 (New), 5707.5.3 (New), 5707.5.4 (New), 5707.5.5 (New), 5707.5.6 (New), 5707.5.7 (New), 5707.5.8 (New)

Proponents: Andrew Klein, representing Booster Fuels (andrew@asklein.com)

2021 International Fire Code

Add new text as follows:

5707.5 Garage Fueling. Where permitted by the *fire code official*, mobile fueling operations conducted in parking structures shall comply with Sections 5707.5.1 through 5707.5.8.

5707.5.1 Automated parking structures. Vehicles shall not be fueled where elevated on a lift or stacker. Fueling shall be prohibited in automated and assisted-mechanical type parking structures.

5707.5.2 Floor levels. Mobile fueling shall be limited to the floor level of fire department access.

Exceptions: Where fire department vehicle access is deemed acceptable to the *fire code official*, mobile fueling shall be permitted in parking structures of Type I construction, protected throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 and comply with one of the following:

1. Up to three floor levels above or below the level of fire department vehicle access.
2. Up to 70 ft above grade level in open parking garages

5707.5.3 Maximum cargo capacity. The cargo capacity of mobile fueling vehicles operating inside of parking structures shall not exceed 1600 gallons (6057 L).

5707.5.4 Fire extinguisher. In addition to the fire extinguisher required by Section 5707.7.4, mobile fueling vehicles operating in parking structures shall be equipped with a minimum 2.5 gallon AR-AFFF vapor suppressing extinguisher. Extinguishers shall be maintained at a temperature within the manufacturer's limits.

5707.5.5 Spill mitigation. Mobile fueling operators shall place a sock down grade from or around the area of fueling prior to fueling. When a spill or unplanned discharge occurs, the operator shall immediately cover the spill with the discharge of the vapor suppressing extinguisher.

5707.5.6 Audible alert. In addition to the vehicle lights required in accordance with Section 5707.8.4, mobile fueling vehicles operating in garages shall emit an audible tone identical to the audible reversing alarm of the vehicle.

5707.5.7 Fuel limit. The mobile fueling vehicle's *fuel limit switch* shall be set to a maximum of 5 gallons (19 L).

5707.5.8 Electrical equipment. Mobile fueling shall not occur within 20 feet of electrical equipment located within 18 inches of the ground unless such electrical equipment is rated for Class I, Division 2 hazardous locations in accordance with the NFPA 70.

Reason Statement: Over the past year, especially, mobile fueling has shown itself to be an indispensable service where available. Unfortunately, mobile fueling is unavailable in many cities because of space restrictions causing the need for garaged parking instead of lot parking. This code change proposal presents reasonable safeguards to allow the service to safely commence within structured parking.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change does not affect construction cost as it is simply adding provisions allowing garage mobile fueling.

F225-21

F226-21

IFC: CHAPTER 1, SECTION 105, 105.5, 105.5.26 (New), CHAPTER 2, SECTION 202, (New), CHAPTER 58, 5809 (New), 5809.1 (New), 5809.1.1 (New), 5809.2 (New), 5809.2.1 (New), 5809.3 (New), 5809.3.1 (New), 5809.3.2 (New), 5809.3.3 (New), 5809.4 (New), 5809.4.1 (New), 5809.4.2 (New), 5809.5 (New), 5809.5.1 (New), 5809.5.2 (New), 5809.6 (New), 5809.6.1 (New), 5809.6.2 (New), 5809.6.3 (New), 5809.6.4 (New), 5809.6.5 (New), 5809.6.6 (New), 5809.6.7 (New)

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org); Robert J Davidson, Davidson Code Concepts, LLC, representing Toyota, USA (rjd@davidsoncodeconcepts.com)

2021 International Fire Code

CHAPTER 1 SCOPE AND ADMINISTRATION

SECTION 105 PERMITS.

105.5 Required operational permits. The *fire code official* is authorized to issue operational permits for the operations set forth in Sections 105.5.2 through 105.5.52.

Revise as follows:

105.5.26 Hydrogen mobile fueling. An operational permit is required to utilize a location or geographic area for the dispensing of gaseous hydrogen from tank vehicles or tank trailers into the fuel tanks of hydrogen fueled motor vehicles for on-demand mobile fueling operations in accordance with Section 5809

CHAPTER 2 DEFINITIONS

SECTION 202 GENERAL DEFINITIONS.

Revise as follows:

MOBILE FUELING, LIQUID. The operation of dispensing liquid fuels from tank vehicles into the fuel tanks of motor vehicles. Mobile fueling may also be known by the terms "Mobile fleet fueling," "Wet fueling" and "Wet hosing."

Add new text as follows:

MOBILE FUELING, HYDROGEN. The operation of dispensing gaseous hydrogen from tank vehicles or tank trailers into the fuel tanks of hydrogen fueled motor vehicles. Hydrogen mobile fueling may also be known by the terms "Hydrogen mobile fleet fueling."

CHAPTER 58 FLAMMABLE GASES AND FLAMMABLE CRYOGENIC FLUIDS

Add new text as follows:

5809 On-Demand Hydrogen Mobile Fueling Operations.

5809.1 General. On-demand hydrogen mobile fueling operations that dispenses gaseous hydrogen into the fuel tanks of motor vehicles shall comply with Sections 5809.1 through 5809.6.5.

5809.1.1 Approval required. Hydrogen mobile fueling operations shall not be conducted without first obtaining a permit and approval from the fire code official. Hydrogen mobile fueling operations shall occur only at approved locations. The fire code official is authorized to approve individual locations or geographic areas where mobile fueling is allowed.

5809.2 Hydrogen mobile fueling vehicle or trailer. An on-demand hydrogen mobile fueling vehicle or mobile fueling trailer shall be that which is utilized in on-demand fueling operations for the dispensing of gaseous hydrogen into the fuel tanks of motor vehicles.

5809.2.1 Hydrogen mobile fueling vehicle requirements. Each hydrogen mobile fueling vehicle or mobile fueling trailer shall comply with all local, state and federal requirements, as well as the following.

1. The hydrogen mobile fueling vehicle or mobile fueling trailer and its equipment shall be in compliance with the appropriate requirements of NFPA 2.
2. Hydrogen mobile fueling vehicles or mobile fueling trailers shall only contain and dispense gaseous hydrogen.
3. The hydrogen mobile fueling vehicle or mobile fueling trailer and its equipment shall be maintained in good repair.

4. Fueling a hydrogen motor vehicle shall be from tanks or containers mounted on a mobile fueling trailer or from tanks or containers mounted on a mobile fueling vehicle. A mobile fueling operation shall not combine a mobile fueling vehicle with a mobile fueling trailer.
5. Mobile fueling vehicles and trailers shall be provided with at least one portable fire extinguisher of a minimum 10-pound ABC dry chemical type and shall also be rated with an agent discharge rate of 1 lb/sec or greater.

5809.3 Required documents. Documents developed to comply with Sections 5809.3.1 through 5809.3.3 shall be updated as necessary by the owner of the mobile fueling operation and shall be maintained in compliance with Section 108.3.

5809.3.1 Safety and emergency response plan. Hydrogen mobile fueling operators shall have an approved written safety and emergency response plan that establishes policies and procedures for fire safety, release and control, personnel training and compliance with other applicable requirements of this code.

5809.3.2 Training records. Hydrogen mobile fueling vehicles or mobile fueling trailers shall be operated only by designated personnel who are trained on proper fueling procedures and the safety and emergency response plan. Training records of operators shall be maintained.

5809.3.3 Site plan. Where required by the fire code official, a site plan shall be developed for each location at which hydrogen mobile fueling occurs. The site plan shall be in sufficient detail to indicate the following:

1. All buildings and structures
2. Lot lines or property lines
3. Solar photovoltaic parking lot canopies
4. Appurtenances on site and their use or function
5. All uses adjacent to the lot lines of the site
6. Hydrogen fueling locations
7. Scale of the site plan.

5809.4 Hydrogen mobile fueling areas. Hydrogen mobile fueling shall not occur on public streets, public ways or inside buildings. Fueling on the roof level of parking structures or other buildings is prohibited unless access to the roof level is available without entering the structure or building.

5809.4.1 Separation. The point of connection of the vehicle being fueled shall not take place within the distances specified by NFPA 2, Table 7.2.2.3.2 based upon the maximum rated capacity of the hydrogen mobile fueling vehicle.

5809.4.2 Sources of ignition. Smoking, open flames and other sources of ignition shall be prohibited within 25 feet (7620 mm) of fuel dispensing activities. Signs prohibiting smoking or open flames within 25 feet (7620 mm) of the vehicle or the point of fueling shall be prominently posted on the hydrogen mobile fueling vehicle. The fuel cell of vehicles being fueled shall be shut off during fueling.

5809.5 Equipment. Hydrogen mobile fueling equipment shall comply with Sections 5809.5.1 and 5809.5.2.

5809.5.1 Dispensing hoses, nozzles and equipment. Dispensing hoses, nozzles and equipment shall comply with NFPA 2.

5809.5.2 Fire extinguisher. An approved portable fire extinguisher complying with Section 906 with a minimum rating of 4-A:80-B:C shall be provided on the hydrogen mobile fueling vehicle with signage clearly indicating its location.

5809.6 Operations. Hydrogen mobile fueling vehicles or mobile fueling trailers shall be operated in accordance with this section and NFPA 2.

5809.6.1 Attendant. Hydrogen mobile fueling vehicles or mobile fueling trailers shall be attended at all times during fueling operations with brakes set and warning lights in operation

5809.6.2 Emergency access roads. Hydrogen mobile fueling vehicles shall not obstruct emergency vehicle access roads.

5809.6.3 Dispensing hose. Where equipped, hydrogen mobile fueling vehicles or mobile fueling trailers shall be positioned in a manner to preclude traffic from driving over the dispensing hose. The dispensing hose shall be properly placed on an approved reel or in an approved compartment prior to moving the mobile fueling vehicle.

5809.6.4 Safety cones. Safety cones or other visual barriers shall be employed as warning devices to highlight the vehicle fueling area.

5809.6.5 Vehicle lights. The hydrogen mobile fueling vehicle or mobile fueling trailer flasher lights shall be in operation while dispensing operations are in progress.

5809.6.6 Nighttime deliveries. Nighttime deliveries shall only be made in areas deemed adequately lighted by the fire code official.

5809.6.7 Spill reporting. Releases shall be reported when required by Section 5003.3.1.

Reason Statement: Starting in 2018 the IFC language was expanded to cover the emerging mobile fueling industry for liquid fuels to ensure safety of the operations and consistent application of the fire code provisions where these activities are occurring. Some local AHJ's had been 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. Some had been instructed to develop ordinances permitting the activity and in other areas, it had been outright prohibited, all of which was creating an inconsistent pattern.

The same pattern is now emerging for gaseous hydrogen on-demand mobile fueling. Similar to what was done for liquid fuel mobile fueling, these amendments are intended to provide fire code officials with the guidance needed to evaluate planned operations for mobile delivery of gaseous hydrogen. 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.

It should be noted that the safe use of mobile tube trailers for the fuel supply at fixed site hydrogen fueling activities and the use of mobile hydrogen fueling vehicles and trailers for events and demonstration projects has been occurring for years.

As of the end of 2020, almost 9000 fuel cell vehicles powered by hydrogen were in operation in the US. In addition, there are approximately 50 hydrogen fueling stations, primarily in California and the northeast US. Mobile fueling of gaseous hydrogen is an important option to support these vehicles by extending their driving range and in locations where stationary fueling infrastructure does not exist. Adding language for on-demand gaseous hydrogen mobile fueling is important to establish codes which local officials can use to properly permit mobile hydrogen fueling vehicles and trailers. The language proposed is based upon the on-demand mobile fueling for conventional fuels in Chapter 5707. The language was massaged to match the safety measures relative to gaseous hydrogen. It requires approval from the fire code official including an operational permit and sets requirements for the mobile fuelers and their equipment, areas where the fueling will take place and operations. A parallel effort is being coordinated in NFPA2, Hydrogen Technologies Code to ensure the requirements are harmonized.

Note that this is restricted to the use of gaseous hydrogen as opposed to liquid hydrogen which would be prohibited.

Similar to Section 5707 there are appropriate requirements for:

- Permits
- Definition for hydrogen mobile fueling
- Location approval
- Vehicle versus trailer use
- Requirements for the vehicle
- Required documentation
- Having an approved safety and emergency response plan
- Training records
- Site plan
- Restrictions on where the fueling can occur
- Separation from exposures as required by NFPA 2 (current IFC reference)
- Equipment requirements
- Operational 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 and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: <https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/>

Cost Impact: The code change proposal will not increase or decrease the cost of construction

As a mobile fueling service there is no impact on construction costs. There will be a cost benefit to users of hydrogen powered motor vehicles by increasing the utility and range of their clean energy vehicles.

F226-21

F227-21

IFC: SECTION 5809 (New)

Proponents: Toru Sugiura, Toyota Tsusho America, Inc., representing Toyota Tsusho America, Inc. (toru_sugiura@taiamerica.com)

2021 International Fire Code

Add new text as follows:

SECTION 5809 OUTDOOR NONPUBLIC MOBILE GASEOUS FUELING OF HYDROGEN VEHICLES.

5809.1 General. Outdoor nonpublic mobile fueling of hydrogen-fueled vehicles shall comply with Chapters 4 and 10 of NFPA 2 and Sections 5809.2 through 5809.6.2.

5809.2 Vehicles and trailers not in operation. Where mobile refueling vehicles, temporary trailers, with or without tractors, and other means of providing vehicle refueling are not in operation, they shall be subject to the same requirements as a storage installation, except as modified by Section 5809.

5809.3 Permits. Permits shall be required as set forth in Section 105.5.33.

5809.4 Vehicle compliance. Mobile hydrogen refueling vehicles shall comply with US DOTn requirements for the transportation of hydrogen gas.

5809.5 Required Documents. Documents developed to comply with Sections 5809.5.1 through 5809.5.3 shall be submitted to the fire code official prior to approval of the permit application to conduct mobile gaseous hydrogen fueling operations. The required documents shall be maintained and updated when necessary by the permittee. Any modifications to an approved plan shall be submitted as needed and made available to the fire code official for review and approval.

5809.5.1 Safety and Emergency Response Plan. The owner of a mobile hydrogen-fueling operation shall develop a written safety and emergency response plan that includes the following:

1. Establishes policies and procedures for fire safety, hydrogen leak prevention and control, personnel training and compliance with other applicable requirements of this code.
2. Demonstrates readiness to respond to a hydrogen leak and carry out appropriate mitigation measures.

5809.5.2 Standard Operating Procedures. The owner of a mobile hydrogen-fueling operation shall develop a written fueling standard operating procedure (SOP) that includes all of the following:

1. Clearly and unambiguously describes the sequence of steps that a mobile hydrogen refueling vehicle operator needs to take to ensure safety of gaseous hydrogen fueling and compliance with the fueling protocol requirements.
2. Establishes a fueling protocol that is consistent with applicable requirements of a recognized national standard.
3. Where required by the fire code official, a site plan shall be developed for each location at which mobile gaseous hydrogen fueling occurs. The site plan shall be in sufficient detail to indicate: all buildings, structures, lot lines, property lines and appurtenances on site and their use and function, and the scale of the site plan.

5809.5.3 Training Records. Persons performing dispensing operations shall be qualified to deliver and dispense gaseous hydrogen fuels and shall be trained in these standards that are being created, the equipment manufacturer's training and the appropriate mitigating actions in the event of a fire or a hydrogen leak prior to beginning the dispensing operations. Re-training shall be performed periodically, but no less frequent than annually. Training records shall be maintained by the dispensing company and made available to the fire code official upon request.

5809.6 Operations. Mobile hydrogen-fueling operations shall comply with Sections 5809.6.1 through 5809.6.2.

5809.6.1 Attendance. Mobile refueling vehicles shall be constantly attended during fueling operations.

5809.6.2 Bonding and Grounding. The mobile refueling vehicle and vehicle being fueled shall be bonded and grounded.

105.5.33 Mobile Fueling of Hydrogen-Fueled Vehicles. An operational permit is required to engage in the mobile dispensing of gaseous hydrogen into the fuel tanks of hydrogen vehicles.

Reason Statement: The purpose of this proposed IFC change is to clarify a path of acceptance for mobile hydrogen refueling that already exists within the code, and to highlight key requirements users should be particularly aware of.

Mobile hydrogen refueling is prescriptively allowed in the 2021 IFC through the direct adoption of the 2020 edition of NFPA 2, Hydrogen Technologies Code, via the scoping language of Chapter 58 for Flammable Gases and Flammable Cryogenic Fluids. This proposal does not seek to change the Chapter 58 scoping language or the direct adoption of NFPA 2.

The base code language in the 2021 IFC does not specifically discuss mobile hydrogen refueling; thus, the user is directed to NFPA 2 for

requirements.

NFPA 2 Section 10.9 for **Outdoor Nonpublic Refueling from Transport Vehicles** covers the topic of mobile hydrogen refueling. Additional requirements from NFPA 2 also apply, specifically those found in the remainder of Chapter 10 for GH2 Vehicle Fueling Facilities.

This code change is not proposed to permit mobile hydrogen refueling, as it is already permitted in the base code via adoption of NFPA 2, but is instead proposed to create a clearer code path detailing key requirements and pointing users to where additional requirements are located. The proposed code language points users to sections within the IFC and NFPA 2 and provides guidance on a clearer basis of design for mobile hydrogen refuelers when not in operation (i.e. storage). It also proposes to add a section to the IFC permit requirements, under permits for compressed gases, specifying that an operational permit is required for mobile hydrogen refueling.

The 2019 California Fire Code (CFC), based on the 2018 IFC, incorporated additional language specifically for mobile hydrogen refueling – Section 5809, **Mobile Gaseous Fueling of Hydrogen-Fueled Vehicles** – while maintaining the code path to adopt NFPA 2 through the scoping language of Chapter 58, all still existing within the 2021 IFC. This IFC proposal seeks to incorporate a similar section within the base code IFC, but instead of adding new requirements, it seeks to clarify the code path for users to navigate the requirements that already exist within the code and its referenced standards.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

The proposed code language seeks to clarify a code path that already exists within the IFC and its referenced standards, specifically NFPA 2, Hydrogen Technologies Code. For this reason, there will be no impact on construction costs.

F227-21

F228-21

IFC: SECTION B104, B104.1, B104.2, B104.3

Proponents: Eirene Knott, representing Metropolitan Kansas City Chapter of the ICC (Eirene.Knott@brrarch.com)

2021 International Fire Code

SECTION B104 FIRE-FLOW CALCULATION AREA.

Revise as follows:

B104.1 General. The *fire-flow calculation area* shall be the total floor area of all floor levels within the *exterior walls*, and under the horizontal projections of the roof of a building, ~~except as modified in Section B104.3.~~

Exceptions:

1. The fire-flow calculation area of buildings constructed of Type IA and Type IB construction shall be the area of the three largest successive floors.
2. Fire-flow calculation area for open parking garages shall be determined by the area of the largest floor.

B104.2 Area separation. Portions of buildings that are separated by *fire walls* without openings, constructed in accordance with the *International Building Code*, are allowed to be considered as separate *fire-flow calculation areas*.

Delete without substitution:

~~**B104.3 Type IA and Type IB construction.** The *fire-flow calculation area* of buildings constructed of Type IA and Type IB construction shall be the area of the three largest successive floors.~~

~~**Exception:** *Fire-flow calculation area* for open parking garages shall be determined by the area of the largest floor.~~

Reason Statement: My intention with this code change is to clarify the intention of the exception for parking garages. The way the current language reads, it implies that the exception only applies to parking garages of Type IA and IB construction as that's the charging language here. If one reads this in black and white, the exception will only apply to Types IA and IB parking garages, but that is not the intention. The intention is for parking garages to allow for this method of calculation and should not be noted as an exception just to Type IA and IB construction. By moving the language around, I believe this now clearly indicates that parking garages have their own method of calculation as do Types IA and IB construction.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

This should not have any impact on the construction cost, but it may actually reduce the cost if this code language has been misinterpreted.

F228-21

F229-21

IFC: TABLE B105.1(2)

Proponents: Daniel Nichols, representing Metropolitan Transportation Authority, Construction and Development (dnichols@mnr.org)

2021 International Fire Code

Revise as follows:

TABLE B105.1(2)
REFERENCE TABLE FOR TABLES B105.1(1) AND B105.2

FIRE-FLOW CALCULATION AREA (square feet)					FIRE FLOW (gallons per minute) ^b	FLOW DURATION (hours)
Type IA and IB ^a	Type IIA and IIIA ^a	Type IV and V-A ^a	Type IIB and IIIB ^a	Type V-B ^a		
0–22,700	0–12,700	0–8,200	0–5,900	0–3,600	1,500	2
22,701–30,200	12,701–17,000	8,201–10,900	5,901–7,900	3,601–4,800	1,750	
30,201–38,700	17,001–21,800	10,901–12,900	7,901–9,800	4,801–6,200	2,000	
38,701–48,300	21,801–24,200	12,901–17,400	9,801–12,600	6,201–7,700	2,250	
48,301–59,000	24,201–33,200	17,401–21,300	12,601–15,400	7,701–9,400	2,500	
59,001–70,900	33,201–39,700	21,301–25,500	15,401–18,400	9,401–11,300	2,750	
70,901–83,700	39,701–47,100	25,501–30,100	18,401–21,800	11,301–13,400	3,000	3
83,701–97,700	47,101–54,900	30,101–35,200	21,801–25,900	13,401–15,600	3,250	
97,701–112,700	54,901–63,400	35,201–40,600	25,901–29,300	15,601–18,000	3,500	
112,701–128,700	63,401–72,400	40,601–46,400	29,301–33,500	18,001–20,600	3,750	
128,701–145,900	72,401–82,100	46,401–52,500	33,501–37,900	20,601–23,300	4,000	4
145,901–164,200	82,101–92,400	52,501–59,100	37,901–42,700	23,301–26,300	4,250	
164,201–183,400	92,401–103,100	59,101–66,000	42,701–47,700	26,301–29,300	4,500	
183,401–203,700	103,101–114,600	66,001–73,300	47,701–53,000	29,301–32,600	4,750	
203,701–225,200	114,601–126,700	73,301–81,100	53,001–58,600	32,601–36,000	5,000	
225,201–247,700	126,701–139,400	81,101–89,200	58,601–65,400	36,001–39,600	5,250	
247,701–271,200	139,401–152,600	89,201–97,700	65,401–70,600	39,601–43,400	5,500	
271,201–295,900	152,601–166,500	97,701–106,500	70,601–77,000	43,401–47,400	5,750	
295,901–Greater ^c	166,501–Greater ^c	106,501–115,800	77,001–83,700	47,401–51,500	6,000	
—	—	115,801–125,500	83,701–90,600	51,501–55,700	6,250	
—	—	125,501–135,500	90,601–97,900	55,701–60,200	6,500	
—	—	135,501–145,800	97,901–106,800	60,201–64,800	6,750	
—	—	145,801–156,700	106,801–113,200	64,801–69,600	7,000	
—	—	156,701–167,900	113,201–121,300	69,601–74,600	7,250	
—	—	167,901–179,400	121,301–129,600	74,601–79,800	7,500	
—	—	179,401–191,400	129,601–138,300	79,801–85,100	7,750	
—	—	191,401–Greater ^c	138,301–Greater ^c	85,101–Greater ^c	8,000	

For SI: 1 square foot = 0.0929 m², 1 gallon per minute = 3.785 L/m, 1 pound per square inch = 6.895 kPa.

- Types of construction are based on the *International Building Code*.
- Measured at 20 psi residual pressure.
- For fire flow calculation areas greater than the value, the fire code official is authorized to require additional fire flow, based on a consideration of access, fire hazards, exposure, and capabilities of the fire department.

Reason Statement: The limitations of the fire flow calculation area are sourced back to the fire suppression rating schedule calculations. However, unlimited area buildings do create unique challenges for fire departments and additional fire flow might be needed to control fires due to unique exposures, multiple exposure protection, and the geometry of the building. The fire code official should have the ability to account for these specific needs when the values of the table are outside the original targeted protection.

Cost Impact: The code change proposal will not increase or decrease the cost of construction. This proposal provides guidance to building arrangements not previously addressed.

F230-21

IFC: D102.1

Proponents: Gary Ehrlich, representing NAHB (gehrlich@nahb.org)

2021 International Fire Code

Revise as follows:

D102.1 Access and loading. Facilities, buildings or portions of buildings hereafter constructed shall be accessible to 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 up to 75,000 pounds (34 050 kg).

Exception: An additional fire apparatus access road required by this appendix is permitted to be a sidewalk, driveway, pathway, court or other approved surface not accessible to public motor vehicles where designed by a registered design professional to meet the loading requirements and minimum specifications of this appendix, and the surface provides all-weather driving capabilities.

Reason Statement: The current provisions of IFC Section 503, Appendix D and the definition of "fire department apparatus road" as written can be interpreted to require the construction of an actual road, street, lane or other feature potentially accessible to public vehicular traffic as well as fire department vehicles, complete with curbs and gutters, shoulders and other components and making a complete intersection with a main road, street, highway, etc. adjacent to the development. However, for long, narrow parcels of land which can only be physically accessed along one of the narrow sides, such an interpretation may result in placing the intersection created by the second access road closer to the main access to the development than is permitted by local highway or zoning ordinances.

Nothing in IFC Section 503 or Appendix D requires the additional road intersect a public way at the same elevation as the public way, or even be a true "road" accessible to vehicular traffic. A code-compliant "road" could simply be a sidewalk or other pathway primarily intended for pedestrian use but constructed to meet the width, loading and other requirements of a fire apparatus access road. Such a walking path would not need to form a true intersection with public streets but could simply end at a sloped or roll-up curb. The proposed exception clarifies such methods of constructing the additional fire department apparatus "road" are acceptable.

Cost Impact: The code change proposal will decrease the cost of construction

The exception could reduce the cost of constructing a fire apparatus access road by allowing for the elimination of curbs and gutters or other elements associated with a road open to public vehicles. The exception would also enable more cost-effective development of sites where the only option under which development of the site would otherwise be permitted would be providing alternative, potentially costly, means of fire protection.

F230-21

F231-21

IFC: D107.1

Proponents: Gary Ehrlich, representing NAHB (gehrlich@nahb.org)

2021 International Fire Code

Revise as follows:

D107.1 One- or two-family dwelling residential developments. Developments of one- or two-family *dwelling units* where the number of *dwelling units* exceeds 30 shall be provided with two separate and *approved* fire apparatus access roads.

Exceptions:

1. Where there are more than 30 *dwelling units* accessed from a single public or private fire apparatus access road and all *dwelling units* are equipped throughout with an *approved automatic sprinkler system* in accordance with Section 903.3.1.1, 903.3.1.2 or 903.3.1.3, access from two directions shall not be required.
2. Where the number of *dwelling units* on a single public or private fire apparatus access road does not exceed 50, the minimum unobstructed width of the single fire apparatus access road is 26 feet (7925 mm), and the development is not located in a wildland-urban interface area as defined in the *International Wildland-Urban Interface Code*, access from two directions shall not be required.
- 3.2. The number of *dwelling units* accessed from a single fire apparatus access road shall not be increased unless fire apparatus access roads will connect with future development, as determined by the *fire code official*.

Reason Statement: One of the barriers to affordable housing frequently cited by NAHB members is availability of lots for development. In some cases, the dimensions of such parcels, surrounding development, surrounding terrain or other constraints make it difficult if not impossible to provide a second fire department apparatus road, even if constructed as a sidewalk, bike path or other feature only accessible to fire trucks, not accessible to public motor vehicles. A developer may either be faced with having to sacrifice planned dwelling units or providing alternative, potentially costly, means of fire protection in order to construct the development. Either solution increases the cost of construction for the homes in the development and may render them unaffordable to homebuyers or renters with modest incomes. Or, the developer may be forced to abandon the lot, meaning the IFC has improperly acted as a de facto zoning code.

The current 30 dwelling trigger is low compared to a multifamily development can contain up to 100 units. One of the reasons for the second fire department apparatus road is in case the primary access to the development is blocked by traffic congestion or an accident. Given the average household size is between 2 and 3 people, clearly a 100-unit multifamily building is likely to generate more traffic than 30 single-family houses. Average lot size has also been shrinking, so if travel distance is a concern it will take less time for fire equipment to traverse many current single-family developments than it may have previously. There is no reason for such a low trigger as 30 homes.

This proposal adds an exception that raises the trigger to 50 dwellings, or half the number of dwelling units at which a multifamily development triggers the second fire department apparatus road, if the minimum unobstructed width of the primary fire department apparatus road is increased to 26 feet in width to aid in both fire department access and evacuation, and the development is not in a wildfire-prone area.

Cost Impact: The code change proposal will decrease the cost of construction

The proposal will reduce the cost of constructing for developments of 31 to 50 houses by eliminating the need for the second fire apparatus access road and enabling development of slightly larger parcels. The exception would also enable more cost-effective development of sites where the only option under which development of the site would otherwise be permitted would be providing alternative, potentially costly, means of fire protection.

F231-21

F232-21

IFC: E102.1.7, E102.1.7.2 (New), E102.1.7.1, TABLE E102.1.7.2 (New), TABLE E104.1, UN (New), UN Rev.7, 2017 (New)

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Fire Code

E102.1.7 Oxidizers. Examples include:

1. Gases: oxygen, ozone, oxides of nitrogen, fluorine and chlorine (reaction with flammables is similar to that of oxygen).
2. Liquids: bromine, hydrogen peroxide, nitric acid, perchloric acid, sulfuric acid.
3. Solids: chlorates, chromates, chromic acid, iodine, nitrates, nitrites, perchlorates, peroxides.

Add new text as follows:

E102.1.7.2 Oxidizer classification. The UN's Globally Harmonized System (GHS) is an internationally agreed upon standard of classification and labeling that utilizes prescriptive, standardized testing procedures and criteria to classify hazardous materials. Federal law (29 CFR 1910.1200 and 49 CFR 173.127) mandates that manufacturers selling, producing or transporting chemicals in the United States classify chemicals according to the GHS system and make the classifications available in product safety data sheets. For the classification of solid and liquid oxidizers, GHS relies on relevant quantitative test data that measures burning rate, a key indicator of the severity of the hazard.

To assist code officials, an alignment between the GHS and IFC oxidizer hazard classes is provided in Table E102.1.7.2. This alignment is provided as a tool to assist fire code officials and should not be used as the sole means for hazardous materials classification.

E102.1.7.1 Examples of liquid and solid oxidizers according to hazard. Examples include:

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 dichloro)-penta-s-triazinetriene, 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-triazinetriene (potassium dichloro-isocyanurate), potassium perchlorate (99 percent), potassium permanganate (greater than 97.5 percent), sodium bromate, sodium chlorate and sodium chlorite (over 40 percent by weight).

Class 2: barium bromate, barium chlorate, barium hypochlorite, barium perchlorate, barium permanganate, 1-bromo-3-chloro-5, 5-dimethylhydantoin, calcium chlorate, calcium chlorite, 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 chlorate, lithium hypochlorite (more than 39 percent available chlorine), lithium perchlorate, magnesium bromate, magnesium chlorate, magnesium perchlorate, mercurous chlorate, 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 chlorite (40 percent or less by weight), sodium dichloro-s-triazinetriene anhydrous (sodium dichloroisocyanurate anhydrous), sodium perchlorate, sodium perchlorate monohydrate, sodium permanganate, sodium peroxide, sodium persulfate (99 percent), strontium chlorate, strontium perchlorate, thallium chlorate, urea hydrogen peroxide, zinc bromate, zinc chlorate 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 percarbonate, potassium persulfate, sodium carbonate peroxide, sodium dichloro-s-triazinetriene dihydrate, sodium dichromate, sodium perborate (anhydrous), sodium perborate monohydrate, sodium perborate tetra-hydrate, sodium percarbonate, strontium peroxide, trichloro-s-triazinetriene (trichloroisocyanuric acid) and zinc peroxide.

Add new text as follows:

TABLE E102.1.7.2
Oxidizer comparison (IFC vs. GHS)

<u>IFC Hazard Class</u>	<u>GHS Hazard Category</u>
<u>Oxidizer, Class 4</u>	<u>H271, Category 1</u>
<u>Oxidizer, Class 3</u>	<u>H271, Category 1</u>
<u>Oxidizer, Class 2</u>	<u>H272, Category 2</u>
<u>Oxidizer, Class 1</u>	<u>H272, Category 3</u>

Revise as follows:

**TABLE E104.1
REFERENCED STANDARDS**

STANDARD ACRONYM	STANDARD NAME	SECTIONS HEREIN REFERENCED
CGA P-20—2009	<i>Standard for Classification of Toxic Mixtures</i>	E103.1.3.1
CGA P-23—2008	<i>Standard for Categorizing Gas Mixtures Containing Flammable and Nonflammable Components</i>	E102.1.2
<u>UN (Rev.7, 2017)</u>	<u>UN Recommendations on the Transport of Dangerous Goods, Globally Harmonized System of Classification and Labelling of Chemicals (GHS), Part 2: Physical Hazards, Chapter 2.13 and 2.14</u>	<u>E102.1.7.2</u>

Add new standard(s) as follows:

UN

United Nations Statistics Division
New York NY 10017
USA

UN Rev.7, 2017 UN Recommendations on the Transport of Dangerous Goods, Globally Harmonized System of Classification and Labelling of Chemicals (GHS), Part 2: Physical Hazards, Chapter 2.13 and 2.14.

Staff Analysis: A review of the standard proposed for inclusion in the code, UN Rev.7, 2017 UN Recommendations on the Transport of Dangerous Goods, Globally Harmonized System of Classification and Labelling of Chemicals (GHS), Part 2: Physical Hazards, Chapter 2.13 and 2.14, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

Reason Statement: Oxidizing solids and liquids can cause fires to burn more intensely, they can cause substances that do not normally burn to ignite, and can even cause explosions due to shock or contamination. Oxidizers are commonly used in the pool industry, in agriculture (fertilizers), in healthcare (disinfectants), and are precursors to explosives (rocket fuel, ammunition, and improvised explosive devices). Unregulated storage of oxidizers has led to serious injuries, property damage, and hundreds of deaths, including the ammonium nitrate explosion in West Texas in 2013 where 150 buildings were damaged or destroyed and 15 people (mostly emergency responders) were killed. Fire Code officials must enforce the hazardous materials provisions of the International Fire Code (IFC) and the International Building Code (IBC) to ensure that people and property in our communities are safe. The current subjective definitions of oxidizers make it difficult for Fire Code officials to verify the proper classification of different oxidizers and to enforce proper storage and use. Consequences of missing or incorrect classification include increased risk of fires that burn more intensely than expected. This puts people at risk, elevates danger to fire fighters who may enter spaces with unknown physical hazards, and increases preventable hazards in locations that may store any quantity of oxidizer.

Additional United Nations (UN) reference is added to provide Fire Code officials the option to utilize relevant quantitative test data for the classification of oxidizers that measures burning rate for oxidizing solids and liquids. Differences in burning rate among chemicals provide key indicators of the severity of the hazard. The UN's Globally Harmonized System (GHS) is an internationally agreed upon standard of classification and labeling that utilizes prescriptive, standardized testing procedures and criteria to classify hazardous materials. Federal law (29 CFR 1910.1200 and 49 CFR 173.127) mandates that manufacturers selling, producing or transporting chemicals in the United States classify chemicals according to the GHS system and make the information readily available on product Safety Data Sheets (SDSs). Adding a comparison between IFC and GHS definitions can better inform code officials faced with validating classifications of hazardous materials.

IFC and GHS reference alignment:

The alignment with IFC oxidizer classes and GHS oxidizer categories is based upon comparison of 30 oxidizing solids defined by the International Fire Code (Appendix E) and the Globally Harmonized System (GHS) of classification. The IFC classes and corresponding GHS categories, as outlined below, were not statistically different based on a Chi-Squared goodness of fit test ($p = 0.102$).

Oxidizer alignment: IFC vs. GHS

IFC Hazard Class	GHS Hazard Category	Oxidizer, Class 4H271, Category 1	Oxidizer, Class 3H271, Category 1
Oxidizer, Class 2H272, Category 2	Oxidizer, Class 1H272, Category 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 and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: <https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/>

Cost Impact: The code change proposal will not increase or decrease the cost of construction

There would be no change in cost of construction, if the GHS categories were used to inform IFC oxidizer classes.

Oxidizers used for maintenance purposes (e.g., pool chemicals) already have reduced MAQ restrictions (see 2021 International Fire Code, Table 5003.1.1(1), footnote k), and this proposal would be unlikely to have any cost impact on either construction or to the business itself for these types of chemicals.

Ammonium nitrate fertilizer has specific storage guidelines per IFC, which would still apply and any changes in this proposal would have no cost impact on this large industry.

Oxidizer storage in M- and S-occupancies is already permitted in large quantities, which eliminates the need to construct an expensive H-occupancy.

F232-21

F233-21

IFC: E103.2, SECTION E104 (New), E104.1 (New), E104.2 (New), TABLE E104.2 (New), TABLE E104.1, SECTION E104, UN (New), UN Rev.7, 2017 (New)

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Fire Code

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

1. What is the material? Correct identification is important; exact spelling is vital. Checking labels and SDS and asking responsible persons should be among the highest priorities.
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? (For example, other materials, temperature, shock, pressure.)
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 system ventilation, special electrical, detection and alarm, extinguishment, explosion venting, limit controls, exhaust scrubbers and excess flow control.
 - 11.6. Administrative (operational) control 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 104.8.2

Add new text as follows:

SECTION E104

GHS HAZARDOUS MATERIALS DEFINITIONS CONTENT

.

E104.1 Hazardous materials definitions. The categorization and classification of hazardous materials enables the code user to determine the applicability of requirements based on hazard category and class related to the physical and health hazards of materials. The current definitions found in Chapter 2 have been developed using criteria found in NFPA codes and standards, model fire prevention codes, NIOSH, requirements of the U.S. DOT, and by U.S. OSHA.

The chemical industry has grown substantially since the inception of the IFC hazard definitions. Large-scale global production and distribution of common and specialty chemicals has become mainstream. In the 1990s, the United Nations (UN) developed the Globally Harmonized System of Classification and Labeling of Chemicals (GHS) to create international congruency among chemical suppliers. The GHS is an internationally agreed upon standard of classification and labeling that utilizes prescriptive, standardized testing procedures and criteria to classify hazardous materials.

The U.S. Department of Labor's Occupational Safety and Health Administration (OSHA) published a revised Hazard Communication Standard

(29 CFR 1910.1200) to align with the GHS in March 2012. It became effective in May 2012. All manufacturers selling, producing or transporting chemicals in the United States are now required to comply with the GHS and provide this standardized hazard information on all Safety Data Sheets (SDSs).

Safety Data Sheets are a primary source of information for identifying hazards for chemicals and mixtures containing hazardous materials. It can be helpful for fire code officials to become familiar with the GHS definitions and how they relate to IFC hazard definitions.

E104.2 GHS Hazardous Materials Definitions Comparison Table. Table E104.2 provides a tabular presentation of the various definitions published within the International Fire Code. In addition, the table presents corresponding definitions, where available, from the 2012 edition of the Hazard Communication Standard developed by the Occupational Health and Safety Administration (OSHA) along with applicable hazard statement codes. OSHA's 2012 Hazard Communication Standard aligns with the United Nations' Globally Harmonized System of Classification and Labeling of Chemicals (GHS). The Table is not meant to imply perfect alignment between IFC and GHS definitions.

TABLE E104.2
IFC AND GHS HAZARD DEFINITION COMPARISON

IFC MATERIAL	IFC CLASS	IFC DEFINITION	GHS 2017 (REV 7) CLASSIFICATION (H-CODE AND CATEGORY); HAZARD STATEMENT; DEFINITION
<u>Aerosol</u>		<u>A combination of a container, a propellant and a material that is dispensed. 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.</u>	<u>Any non-refillable receptacles made of metal, glass or plastics and containing a gas compressed, liquefied or dissolved under pressure, with or without a liquid, paste or powder, and fitted with a release device allowing the contents to be ejected as solid or liquid particles in suspension in a gas, as a foam, paste or powder or in a liquid state or in a gaseous state</u>
<u>Aerosol</u>	<u>Level 1</u>	<u>Those with a total chemical heat of combustion that is less than or equal to 8,600 Btu/lb (20kJ/g).</u>	<u>H223, Category 3; Pressurized container: May burst if heated:</u> <u>1) Any aerosol that contains ≤ 1% flammable components (by mass) and that has a heat of combustion < 20 kJ/g; or</u> <u>2) Any aerosol that contains > 1% (by mass) flammable components or which has a heat of combustion of ≥ 20 kJ/g but which, based on the results of the ignition distance test, the enclosed space ignition test or the aerosol foam flammability test, does not meet the criteria for Category 1 or Category 2</u>
<u>Aerosol</u>	<u>Level 2</u>	<u>Those with a total chemical heat of combustion that is greater than 8,600 Btu/lb (20kJ/g), but less than or equal to 13,000 Btu/lb (30kJ/g).</u>	<u>H223, Category 2; Flammable aerosol. Pressurized container: May burst if heated:</u> <u>1) Any aerosol that dispenses a spray that, based on the results of the ignition distance test, does not meet the criteria for Category 1, and which has:</u> <u>(a) a heat of combustion of ≥ 20 kJ/g;</u> <u>(b) a heat of combustion of < 20 kJ/g along with an ignition distance of ≥ 15 cm; or</u> <u>(c) a heat of combustion of < 20 kJ/g and an ignition distance of < 15 cm along with either, in the enclosed space ignition test a time:</u> <u>(i) - a time equivalent of ≤ 300 s/m³; or</u> <u>(ii) - a deflagration density of ≤ 300 g/m³;</u> <u>or</u> <u>2) Any aerosol that dispenses a foam that, based on the results of the aerosol foam flammability test, does not meet the criteria for Category 1, and which has a flame height of ≥ 4 cm and a flame duration of ≥ 2 s.</u>
<u>Aerosol</u>	<u>Level 3</u>	<u>Those with a total chemical heat of combustion that is greater than 13,000 Btu/lb (30kJ/g).</u>	<u>H222, Category 1; Extremely flammable aerosol. Pressurized container: May burst if heated:</u> <u>1) Any aerosol that contains ≥ 85% flammable components (by mass) and has a heat of combustion of ≥ 30 kJ/g;</u> <u>2) Any aerosol that dispenses a spray that, in the ignition distance test, has an ignition distance of ≥ 75 cm; or</u> <u>3) Any aerosol that dispenses a foam that, in the foam flammability test, has:</u> <u>(a) a flame height of ≥ 20 cm and a flame duration of ≥ 2 s; or</u> <u>(b) a flame height of ≥ 4 cm and a flame duration of ≥ 7 s.</u>

<u>Combustible liquid</u>	-	<u>A liquid having a closed cup flash point at or above 100° F (38° C). Combustible liquids shall be subdivided as follows:</u>	<u>A flammable liquid means a liquid having a flash point of not more than 93° C</u>
<u>Combustible liquid</u>	<u>II</u>	<u>Liquids having a closed cup flash point at or above 100° F (38° C) and below 140° F (60° C).</u>	<u>H226, Category 3; Flammable liquid and vapour: Flash point ≥ 23° C and ≤ 60° C</u>
<u>Combustible Liquid</u>	<u>IIIA</u>	<u>Liquids having a closed cup flash point at or above 140° F (60° C) and below 200° F (93° C)</u>	<u>H227, Category 4; Combustible liquid: Flash point > 60° C and ≤ 93° C</u>
<u>Combustible Liquid</u>	<u>IIIB</u>	<u>Liquids having closed cup flash points at or above 200° F (93° C).</u>	<u>N/A</u>
<u>Compressed Gas</u>	-	<p><u>A material or mixture of materials that:</u></p> <p><u>1) Is a gas at 68° F (20° C) or less at 14.7 psia (101 kPa) of pressure, and</u></p> <p><u>2) Has a boiling point of 68° F (20° C) or less at 14.7 psia (101 kPa) which is either liquefied, nonliquefied or in solution, except those gases which have no other health- or physical-hazard properties are not considered to be compressed until the pressure in the packaging exceeds 41 psia (282 kPa) at 68° F (20° C).</u></p> <p><u>States of compressed gases:</u></p> <p><u>1) Nonliquefied compressed gases are gases, other than those in solution, which are in a packaging under the charged pressure and are entirely gaseous at a temperature of 68° F (20° C).</u></p> <p><u>2) Liquefied compressed gases are gases that, in a packaging under the charged pressure, are partially liquid at a temperature of 68° F (20° C).</u></p> <p><u>3) Compressed gases in solution are nonliquefied gases that are dissolved in a solvent.</u></p> <p><u>4) Compressed gas mixtures consist of a mixture of two or more compressed gases contained in a packaging, the hazard properties of which are represented by the properties of the mixture as a whole.</u></p>	<p><u>Gases under pressure are gases which are contained in a receptacle at a pressure of 200 kPa (gauge) or more at 20° C, or which are liquefied, or liquefied and refrigerated.</u></p> <p>-</p> <p><u>H280, compressed gas; Contains gas under pressure; May explode if heated: A gas which when under pressure is entirely gaseous at -50° C (-58° F), including all gases with a critical temperature ≤ -50° C (-58° F).</u></p> <p>-</p> <p><u>H280, liquefied gas; Contains gas under pressure; May explode if heated: A gas which when under pressure is partially liquid at temperatures above -50° C (-58° F).</u></p> <p><u>H280, dissolved gas; Contains gas under pressure; May explode if heated: A gas which when under pressure is dissolved in a liquid phase solvent.</u></p>
<u>Corrosive</u>	-	<u>A chemical that causes visible destruction of, or irreversible alterations in, living tissue by chemical action at the point of contact. A chemical shall be considered corrosive if, when tested on the intact skin of albino rabbits by the method described in DOTn 49 CFR 173.137, such chemical destroys or changes irreversibly the structure of the tissue at the point of contact following an exposure period of 4 hours. This term does not refer to action on inanimate surfaces.</u>	<u>H314, Category 1 (1A, 1B, 1C); Causes severe skin burns and eye damage: Skin corrosion refers to the production of irreversible damage to the skin; namely, visible necrosis through the epidermis and into the dermis occurring after exposure to a substance or mixture.</u>
<u>Cryogenic fluid</u>	-	<u>A fluid having a boiling point lower than -130° F (-89.9° C) at 14.7 pounds per square inch atmosphere (psia) (an absolute pressure of 101.3 kPa)</u>	<u>H281, refrigerated liquefied gas; Contains refrigerated gas; May cause cryogenic burns or injury: A gas which is made partially liquid because of its low temperature.</u>

<u>Cryogenic - Flammable</u>	-	<u>A cryogenic fluid that is flammable in its vapor state.</u>	<p>H220, Category 1A; Extremely flammable gas: Gases, which at 20° C and a standard pressure of 101.3 kPa:</p> <p>(a) <u>are ignitable when in a mixture of 13% or less by volume in air; or</u></p> <p>(b) <u>have a flammable range with air of at least 12 percentage points regardless of the lower flammability limit unless data show they meet the criteria for Category 1B</u></p> <p><u>Category 1A includes Pyrophoric gases and Chemically unstable gases.</u>H281, refrigerated liquefied gas would also apply</p>
<u>Cryogenic - Inert</u>	-	<u>A cryogenic fluid that is inert.</u>	<u>H281, refrigerated liquefied gas: Contains refrigerated gas: May cause cryogenic burns or injury: A gas which is made partially liquid because of its low temperature.</u>
<u>Cryogenic - Oxidizing</u>	-	<u>An oxidizing gas in the cryogenic state.</u>	<p>H270, Category 1; May cause or intensify fire; oxidizer: Any gas which may, generally by providing oxygen, cause or contribute to the combustion of other material more than air does.</p> <p>- H281, refrigerated liquefied gas would also apply</p>
<u>Explosives</u>	-	<p><u>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 and igniters.</u></p> <p>- <u>The term "Explosive" includes any material determined to be within the scope of USC Title 18: Ch. 40 and also includes any material classified as an explosive other than consumer fireworks, 1.4G by the hazardous materials regulations of DOTn CFR Parts 100-185.</u></p>	<p><u>An explosive substance (or mixture) is a solid or liquid substance (or mixture of substances) which is in itself capable by chemical reaction of producing gas at such a temperature and pressure and at such a speed as to cause damage to the surroundings. Pyrotechnic substances are included even when they do not evolve gases.</u></p>
<u>Explosives</u>	<u>Unstable Explosives</u>	-	<u>H200; Unstable Explosive: Unstable explosives are those which are thermally unstable and/or too sensitive for normal handling, transport and use. Special precautions are necessary.</u>
<u>Explosives</u>	<u>Division 1.1</u>	<u>Explosives that have a mass explosion hazard. A mass explosion is one which affects almost the entire load instantaneously.</u>	<u>H201; Explosive; mass explosion hazard: Substances, mixtures and articles which have a mass explosion hazard (a mass explosion is one which affects almost the entire quantity present virtually instantaneously).</u>
<u>Explosives</u>	<u>Division 1.2</u>	<u>Explosives that have a projection hazard but not a mass explosion hazard.</u>	<u>H202; Explosive; severe projection hazard: Substances, mixtures and articles which have a projection hazard but not a mass explosion hazard.</u>
<u>Explosives</u>	<u>Division 1.3</u>	<u>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.</u>	<p><u>H203; Explosive; fire, blast or projection hazard: Substances, mixtures, and articles which have a fire hazard and either a minor blast hazard or a minor projection hazard or both, but not a mass explosion hazard:</u></p> <p><u>(i) combustion of which gives rise to considerable radiant heat; or</u> <u>(ii) which burn one after another, producing minor blast or projection effects or both;</u></p>
<u>Explosives</u>	<u>Division 1.4</u>	<u>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.</u>	<u>H204; Fire or projection hazard: Substances, mixtures and articles which present no significant hazard: substances, mixtures and articles which present only a small hazard in the event of ignition or initiation. The effects are largely confined to the package and no projection of fragments of appreciable size or range is to be expected. An external fire shall not cause virtually instantaneous explosion of almost the entire contents of the package.</u>

<u>Explosives</u>	<u>Division 1.4G</u>	<u>Small fireworks devices containing restricted amounts of pyrotechnic composition designed primarily to produce visual or audible effects by combustion 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.</u>	<u>N/A</u>
<u>Explosives</u>	<u>Division 1.5</u>	<u>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.</u>	<u>H205; May mass explode in fire: Very insensitive substances or mixtures which have a mass explosion hazard: substances and mixtures which have a mass explosion hazard but are so insensitive that there is very little probability of initiation or of transition from burning to detonation under normal conditions.</u>
<u>Explosives</u>	<u>Division 1.6</u>	<u>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.</u>	<u>Extremely insensitive articles which do not have a mass explosion hazard: articles which predominantly contain extremely insensitive substances or mixtures and which demonstrate a negligible probability of accidental initiation or propagation.</u>
<u>Flammable Gas</u>	<u>Gaseous</u>	<p><u>A material which is a gas at 68° F (20° C) or less at 14.7 psia (101 kPa) of pressure [a material that has a boiling point of 68° F (20° C) or less at 14.7 psia (101 kPa)] which:</u></p> <ol style="list-style-type: none"> <u>1. Is ignitable at 14.7 psia (101 kPa) when in a mixture of 13% or less by volume with air; or</u> <u>2. Has a flammable range at 14.7 psia (101 kPa) with air of not less than 12%, regardless of the lower limit.</u> <p><u>The limits specified shall be determined at 14.7 psia (101 kPa) of pressure and a temperature of 68° F (20° C) in accordance with ASTM E681.</u></p>	<p><u>A flammable gas is a gas having a flammable range with air at 20° C and a standard pressure of 101.3kPa</u></p> <p>-</p> <p><u>H220, Category 1A; Extremely flammable gas: Gases, which at 20° C and a standard pressure of 101.3 kPa:</u></p> <p><u>(a) are ignitable when in a mixture of 13% or less by volume in air; or</u></p> <p><u>(b) have a flammable range with air of at least 12 percentage points regardless of the lower flammability limit unless data show they meet the criteria for Category 1B</u></p> <p><u>Category 1A includes Pyrophoric gases and Chemically unstable gases</u></p> <p><u>H220, Category 1B; Flammable gas: Gases which meet the flammability criteria for Category 1A, but which are not pyrophoric, nor chemically unstable, and which have at least either:</u></p> <p><u>(a) a lower flammability limit of more than 6% by volume in air; or</u></p> <p><u>(b) a fundamental burning velocity of less than 10 cm/s</u></p> <p>-</p> <p><u>H280, compressed gas would also apply</u></p>

<u>Flammable Gas</u>	<u>Liquefied</u>	<p><u>A liquefied compressed gas which, under a charged pressure, is partially liquid at a temperature of 68° F (20° C) and which is flammable.</u></p>	<p><u>A flammable gas is a gas having a flammable range with air at 20° C and a standard pressure of 101.3kPa</u></p> <p>-</p> <p><u>H220, Category 1A; Extremely flammable gas: Gases, which at 20° C and a standard pressure of 101.3 kPa:</u></p> <p><u>(a) are ignitable when in a mixture of 13% or less by volume in air; or</u></p> <p><u>(b) have a flammable range with air of at least 12 percentage points regardless of the lower flammability limit unless data show they meet the criteria for Category 1B</u></p> <p><u>Category 1A includes Pyrophoric gases and Chemically unstable gases</u></p> <p>-</p> <p><u>H220, Category 1B; Flammable gas: Gases which meet the flammability criteria for Category 1A, but which are not pyrophoric, nor chemically unstable, and which have at least either:</u></p> <p><u>(a) a lower flammability limit of more than 6% by volume in air; or (b) a fundamental burning velocity of less than 10 cm/s</u></p> <p>-</p> <p><u>AND</u></p> <p>-</p> <p><u>A gas which when packaged under pressure, is partially liquid at temperatures above -50° C. A distinction is made between:</u></p> <p><u>(a) High pressure liquefied gas: a gas with a critical temperature between -50° C and +65° C and</u></p> <p><u>(b) Low pressure liquefied gas: a gas with a critical temperature above +65° C. Refrigerated liquefied gas A gas which when packaged is made partially liquid because of its low temperature. Dissolved gas A gas which when packaged under pressure is dissolved in a liquid phase solvent.</u></p> <p><u>H280, liquefied gas would also apply</u></p>
<u>Flammable Liquid</u>	-	<p><u>A liquid having a closed cup flash point below 100° F (38° C). Flammable liquids are further categorized into a group known as Class I liquids. The Class I category is subdivided as follows</u></p>	<p><u>A liquid having a flash point of not more than 93° C. A flammable liquid is classified in one of the four categories for this class according to the following table:</u></p>
<u>Flammable Liquid</u>	<u>IA</u>	<p><u>Liquids having a flash point below 73° F (23° C) and having a boiling point below 100° F (38° C).</u></p>	<p><u>H224, Category 1; Extremely flammable liquid and vapour: Flash point < 23° C and initial boiling point <= 35° C</u></p>
<u>Flammable Liquid</u>	<u>IB</u>	<p><u>Liquids having a flash point below 73° F (23° C) and having a boiling point at or above 100° F (38° C).</u></p>	<p><u>H225, Category 2; Highly flammable liquid and vapour. Flash point < 23° C and initial boiling point > 35° C</u></p>
<u>Flammable Liquid</u>	<u>IC</u>	<p><u>Liquids having a flash point at or above 73° F (23° C) and below 100° F (38° C).</u></p>	<p><u>H226, Category 3; Flammable liquid and vapour. Flash point >= 23° C and <= 60° C</u></p>

<u>Flammable Solid</u>	-	<p><u>A solid, other than a blasting agent or explosive, that is capable of causing fire through friction, absorption of moisture, spontaneous chemical change or retaining heat from manufacturing or processing, or which has an ignition temperature below 212° F (100° C) or which burns so vigorously and persistently when ignited as to create a serious hazard. A chemical shall be considered a flammable solid as determined in accordance with the test method of CPSC 16 CFR Part 1500.44, if it ignites and burns with a self-sustained flame at a rate greater than 0.0866 inch (2.2 mm) per second along its major axis.</u></p>	<p><u>A flammable solid is a solid which is readily combustible, or may cause or contribute to fire through friction.</u></p> <p>-</p> <p><u>A flammable solid is classified in one of the two categories for this class using method N.1 as described in Part III, sub-section 33.2.1 of the Manual of Tests and Criteria, according to:</u></p> <p>-</p> <p><u>H228, Category 1; Flammable solid: Burning rate test: Substances or mixtures other than metal powders:</u></p> <p>(a) <u>wetted zone does not stop fire; and</u></p> <p>(b) <u>burning time < 45 s or burning rate > 2.2 mm/s</u></p> <p><u>Metal powders: burning time <=5 min</u></p> <p>-</p> <p><u>H228, Category 2; Flammable solid: Burning rate test: Substances or mixtures other than metal powders:</u></p> <p>(c) <u>wetted zone stops the fire for at least 4 min; and</u></p> <p>(d) <u>burning time < 45 s or burning rate > 2.2 mm/s</u></p> <p><u>Metal powders: burning time > 5 min and <= 10 min</u></p>
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Highly Toxic	-	<p><u>A material which produces a lethal dose or lethal concentration which falls within any of the following categories:</u></p> <p>1. <u>A chemical that has a median lethal dose (LD50) of 50 mg or less per kg of body weight when administered orally to albino rats weighing between 200 and 300 g each.</u></p> <p>2. <u>A chemical that has a medial lethal dose (LD50) of 200 mg or less per kg of body weight when administered by continuous contact for 24 hrs (or less if death occurs within 24 hrs) with the bare skin of albino rabbits weighing between 2 and 3 kg each.</u></p> <p>3. <u>A chemical that has a median lethal concentration (LC50) in air of 200 ppm by volume or less of gas or vapor, or 2 mg/l or less of mist, fume or dust, when administered by continuous inhalation for 1 hr (or less if death occurs within 1 hr) to albino rats weighing between 200 and 300 g.</u></p>	<p><u>Acute toxicity refers to serious adverse health effects (i.e., lethality) occurring after a single or short-term oral, dermal or inhalation exposure to a substance or mixture.</u></p> <p>-</p> <p><u>Oral</u></p> <p><u>H300, Category 1; Fatal if swallowed: LD50 ≤ 5 mg/kg bodyweight</u></p> <p>-</p> <p><u>H300, Category 2; Fatal if swallowed: LD50 > 5 ≤ 50 mg/kg bodyweight</u></p> <p>-</p> <p><u>Dermal</u></p> <p><u>H310, Category 1; Fatal in contact with skin: LD50 ≤ 50 mg/kg bodyweight</u></p> <p>-</p> <p><u>H310, Category 2; Fatal in contact with skin: LD50 > 50 ≤ 200 mg/kg bodyweight</u></p> <p>-</p> <p><u>Inhalation</u></p> <p><u>H330, Category 1; Fatal if inhaled:</u></p> <p><u>Gases: LC50 ≤ 100 ppm (4 hr) ≈ 200 ppm (1 hr)</u></p> <p>-</p> <p><u>Vapours: LC50 ≤ 0.5 mg/l (4 hr) ≈ 2 mg/l (1 hr)</u></p> <p><u>Dust/mist: LC50 ≤ 0.05 mg/l (4 hr) ≈ 0.2 mg/l (1 hr)</u></p>
Inert Gas	-	<p><u>A gas that is capable of reacting with other materials only under abnormal conditions such as high temperatures, pressures and similar extrinsic physical forces. Within the context of the code, inert gases do not exhibit either physical or health hazard properties as defined (other than acting as a simple asphyxiant) or hazard properties other than those of a compressed gas. Some of the more common inert gases include argon, helium, krypton, neon, nitrogen, and xenon.</u></p>	<p><u>Gases under pressure are gases which are contained in receptacles at a pressure of 200 kPa (gauge) or more at 20°C or which are liquefied or liquefied and refrigerated. They comprise compressed gases, liquefied gases, dissolved gases, and refrigerated liquefied gases.</u></p> <p><u>See Compressed gases/Gases under pressure.</u></p>

<u>Organic Peroxide</u>	-	<u>An organic compound that contains the bivalent -O-O- structure and which may be considered to be a structural derivative of hydrogen peroxide where one or both of the hydrogen atoms have been replaced by an organic radical. Organic peroxides can present an explosion hazard (detonation or deflagration) or they can be shock sensitive. They can also decompose into various unstable compounds over an extended period of time.</u>	<p><u>Organic peroxides are liquid or solid organic substances which contain the bivalent -O-O- structure and may be considered derivatives of hydrogen peroxide, where one or both of the hydrogen atoms have been replaced by organic radicals. The term also includes organic peroxide formulations (mixtures). Organic peroxides are thermally unstable substances or mixtures, which may undergo exothermic self-accelerating decomposition. In addition, they may have one or more of the following properties:</u></p> <p>-</p> <p><u>(a) be liable to explosive decomposition;</u></p> <p><u>(b) burn rapidly;</u></p> <p><u>(c) be sensitive to impact or friction;</u></p> <p><u>(d) react dangerously with other substances.</u></p>
<u>Organic peroxide</u>	<u>UD</u>	<u>Organic peroxides that are capable of detonation. These peroxides pose an extremely high-explosion hazard through rapid explosive decomposition</u>	<u>H240, Organic Peroxide, Type A; Heating may cause an explosion: (a) Any organic peroxide which, as packaged, can detonate or deflagrate rapidly will be defined as organic peroxide TYPE A;</u>
<u>Organic Peroxide</u>	<u>I</u>	<u>Describes those formulations that are capable of deflagration but not detonation.</u>	<p><u>H241, Organic Peroxide, Type B; Heating may cause a fire or explosion:</u></p> <p><u>(b) Any organic peroxide possessing explosive properties and which, as packaged, neither detonates nor deflagrates rapidly, but is liable to undergo a thermal explosion in that package will be defined as organic peroxide TYPE B;</u></p>
<u>Organic Peroxide</u>	<u>II</u>	<u>Describes those formulations that burn very rapidly and that pose a moderate reactivity hazard</u>	<p><u>H242, Organic Peroxide, Type C; Heating may cause a fire:</u></p> <p><u>(c) Any organic peroxide possessing explosive properties when the substance or mixture as packaged cannot detonate or deflagrate rapidly or undergo a thermal explosion will be defined as organic peroxide TYPE C;</u></p> <p>-</p> <p><u>H242, Organic Peroxide, Type D; Heating may cause a fire:</u></p> <p><u>(d) Any organic peroxide which in laboratory testing:</u></p> <p>-</p> <p><u>(i) detonates partially, does not deflagrate rapidly and shows no violent effect when heated under confinement; or</u></p> <p><u>(ii) does not detonate at all, deflagrates slowly and shows no violent effect when heated under confinement; or</u></p> <p><u>(iii) does not detonate or deflagrate at all and shows a medium effect when heated under confinement; will be defined as organic peroxide TYPE D;</u></p>
<u>Organic Peroxide</u>	<u>III</u>	<u>Describes those formulations that burn rapidly and that pose a moderate reactivity hazard.</u>	<p><u>H242, Organic Peroxide, Type E; Heating may cause a fire:</u></p> <p><u>(e) Any organic peroxide which, in laboratory testing, neither detonates nor deflagrates at all and shows low or no effect when heated under confinement will be defined as organic peroxide TYPE E;</u></p>

<u>Organic Peroxide</u>	<u>IV</u>	<u>Describes those formulations that burn in the same manner as ordinary combustibles and that pose a minimal reactivity hazard.</u>	<u>H242, Organic Peroxide, Type F; Heating may cause a fire:</u> <u>(f) Any organic peroxide which, in laboratory testing, neither detonates in the cavitated state nor deflagrates at all and shows only a low or no effect when heated under confinement as well as low or no explosive power will be defined as organic peroxide TYPE F;</u>
<u>Organic peroxide</u>	<u>V</u>	<u>Describes those formulations that burn with less intensity than ordinary combustibles or do not sustain combustion and that pose no reactivity hazard.</u>	<u>H240, Organic Peroxide, Type G; Heating may cause a fire:</u> <u>(g) Any organic peroxide which, in laboratory testing, neither detonates in the cavitated state nor deflagrates at all and shows no effect when heated under confinement nor any explosive power, provided that it is thermally stable (self-accelerating decomposition temperature is 60 °C or higher for a 50 kg package), and, for liquid mixtures, a diluent having a boiling point of not less than 150 °C is used for desensitization, will be defined as organic peroxide TYPE G. If the organic peroxide is not thermally stable or a diluent having a boiling point less than 150 °C is used for desensitization, it shall be defined as organic peroxide TYPE F.</u>
<u>Oxidizer</u>		<u>A material that readily yields oxygen or other oxidizing gas, or that readily reacts to promote or initiate combustion of combustible materials and, if heated or contaminated, can result in vigorous self-sustained decomposition.</u>	<u>An oxidizing solid is a solid which, while in itself is not necessarily combustible, may, generally by yielding oxygen, cause, or contribute to, the combustion of other material.</u> <u>An oxidizing liquid is a liquid which, while in itself not necessarily combustible, may, generally by yielding oxygen, cause, or contribute to, the combustion of other material.</u>
<u>Oxidizer</u>	<u>4</u>	<u>An oxidizer that can undergo an explosive reaction due to contamination or exposure to a thermal or physical shock that causes a severe increase in the burning rate of combustible materials with which it comes into contact. Additionally, the oxidizer causes a severe increase in the burning rate and can cause spontaneous ignition of combustibles.</u>	<u>H271, Category 1; May cause fire or explosion; strong oxidizer:</u> - <u>Criteria for solids (based on Test O.1 or O.3 in Part III of UN Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria): Test O.1—Any substance or mixture which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning time less than the mean burning time of a 3:2 mixture (by mass) of potassium bromate and cellulose. Test O.3—Any substance or mixture which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning rate greater than the mean burning rate of a 3:1 mixture (by mass) of calcium peroxide and cellulose.</u> <u>Criteria for liquids (based on Test O.2 in Part III of UN Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria): Any substance or mixture which, in the 1:1 mixture, by mass, of substance (or mixture) and cellulose tested, spontaneously ignites; or the mean pressure rise time of a 1:1 mixture, by mass, of substance and cellulose is less than that of a 1:1 mixture, by mass, of 50% perchloric acid and cellulose.</u>

<u>Oxidizer</u>	<u>3</u>	<u>An oxidizer that causes a severe increase in the burning rate of combustible materials with which it comes in contact.</u>	<p>H271, Category 1; May cause fire or explosion; strong oxidizer:</p> <p><u>Criteria for solids (based on Test O.1 or O.3 in Part III of UN Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria): Test O.1—Any substance or mixture which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning time less than the mean burning time of a 3:2 mixture (by mass) of potassium bromate and cellulose. Test O.3—Any substance or mixture which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning rate greater than the mean burning rate of a 3:1 mixture (by mass) of calcium peroxide and cellulose.</u></p> <p><u>Criteria for liquids (based on Test O.2 in Part III of UN Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria): Any substance or mixture which, in the 1:1 mixture, by mass, of substance (or mixture) and cellulose tested, spontaneously ignites; or the mean pressure rise time of a 1:1 mixture, by mass, of substance and cellulose is less than that of a 1:1 mixture, by mass, of 50% perchloric acid and cellulose.</u></p>
<u>Oxidizer</u>	<u>2</u>	<u>An oxidizer that will cause a moderate increase in the burning rate of combustible materials with which it comes in contact.</u>	<p>H272, Category 2; May intensify fire, oxidizer</p> <p>–</p> <p><u>Criteria for solids (based on Test O.1 or O.3 in Part III of UN Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria): Test O.1—Any substance or mixture which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning time equal to or less than the mean burning time of a 2:3 mixture (by mass) of potassium bromate and cellulose and the criteria for Category 1 are not met. Test O.3—Any substance or mixture which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning rate equal to or greater than the mean burning rate of a 1:1 mixture (by mass) of calcium peroxide and cellulose and the criteria for Category 1 are not met.</u></p> <p>–</p> <p><u>Criteria for liquids (based on Test O.2 in Part III of UN Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria): Any substance or mixture which, in the 1:1 mixture, by mass, of substance (or mixture) and cellulose tested, exhibits a mean pressure rise time less than or equal to the mean pressure rise time of a 1:1 mixture, by mass, of a 40% aqueous sodium chlorate solution and cellulose; and the criteria for Category 1 are not met.</u></p>

<u>Oxidizer</u>	<u>1</u>	<u>An oxidizer that does not moderately increase the burning rate of combustible materials.</u>	<p>H272, Category 3; May intensify fire, oxidizer</p> <p>-</p> <p><u>Criteria for solids (based on Test O.1 or O.3 in Part III of UN Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria): Test O.1—Any substance or mixture which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning time equal to or less than the mean burning time of a 3:7 mixture (by mass) of potassium bromate and cellulose and the criteria for Categories 1 and 2 are not met. Test O.3—Any substance or mixture which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning rate equal to or greater than the mean burning rate of a 1:2 mixture (by mass) of calcium peroxide and cellulose and the criteria for Categories 1 and 2 are not met.</u></p> <p><u>Criteria for liquids (based on Test O.2 in Part III of UN Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria): Any substance or mixture which, in the 1:1 mixture, by mass, of substance (or mixture) and cellulose tested, exhibits a mean pressure rise time less than or equal to the mean pressure rise time of a 1:1 mixture, by mass, of a 65% aqueous nitric acid solution and cellulose; and the criteria for Categories 1 and 2 are not met.</u></p>
<u>Oxidizing gas</u>	<u>Gaseous</u>	<u>A gas that can support and accelerate combustion of other materials more than air does.</u>	<p><u>Any gas which may, generally by providing oxygen, cause or contribute to the combustion of other material more than air does.</u></p> <p>-</p> <p>H270, Category 1; May cause or intensify fire; oxidizer: <u>Any gas which may, generally by providing oxygen, cause or contribute to the combustion of other material more than air does.</u></p> <p>H280, compressed gas would also apply</p>
<u>Oxidizing gas</u>	<u>Liquefied</u>	<u>An oxidizing gas that is liquefied (liquefied gases are gases that, in a packaging under the charged pressure, are partially liquid at 68°F (20°C)).</u>	<p><u>Any gas which may, generally by providing oxygen, cause or contribute to the combustion of other material more than air does.</u></p> <p>-</p> <p>H270, Category 1; May cause or intensify fire; oxidizer: <u>Any gas which may, generally by providing oxygen, cause or contribute to the combustion of other material more than air does.</u></p> <p>H280, liquefied gas would also apply</p>
<u>Pyrophoric</u>		<u>A chemical with an autoignition temperature in air, at or below a temperature of 130°F (54 °C).</u>	<u>Separate definitions based upon physical state, see below:</u>
<u>Pyrophoric</u>	<u>Solid</u>	<u>A solid with an autoignition temperature in air, at or below a temperature of 130°F (54 °C).</u>	<p>H250, Category 1; Pyrophoric solid, <u>Catches fire spontaneously if exposed to air: A pyrophoric solid is a solid which, even in small quantities, is liable to ignite within five minutes after coming into contact with air.</u></p> <p><u>Classification criteria: The solid ignites within 5 min of coming into contact with air.</u></p>

<u>Pyrophoric</u>	<u>Liquid</u>	<u>A liquid with an autoignition temperature in air, at or below a temperature of 130°F (54 °C).</u>	<p><u>H250, Category 1; Pyrophoric liquid. Catches fire spontaneously if exposed to air: A pyrophoric liquid is a liquid which, even in small quantities, is liable to ignite within five minutes after coming into contact with air.</u></p> <p><u>Classification criteria: The liquid ignites within 5 min when added to an inert carrier and exposed to air, or it ignites or chars a filter paper on contact with air within 5 min. Testing is performed at 25 ±2°C and 50 ±5% relative humidity.</u></p>
<u>Pyrophoric</u>	<u>Gas</u>	<u>A gas with an autoignition temperature in air, at or below a temperature of 130°F (54 °C).</u>	<p><u>H220, Category 1A; Extremely flammable gas. May ignite spontaneously if exposed to air: A pyrophoric gas is a flammable gas that is liable to ignite spontaneously in air at a temperature of 54° C or below.</u></p> <p><u>H280, compressed (or liquefied) gas would also apply.</u></p>

Toxic		<p>A chemical falling within any of the following categories:</p> <ol style="list-style-type: none"> 1. A chemical that has a median lethal dose (LD50) of more than 50 mg per kg, but not more than 500 mg per kg of body weight when administered orally to albino rats weighing between 200 and 300 g each. 2. A chemical that has a medial lethal dose (LD50) of more than 200 mg per kg but not more than 1,000 mg per kg of body weight when administered by continuous contact for 24 hrs (or less if death occurs within 24 hrs) with the bare skin of albino rabbits weighing between 2 and 3 kg each. 3. A chemical that has a median lethal concentration (LC50) in air of more than 200 ppm but not more than 2,000 ppm by volume or less of gas or vapor, or more than 2 mg/l but not more than 20 mg/l of mist, fume or dust, when administered by continuous inhalation for 1 hr (or less if death occurs within 1 hr) to albino rats weighing between 200 and 300 g 	<p>Acute toxicity refers to serious adverse health effects (i.e., lethality) occurring after a single or short-term oral, dermal or inhalation exposure to a substance or mixture.</p> <p>-</p> <p><u>Oral</u></p> <p>H301, Category 3: Toxic if swallowed: LD50 > 50 ≤ 300 mg/kg bodyweight</p> <p>-</p> <p>H302, Category 4: Harmful if swallowed: LD50 > 300 ≤ 2,000 mg/kg bodyweight</p> <p>-</p> <p><u>Dermal</u></p> <p>H311, Category 3, Toxic in contact with skin: LD50 > 200 ≤ 1,000 mg/kg bodyweight</p> <p>-</p> <p><u>Inhalation</u></p> <p>H330, Category 2: Fatal if inhaled:</p> <p>Gases: LC50 > 100 ppm (4 hr) ≈ 200 ppm (1 hr) ≤ 500 ppm (4 hr) ≈ 1,000 ppm (1 hr)</p> <p>-</p> <p>Vapours: LC50 > 0.5 mg/l (4 hr) ≈ 2 mg/l (1 hr) ≤ 2 mg/l (4 hr) ≈ 8 mg/l (1 hr)</p> <p>-</p> <p>Dust/mist: LC50 > 0.05 mg/l (4 hr) ≈ 0.2 mg/l (1 hr) ≤ 0.5 mg/l (4 hr) ≈ 2 mg/l (1 hr)</p> <p>-</p> <p>H331, Category 3: Toxic if inhaled:</p> <p>Gases: LC50 > 500 ppm (4 hr) ≈ 1,000 ppm (1 hr) ≤ 2,500 ppm (4 hr) ≈ 5,000 ppm (1 hr)</p> <p>Vapours: LC50 > 2 mg/l (4 hr) ≈ 8 mg/l (1 hr) ≤ 10 mg/l (4 hr) ≈ 40 mg/l (1 hr)</p> <p>-</p> <p>Dust/mist: LC50 > 0.5 mg/l (4 hr) ≈ 2 mg/l (1 hr) ≤ 1 mg/l (4 hr) ≈ 4 mg/l (1 hr)</p>
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<u>Unstable (reactive)</u>		<u>A material, other than an explosive, which in the pure state or as commercially produced, will vigorously polymerize, decompose, condense or become self-reactive and undergo other violent chemical changes, including explosion, when exposed to heat, friction or shock, or in the absence of an inhibitor, or in the presence of contaminants, or in contact with incompatible materials. Unstable (reactive) materials are subdivided as follows:</u>	<u>Self-reactive substances or mixtures are thermally unstable liquids or solid substances or mixtures liable to undergo a strongly exothermic decomposition even without participation of oxygen (air). This definition excludes substances and mixtures classified under the GHS as explosives, organic peroxides or as oxidizing.</u> <u>A self-reactive substance or mixture is regarded as possessing explosive properties when in laboratory testing the formulation is liable to detonate, to deflagrate rapidly or to show a violent effect when heated under confinement.</u>
<u>Unstable (reactive)</u>	4	<u>Materials that in themselves are readily capable of detonation or of explosive decomposition or explosive reaction at normal temperatures and pressures. This class includes materials that are sensitive to mechanical or localized thermal shock at normal temperatures and pressures.</u>	<u>H240, Type A; Heating may cause an explosion: (a) Any self-reactive substance or mixture which can detonate or deflagrate rapidly, as packaged.</u> <u>will be defined as self-reactive substance TYPE A:</u>
<u>Unstable (reactive)</u>	3	<u>Materials that in themselves are capable of detonation or of explosive decomposition or explosive reaction but which require a strong initiating source or which must be heated under confinement before initiation. This class includes materials that are sensitive to thermal or mechanical shock at the elevated temperatures and pressures.</u>	<u>H241, Type B; Heating may cause a fire or explosion: (b) Any self-reactive substance or mixture possessing explosive properties and which,</u> <u>as packaged, neither detonates nor deflagrates rapidly, but is liable to undergo a thermal</u> <u>explosion in that package will be defined as self-reactive substance TYPE B;</u>
<u>Unstable (reactive)</u>	2	<u>Materials that in themselves are normally unstable and readily undergo violent chemical change but do not detonate. This class includes materials that can undergo chemical change with rapid release of energy at normal temperatures and pressures, and that can undergo violent chemical change at elevated temperatures and pressures.</u>	<u>H242, Type C; Heating may cause a fire: (c) Any self-reactive substance or mixture possessing explosive properties when the substance or mixture as packaged cannot detonate or deflagrate rapidly or undergo a thermal explosion will be defined as self-reactive substance TYPE C;</u> - <u>H242, Type D; Heating may cause a fire: (d) Any self-reactive substance or mixture which in laboratory testing:</u> <u>(i) detonates partially, does not deflagrate rapidly and shows no violent effect when heated under confinement; or</u> <u>(ii) does not detonate at all, deflagrates slowly and shows no violent effect when heated under confinement; or</u> <u>(iii) does not detonate or deflagrate at all and shows a medium effect when heated under confinement;</u> <u>will be defined as self-reactive substance TYPE D;</u>

<u>Unstable (Reactive)</u>	<u>1</u>	<u>Materials that in themselves are normally stable but which can become unstable at elevated temperatures and pressures.</u>	<p>H242, Type E; Heating may cause a fire: (e) Any self-reactive substance or mixture which, in laboratory testing, neither detonates nor deflagrates at all and shows low or no effect when heated under confinement will be defined as self-reactive substance TYPE E;</p> <p>H242, Type F; Heating may cause a fire: (f) Any self-reactive substance or mixture which, in laboratory testing, neither detonates in the cavitated state nor deflagrates at all and shows only a low or no effect when heated under confinement as well as low or no explosive power will be defined as self-reactive substance</p> <p>TYPE F;</p> <p>-</p> <p>(g) Any self-reactive substance or mixture which, in laboratory testing, neither detonates in the cavitated state nor deflagrates at all and shows no effect when heated under confinement nor any explosive power, provided that it is thermally stable (self-accelerating decomposition temperature is 60 °C to 75 °C for a 50 kg package), and, for liquid mixtures, a diluent having a boiling point greater than or equal to 150 °C is used for desensitization will be defined as self-reactive substance TYPE G. If the mixture is not thermally stable or a diluent having a boiling point less than 150 °C is used for desensitization, the mixture shall be defined as self-reactive substance TYPE F</p>
<u>Unstable (reactive) gas</u>	<u>Gaseous</u>		<p>A chemically unstable gas is a flammable gas that is able to react explosively even in the absence of air or oxygen.</p> <p>-</p> <p>H220, Category 1A, Category A; Extremely flammable gas. May react explosively even in the absence of air: Flammable gases which are chemically unstable at 20 °C and a standard pressure of 101.3 kPa.</p> <p>-</p> <p>H220, Category 1A, Category B; Extremely flammable gas. May react explosively even in the absence of air at elevated pressure and/or temperature: Flammable gases which are chemically unstable at a temperature greater than 20 °C and/or a standard pressure greater than 101.3 kPa.</p> <p>-</p> <p>H280, compressed gas would also apply.</p>
<u>Water reactive</u>	<u>3</u>	<u>Materials that react explosively with water without requiring heat or confinement.</u>	<p>H260, Category 1; In contact with water releases flammable gases which may ignite spontaneously: Any substance or mixture which reacts vigorously with water at ambient temperatures and demonstrates generally a tendency for the gas produced to ignite spontaneously, or which reacts readily with water at ambient temperatures such that the rate of evolution of flammable gas is equal to or greater than 10 liters per kilogram of substance over any one minute. (UN/DOT test methods: Test N.5, Part III, sub-section 33.4.1.4)</p>

<u>Water reactive</u>	<u>2</u>	<u>Materials that react violently with water or have the ability to boil water. Materials that produce flammable, toxic or other hazardous gases, or evolve enough heat to cause autoignition of combustibles upon exposure to water or moisture.</u>	<u>H261, Category 2; In contact with water releases flammable gas: Any substance or mixture which reacts readily with water at ambient temperatures such that the maximum rate of evolution of flammable gas is equal to or greater than 20 liters per kilogram of substance per hour, and which does not meet the criteria for Category 1.</u>
<u>Water reactive</u>	<u>1</u>	<u>Materials that react with water with some release of energy, but not violently.</u>	<u>H261, Category 3; In contact with water releases flammable gas: Any substance or mixture which reacts slowly with water at ambient temperatures such that the maximum rate of evolution of flammable gas is equal to or greater than 1 liters per kilogram of substance per hour, and which does not meet the criteria for Categories 1 and 2.</u>

a. The table illustrates that there is not perfect alignment between the IFC and GHS definitions and provides information on similarities and difference between the two classification systems.

Revise as follows:

**TABLE E104.1-E105.1
REFERENCED STANDARDS**

STANDARD ACRONYM	STANDARD NAME	SECTIONS HEREIN REFERENCED
CGA P-20—2009	<i>Standard for Classification of Toxic Mixtures</i>	E103.1.3.1
CGA P-23—2008	<i>Standard for Categorizing Gas Mixtures Containing Flammable and Nonflammable Components</i>	E102.1.2
UN (Rev.7, 2017)	<u>UN Recommendations on the Transport of Dangerous Goods, Globally Harmonized System of Classification and Labelling of Chemicals (GHS), Part 2: Physical Hazards, Chapter 2.13 and 2.14</u>	<u>Table E104.2</u>

SECTION E104 E105 REFERENCED STANDARDS.

Add new standard(s) as follows:

UN

United Nations Statistics Division
New York, NY 10017
USA

UN Rev.7, 2017 UN Recommendations on the Transport of Dangerous Goods, Globally Harmonized System of Classification and Labelling of Chemicals (GHS), Part 2: Physical Hazards, Chapter 2.13 and 2.14.

Staff Analysis: A review of the standard proposed for inclusion in the code, UN Rev.7, 2017 UN Recommendations on the Transport of Dangerous Goods, Globally Harmonized System of Classification and Labelling of Chemicals (GHS), Part 2: Physical Hazards, Chapter 2.13 and 2.14, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

Reason Statement: Fire Code officials must enforce the hazardous materials provisions of the International Fire Code (IFC) and the International Building Code (IBC) to ensure that people and property in our communities are safe. Consequences of missing or incorrect classification include increased fire and life safety risk and can lead to misclassification of an occupancy.

United Nations (UN) reference is added to provide Fire Code officials the option to compare IFC and GHS hazardous materials definitions. The UN's Globally Harmonized System (GHS) is an internationally agreed upon standard of classification and labeling that utilizes prescriptive, standardized testing procedures and criteria to classify hazardous materials. Federal law (29 CFR 1910.1200 and 49 CFR 173.127) mandates that manufacturers selling, producing or transporting chemicals in the United States classify chemicals according to the GHS system and make the information readily available in product Safety Data Sheets (SDSs). Adding a comparison between IFC and GHS definitions to illustrate the differences and similarities better informs code officials faced with validating classifications of hazardous materials.

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 and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties, to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: <https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/>

Cost Impact: The code change proposal will not increase or decrease the cost of construction
If the GHS categories were used to inform IFC hazard classification, there would be no change in the cost of construction.

F233-21

F234-21

IFC: I101.2 (New), I101.2, I101.3

Proponents: Jeffrey Hugo, National Fire Sprinkler Association, representing NFSA (hugo@nfsa.org); Jason Webb, Potter Electric Signal Company, representing Automatic Fire Alarm Association Codes & Standards Committee (jasonw@pottersignal.com)

2021 International Fire Code

Add new text as follows:

I101.2 Impaired conditions requiring immediate action. The following conditions indicate noncompliant and impaired fire protection systems. An impaired system(s) shall require immediate action by the building owner to return the fire protection system back to service:

1. Valves in the shut or closed position:
 - 1.1 Water supply valves, such as in riser rooms, yards, and vaults.
 - 1.2 Water supply floor control valves in multi-story buildings.
 - 1.3 Fuel supply valves for fire pumps.
 - 1.4 Commercial kitchen hood suppression valves
2. Impaired fire alarm systems:
 - 2.1 Fire alarm systems with no power (primary or secondary).
 - 2.2 No active communication path to the supervising/remote station (unless the system is local)

Revise as follows:

~~H01.2~~ **I101.3 Noncompliant conditions requiring component replacement.** The following conditions shall be deemed noncompliant and shall cause the related component(s) to be replaced to comply with the provisions of this code:

1. Sprinklers ~~heads~~ having any of the following conditions:
 - 1.1. Signs of leakage.
 - 1.2. Paint or other ornamentation that is not factory applied.
 - 1.3. Evidence of corrosion including, but not limited to, discoloration or rust.
 - 1.4. Deformation or damage of any part.
 - 1.5. Improper orientation of sprinkler ~~head~~.
 - 1.6. Empty glass bulb.
 - 1.7. Sprinklers ~~heads~~ manufactured prior to 1920.
 - 1.8. Replacement sprinklers ~~heads~~ that do not match existing sprinkler ~~heads~~ in orifice size, K-factor temperature rating, coating or deflector type.
 - 1.9. Sprinklers ~~heads~~ for the protection of cooking equipment that have not been replaced within one year.
2. Water pressure and air pressure gauges; ~~that have been installed for more than 5 years and have not been tested to within 3 percent accuracy.~~
 - 2.1. Installed for more than 5 years and have not been tested to within 3 percent accuracy.
 - 2.2. Indicate zero pressure.

~~H01.3~~ **I101.4 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~~ any fire alarm equipment, devices, or appliances.
 - 6.4. Tripped fuses.
 - 6.5. Fire alarm systems not in "normal" (no alarm, supervisory, or trouble) state.

7. Fire department connections having any of the following conditions:

- 7.1. Fire department connections are not visible or able to be accessed 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.

Reason Statement: New in the 2009 IFC through F304-07/08, the ICC hazard abatement in existing buildings committee submitted this appendix as a bridge to the essential fire protection inspection, testing, and maintenance standards. This is a frequently adopted appendix by fire departments in jurisdictions using company inspections.

The new section, I101.2 should come first, because of the priority of an impaired system. Impaired systems are an immediate priority, because items, such as shut valves and no fuel prevent fire protection systems from operating. The NFPA 25 and NFPA 72 standards have more impairment conditions but getting fire code officials on company level inspections to recognize shut valves should be first on their checklist. This proposal is attempting to keep in original spirit and purpose of the original submitters, to highlight "...conditions readily identifiable by the fire code official during the course of an inspection..."

The new and updated sections above include terminology, such as impairment and deficiency, to continue the correlation of common issues between the codes and standards for the fire code official. The term impaired and deficiency are defined terms in NFPA 25 and NFPA 72. They are used to categorize the level of system status. Adding these to the appendix only helps the fire code official recognize and understand the issue better.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This is a maintenance issue, not a construction issue.

F234-21

Proponents: Jeffrey Shapiro, representing Self (jeff.shapiro@intlcodeconsultants.com)

2021 International Fire Code

Delete without substitution:

APPENDIX L REQUIREMENTS FOR FIRE FIGHTER AIR REPLENISHMENT SYSTEMS

SECTION L101 GENERAL.

L101.1 Scope. Fire fighter air replenishment systems (FARS) shall be provided in accordance with this appendix. The adopting ordinance shall specify building characteristics or special hazards that establish thresholds triggering a requirement for the installation of a FARS. The requirement shall be based on the fire department's capability of replenishing fire fighter breathing air during sustained emergency operations. Considerations shall include:

1. Building characteristics, such as number of stories above or below *grade plane*, floor area, type of construction and fire resistance of the primary structural frame to allow sustained fire fighting operations based on a rating of not less than 2 hours.
2. Special hazards, other than buildings, that require unique accommodations to allow the fire department to replenish fire fighter breathing air.
3. Fire department staffing level.
4. Availability of a fire department breathing air replenishment vehicle.

SECTION L102 DEFINITIONS.

L102.1 Definitions. For the purpose of this appendix, certain terms are defined as follows:

FIRE FIGHTER AIR REPLENISHMENT SYSTEM (FARS). A permanently installed arrangement of piping, valves, fittings and equipment to facilitate the replenishment of breathing air in self-contained breathing apparatus (SCBA) for fire fighters engaged in emergency operations.

SECTION L103 PERMITS.

L103.1 Permits. Permits shall be required to install and maintain a FARS. Permits shall be in accordance with Sections L103.2 and L103.3.

L103.2 Construction permit. A construction permit is required for installation of or modification to a FARS. The construction permit application shall include documentation of an acceptance and testing plan as specified in Section L105.

L103.3 Operational permit. An operational permit is required to maintain a FARS.

SECTION L104 DESIGN AND INSTALLATION.

L104.1 Design and installation. A FARS shall be designed and installed in accordance with Sections L104.2 through L104.15.3.

L104.2 Standards. Fire fighter air replenishment systems shall be in accordance with Sections L104.2.1 and L104.2.2.

L104.2.1 Pressurized system components. Pressurized system components shall be designed and installed in accordance with ASME B31.3.

L104.2.2 Air quality. The system shall be designed to convey breathing air complying with NFPA 1989.

L104.3 Design and operating pressure. The minimum design pressure shall be 110 percent of the fire department's normal SCBA fill pressure. The system design pressure shall be marked in an *approved* manner at the supply connections, and adjacent to pressure gauges on any fixed air supply components. Pressure shall be maintained in the system within 5 percent of the design pressure.

L104.4 Cylinder refill rate. The FARS shall be capable of refilling breathing air cylinders of a size and pressure used by the fire department at a rate of not less than two empty cylinders in 2 minutes.

L104.5 Breathing air supply. Where a fire department mobile air unit is available, the FARS shall be supplied by an external mobile air connection in accordance with Section L104.14. Where a fire department mobile air unit is not available, a stored pressure air supply shall be provided in accordance with Section L104.5.1. A stored pressure air supply shall be permitted to be added to a system supplied by an external mobile air connection provided that a means to bypass the stored pressure air supply is located at the external mobile air connection.

L104.5.1 Stored pressure air supply. A stored pressure air supply shall be designed based on Chapter 24 of NFPA 1901 except that provisions applicable only to mobile apparatus or not applicable to system design shall not apply. A stored pressure air supply shall be capable of refilling not less than 50 empty breathing air cylinders of a size and pressure used by the fire department.

L104.5.2 Retrofit of external mobile air connection. A FARS not initially provided with an external mobile air connection due to the lack of a mobile air unit shall be retrofitted with an external mobile air connection where a mobile air unit becomes available. Where an external mobile air connection is provided, a means to bypass the stored pressure air supply shall be located at the external mobile air connection. The retrofit shall be completed not more than 12 months after notification by the *fire code official*.

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

L104.7 Pressure relief valve. Pressure relief valves shall be installed at each point of supply and at the top or end of every riser. The relief valve shall meet the requirements of CGA S-1.3 and shall not be field adjustable. Pressure relief valves shall discharge in a manner that does not endanger personnel who are in the area. Valves, plugs or caps shall not be installed in the discharge of a pressure relief valve. Where discharge piping is used the end shall not be threaded.

L104.8 Materials and equipment. Pressurized system components shall be *listed* or *approved* for their intended use and rated for the maximum allowable design pressure in the system. Piping and fittings shall be stainless steel.

L104.9 Welded connections. Piping connections that are concealed shall be welded.

L104.10 Protection of piping. System piping shall be protected from physical damage in an *approved* manner.

L104.11 Compatibility. Fittings and connections intended to be used by the fire department shall be compatible with the fire department's equipment.

L104.12 Security. Connections to a FARS shall be safeguarded from unauthorized access in an *approved* manner.

L104.13 Fill stations. Fire fighter air replenishment fill stations shall comply with Section L104.13.1 through L104.13.3.

L104.13.1 Location. Fill stations for refilling breathing air cylinders shall be located as follows:

1. Fill stations shall be provided at the fifth floor above and below the ground level floor and every third floor level thereafter.
2. On floor levels requiring fill stations, one fill station shall be provided adjacent to a required exit stair at a location designated by the *fire code official*. In buildings required to have three or more exit stairs, additional fill stations shall be provided at a ratio of one fill station for every three stairways.

L104.13.2 Design. Fill stations for breathing air cylinders shall be designed to meet the following requirements:

1. A pressure gauge and pressure regulating devices and controls shall be provided to allow the operator to control the fill pressure and fill rate on each cylinder fill hose.
2. Valves controlling cylinder fill hoses shall be slow operating valves.
3. A separate flow restriction device shall be provided on each fill hose.
4. A method shall be provided to bleed each cylinder fill hose.
5. The fill station shall be designed to provide a containment area that fully encloses any cylinder being filled and flexible cylinder fill hoses, and directs the energy from a failure away from personnel. Fill stations shall be designed to prohibit filling of cylinders that are not enclosed within the containment area.

Exception: Where required or *approved* by the *fire chief*, fill stations providing for the direct refilling of the fire fighters' breathing air cylinders using Rapid Intervention Crew/Company Universal Air Connection (RIC/UAC) fittings shall be used in lieu of cylinder fill stations that utilize containment areas.

L104.13.3 Cylinder refill rate. Fill stations shall be capable of simultaneously filling two or more empty breathing air cylinders equivalent to those used by the fire department to the cylinders' design pressure within 2 minutes.

L104.14 External mobile air connection. An external mobile air connection shall be provided for fire department mobile air apparatus where required by Section L104.5 to supply the system with breathing air.

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

L104.14.2 Protection from vehicles. A means of vehicle impact protection in accordance with Section 312 shall be provided to protect mobile air connections that are subject to vehicular impact.

L104.14.3 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 external mobile air connections.

L104.15 Air monitoring system. An *approved* air monitoring system shall be provided. The system shall automatically monitor air quality, moisture

and pressure on a continual basis. The air monitoring system shall be equipped with not less than two content analyzers capable of detecting carbon monoxide, carbon dioxide, nitrogen, oxygen, moisture and hydrocarbons.

L104.15.1 Alarm conditions. The air monitoring system shall transmit a supervisory signal when any of the following levels are detected:

1. Carbon monoxide exceeds 5 ppm.
2. Carbon dioxide exceeds 1,000 ppm.
3. An oxygen level below 19.5 percent or above 23.5 percent.
4. A nitrogen level below 75 percent or above 81 percent.
5. Hydrocarbon (condensed) content exceeds 5 milligrams per cubic meter of air.
6. The moisture concentration exceeds 24 ppm by volume.
7. The pressure falls below 90 percent of the maintenance pressure specified in Section L104.3.

L104.15.2 Alarm supervision, monitoring and notification. The air monitoring system shall be electrically supervised and monitored by an *approved* supervising station, or where *approved*, shall initiate audible and visual supervisory signals at a constantly attended location.

L104.15.3 Air quality status display. Air quality status shall be visually displayed at the external mobile air connection required by Section L104.14.

SECTION L105 ACCEPTANCE TESTS.

L105.1 Acceptance tests. Upon completion of the installation, a FARS shall be acceptance tested to verify compliance with equipment manufacturers' instructions and design documents. Oversight of the acceptance tests shall be provided by a *registered design professional*. Acceptance testing shall include all of the following:

1. A pneumatic test in accordance with ASME B31.3 of the complete system at a minimum test pressure of 110 percent of the system design pressure using oil free dry air, nitrogen or argon shall be conducted. Test pressure shall be maintained for not less than 24 hours. During this test, all fittings, joints and system components shall be inspected for leaks. Defects in the system or leaks detected shall be documented and repaired.
2. A cylinder filling performance test shall be conducted to verify compliance with the required breathing air cylinder refill rate from the exterior mobile air connection and, where provided, a stored air pressure supply system.
3. The air quality monitoring system shall be tested to verify both of the following conditions:
 - 3.1. Visual indicators required by Section L104.15.1 function properly.
 - 3.2. Supervisory signals are transmitted as required by Section L104.15.2 for each sensor based on a sensor function test.
4. Connections intended for fire department use shall be confirmed as compatible with the fire department's mobile air unit, SCBA cylinders and, where provided, RIG/UAC connections.
5. Air samples shall be taken from not less than two fill stations and submitted to an *approved* gas analysis laboratory to verify compliance with NFPA 1989. The FARS shall not be placed into service until a written report verifying compliance with NFPA 1989 has been provided to the *fire code official*.

SECTION L106 INSPECTION, TESTING AND MAINTENANCE.

L106.1 Periodic inspection, testing and maintenance. A FARS shall be continuously maintained in an operative condition and shall be inspected not less than annually. Not less than quarterly, an air sample shall be taken from the system and tested to verify compliance with NFPA 1989. The laboratory test results shall be maintained on site and readily available for review by the *fire code official*.

SECTION L107 REFERENCED STANDARDS.

L107.1 General. See Table L107.1 for standards that are referenced in various sections of this appendix. Standards are listed by the standard identification with the effective date, standard title, and the section or sections of this appendix that reference the standard.

TABLE L107.1
REFERENCED STANDARDS

STANDARD ACRONYM	STANDARD NAME	SECTIONS HEREIN REFERENCED
ASME B31.3—2020	Process Piping	L104.2.1, L105.1
CGA S-1.3—2008	Pressure Relief Device Standards—Part 3 Stationary Storage Containers for Compressed Gases	L104.7
NFPA 1901—16	Standard for Automotive Fire Apparatus	L104.5.1
NFPA 1989—13	Breathing Air Quality for Fire Emergency Services Respiratory Protection	L104.2.2, L105.1, L106.1

Reason Statement: Although firefighter air replenishment systems have been around for decades at a cost of many millions of dollars to building owners and the fire service, I have been unable find a single fire incident during which such systems were deployed. A single manufacturer/supplier sources these systems, and while they do so via multiple channels, the systems are ultimately proprietary to that one source. Even with the inclusion of requirements in model codes, no additional suppliers appear to have entered the market. The manufacturer/supplier Web site <http://rescueair.com/> touts over 500 system installations in 19 states, but does not offer an incident history demonstrating the value, if any, of these installations.

From a fire service perspective, most jurisdictions in the country do not use these systems, so it's clear that fire service organizations can and do operate without them. But, in jurisdictions that are requiring such systems, they do so at significant expense to building owners for installation and maintenance costs (regular air quality tests) and at significant expense to the fire service for training, and in some cases costs associated with operation of a suitable air-support vehicle. Although there may be cases where jurisdictions or owners might be interested in these systems for iconic buildings, significant buy-in by the fire service is needed to assure that firefighters will be trained to understand and use the system if there is an incident that might lead to their use. It's not just a simple case of adopting the appendix, having systems installed, and firefighters showing up to use the system as they would a standpipe. Accordingly, given the single source supplier, it is preferable for the supplier to provide installation and operational recommendations to customers/jurisdictions using the systems versus having the IFC essentially promote the use of such systems, to the benefit of a single proprietary interest, by including requirements in a model fire code appendix. Accordingly, the appendix should be deleted.

Cost Impact: The code change proposal will decrease the cost of construction
Significant construction cost savings will be realized by not having to install these systems in new buildings.

F235-21

F236-21

IFC: APPENDIX O (New), (New), SECTION O101 (New), O101.1 (New), SECTION O102 (New), O102.1 (New), SECTION O103 (New), O103.1 (New), O103.2 (New), O103.3 (New), O103.4 (New), O103.5 (New), SECTION O104 (New), O104.1 (New), O104.2 (New), O104.3 (New), SECTION O105 (New), O105.1 (New), O105.2 (New), O105.3 (New), SECTION O106 (New), TABLE O106.1 (New), O106.1 (New)

Proponents: Michael O'Brian, representing FCAC (fcac@iccsafe.org)

2021 International Fire Code

Add new text as follows:

APPENDIX O **VALET TRASH AND RECYCLING COLLECTION IN GROUP R-2 OCCUPANCIES**

. The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance or legislation of the jurisdiction. About this appendix: Appendix O provides for trash and recycle collection services in Group R-2 occupancies. Occupants receiving this service place trash and recyclables in the corridor outside of their residence for pickup by a collection service on a regularly scheduled basis in accordance with restrictions, as prescribed by this appendix.

SECTION O101 SCOPE.

O101.1 Scope. Valet trash collection in Group R-2 Occupancies shall comply with this Appendix.

SECTION O102 DEFINITIONS.

O102.1 Definitions. For the purpose of this appendix certain terms are defined as follows:

VALET TRASH COLLECTION. A service provided whereby trash or recycling is placed outside of dwelling units in approved containers during prescribed times for collection by another party.

SECTION O103 CONTAINERS.

O103.1 General. Containers used for valet trash collection shall comply with Sections O103.2 through O103.5.

O103.2 Integrity. Valet trash or recycling materials shall be stored in containers that are of liquid-tight construction and shall be equipped with tight-fitting lids.

O103.3 Height. Containers shall not exceed 30" in height.

Add new text as follows:

O103.4 Capacity and limit. Individual containers shall not exceed 2.0 cubic feet (15 gallons) in capacity. Only one trash or recycling container per dwelling unit or sleeping unit shall be permitted to be placed outside of the dwelling unit or sleeping unit at one time. Trash and recycling containers shall not be placed outside of a dwelling unit or sleeping unit at the same time.

O103.5 Construction materials. Containers and lids used for valet trash collections shall be constructed entirely of noncombustible materials, or of materials that meet a peak rate of heat release not exceeding 300 kW/m² when tested in accordance with ASTM E1354 at an incident heat flux of 50 kW/m² in the horizontal orientation.

SECTION O104 CONTAINER LOCATION.

O104.1 General. Placement of containers used for valet trash collection outside of a dwelling unit or sleeping unit shall comply with Sections O104.2 and O104.3.

O104.2 Minimum means of egress width. Containers used for valet trash collection shall not obstruct the minimum required egress width.

Add new text as follows:

O104.3 Stairways. Containers used for valet trash collection shall not be placed on stair risers, within minimum required stairway landing dimensions, or anywhere in an interior exit stairway.

SECTION O105 ADDITIONAL REQUIREMENTS.

O105.1 Time limits. Filled containers used for valet trash or recycling services shall not be placed outside a dwelling unit for more than 6 hours within in any 24-hour period. Empty approved containers used for valet trash or recycling services shall not remain in a corridor for more than 12 continuous hours in a 24 hour period.

Add new text as follows:

O105.2 Collection rules. The property owner or manager shall have written valet service rules, hours and penalties provided to all tenants and occupants. The property owner or manager shall be responsible for implementing, monitoring, and enforcing all valet trash collection rules. A copy of the rules shall be provided to the *fire code official* upon request.

O105.3 Suspension of service. The *fire code official* has the authority to order the suspension of *valet trash collection* that is not in compliance with this appendix.

SECTION O106 REFERENCED STANDARDS.

**TABLE O106.1
REFERENCED STANDARDS**

STANDARD ACRONYM	STANDARD NAME	SECTIONS HEREIN REFERENCED
ASTM E1354-17	Standard Test Method for Heat and Visible Smoke Release Rates for Materials and Products Using an Oxygen Consumption Calorimeter	O103.5

O106.1 General. See Table O106.1 for standards that are referenced in various sections of this appendix. Standards are listed by the standard identification with the effective date, standard title, and the section or sections of this appendix that reference the standard.

Reason Statement: Following rejection of a predecessor proposal last cycle, interested parties were welcome to participate in the FCAC discussion on this issue, and input was received from both the fire service and industry representatives. To be clear, this proposal is being advanced by FCAC to achieve reasonable and uniform regulations, and it is not something that was initiated as an industry proposal. Accordingly, FCAC did not feel that we should request or wait for industry to bring this forward vs. dealing with it as an FCAC initiative. Currently, there are no provisions in the IFC specifically prohibiting or regulating the placement of combustible trash or recyclables in an exit access corridor, provided that such materials are not placed within the minimum required width of the means of egress. Code sections relevant to this discussion are as follows:

- IFC Section 315.3.2 specifically regulates "combustible materials" in the means of egress and does not prohibit combustible storage anywhere other than "exits or enclosures for stairways and ramps" or "during construction, demolition, remodeling or alterations." Accordingly, it is difficult to make a case that any other general section in the IFC possibly applicable to this discussion would be intended to add additional regulations for combustibles in exit access corridors when exit access corridors are specifically omitted from Section 315.3.2 and considering that IFC Section 102.10 establishes that specific provisions override general provisions in the event of a conflict.
- Some may argue that prohibition of valet trash can be accomplished under IFC Section 304.2, but that would require a determination that such materials constitute a "hazard to the public health, safety or welfare." A determination of that type is, at best, going to be inconsistent from jurisdiction to jurisdiction and is inconsistent with the "specific over general" rule established by IFC Section 102.10.
- Some may argue that prohibition of valet trash can be accomplished under IFC Section 1020.4, which requires that the minimum width of corridors not be obstructed, but there is no prohibition in this section of combustible material in a corridor if it does not obstruct the minimum required egress width.
- Some may argue that prohibition of valet trash can be accomplished under IFC Section 1032.2, which requires that a means of egress be maintained free from obstructions or impediments to full instant use in the case of fire or other emergency, but like Section 304.2, such determination is going to be inconsistent from jurisdiction to jurisdiction when it comes to valet trash services, and applying the code in this way would be inconsistent with the "specific over general" rule established by IFC Section 102.10.

Further, the issue of disallowing combustibles in corridors has been specifically adjudicated by ICC in two recent code cycles without being supported. Proposal F16-13 had FCAC recommending a change to Section 315.3.2 that would specifically disallow combustibles in corridors, and there was a failed Public Comment attempting to disallow combustibles in corridors serving an occupant load of 10 or more. Then, Proposal F20-16 recommended disallowing combustibles in corridors serving an occupant load of 30 or more, which was also unsuccessful. With ICC having three times rejected a change to the IFC that would disallow combustibles in corridors, any competent defense attorney would be well equipped to challenge a citation claiming that the presence of valet trash or recyclable materials in a corridor constitutes a code violation.

Nevertheless, the occurrence of inconsistent code interpretations and enforcement has become clear in discussions among fire code officials who participated in the FCAC work on this topic. Accordingly, this proposal seeks to add regulations for valet trash services into the IFC appendix, which will offer standardized regulations for jurisdictions choosing to allow the service. Jurisdictions choosing to take a different path and jurisdictions that already have statutory governance of valet trash service would have the option of not adopting the appendix. Regulations proposed for the appendix will establish reasonable precautions and restrictions, where adopted, including: 1) Reminding that containers for valet trash cannot obstruct the minimum egress width, 2) Regulating container construction to reduce fire risk, 3) Limiting the size of containers and requiring that they be equipped with "tight fitting" lids (some have mentioned that "tight fitting" is too vague for inclusion in the code, but the term is already used multiple times in the IBC and IFC), 4) Controlling the time of placement of containers outside of dwelling units, and 5) Providing suitable administrative controls.

Supporters of this proposal cite the value of reduced trash accumulation (a fire and health risk) inside of dwelling units by having frequent pickup service, the value of offering trash removal to elderly and disabled populations who have difficulty or are unable to get trash and recyclables to a trash collection area, and the value of the IFC offering specific controls for a currently unregulated service that is already occurring with plastic bags and highly combustible containers.

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 and life safety in new and existing buildings and facilities as well as the protection of life and property in wildland urban interface areas. In 2020 and 2021 the Fire-CAC held multiple virtual meetings that were open to any interested party. In addition, there were numerous virtual specific working group meetings that were also open to any interested parties,

to develop, discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: <https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/fire-code-action-committee-fcac/>

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal relates to operations in a building and is not associated with any building construction requirements.

F236-21

F237-21

IFC: APPENDIX O (New)

Proponents: William Koffel, representing National Valet Trash and Recycling Valet Trash Association (wkoffel@koffel.com)

2021 International Fire Code

Add new text as follows:

APPENDIX O **VALET TRASH AND RECYCLING COLLECTION IN GROUP R-2 OCCUPANCIES**

. The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance or legislation of the jurisdiction. About this appendix: Appendix O provides for trash and recycle collection services in Group R-2 occupancies. Occupants receiving this service place trash and recyclables in the corridor outside of their residence for pickup by a collection service on a regularly scheduled basis in accordance with restrictions, as prescribed by this appendix.

SECTION O101 SCOPE.

O101.1 Scope. Valet trash collection in Group R-2 Occupancies shall comply with this Appendix.

SECTION O102 DEFINITIONS.

O102.1 Definitions. For the purpose of this appendix certain terms are defined as follows:

VALET TRASH COLLECTION. A service provided whereby trash or recycling is placed outside of dwelling units in approved containers during prescribed times for collection by another party.

SECTION O103 CONTAINERS.

O103.1 General. Containers used for valet trash collection shall comply with Sections O103.2 through O103.5.

O103.2 Integrity. Valet trash or recycling materials shall be stored in containers that are of liquid-tight construction and shall be equipped with lids and the lid shall be in the fully closed position

O103.3 Height. Containers shall not exceed 30" in height.

O103.4 Capacity and Limit. Individual containers shall not exceed 2.0 cubic feet (15 gallons) in capacity. Only one trash or recycling container per dwelling unit or sleeping unit shall be permitted to be placed outside of the dwelling unit or sleeping unit at one time. Trash and recycling containers shall not be placed outside of a dwelling unit or sleeping unit at the same time.

O103.5 Construction materials. Containers and lids used for valet trash collections shall be constructed entirely of noncombustible materials, or of materials that meet a peak rate of heat release not exceeding 300 kW/m² when tested in accordance with ASTM E1354 at an incident heat flux of 50 kW/m² in the horizontal orientation.

Exception: Containers in exterior egress balconies in buildings protected by an approved automatic sprinkler system installed throughout in accordance with Section 903.3.1.1 or 903.3.1.2, including the exterior egress balcony.

SECTION O104 CONTAINER LOCATION.

O104.1 General. Placement of containers used for valet trash collection outside of a dwelling unit or sleeping unit shall comply with Sections O104.2 and O104.3.

O104.2 Minimum means of egress width. Containers used for valet trash collection shall not obstruct the minimum required egress width.

O104.3 Stairways. Containers used for valet trash collection shall not be placed on stair risers, within minimum required stairway landing dimensions, or anywhere in an interior exit stairway.

SECTION O105 ADDITIONAL REQUIREMENTS.

O105.1 Time limits. Filled containers used for valet trash or recycling services shall not be placed outside a *dwelling unit* for more than 6 hours within in any 24-hour period. Empty approved containers used for valet trash or recycling services shall not remain in a corridor for more than 12 continuous hours in a 24 hour period.

O105.2 Collection rules. The property owner or manager shall have written valet service rules, hours and penalties provided to all tenants and occupants. The property owner or manager shall be responsible for implementing, monitoring, and enforcing all valet trash collection rules. A copy of the rules shall be provided to the *fire code official* upon request.

O105.3 Suspension of service. The *fire code official* has the authority to order the suspension of valet trash collection that is not in compliance

with this Appendix.

Revise as follows:

SECTION O106 REFERENCED STANDARDS.

O106.1 General. See Table O106.1 for standards that are referenced in various sections of this appendix. Standards are listed by the standard identification with the effective date, standard title, and the section or sections of this appendix that reference the standard.

**TABLE O106.1
REFERENCED STANDARDS**

STANDARD ACRONYM	STANDARD NAME	SECTIONS HEREIN REFERENCED
ASTM E1354-17	Standard Test Method for Heat and Visible Smoke Release Rates for Materials and Products Using an Oxygen Consumption Calorimeter	O103.5

Reason Statement: The proposal is identical to the FCAC proposal for a new valet trash appendix with two differences.

- **Section O103.2 Integrity** is revised to say that the lid must simply be in a closed position. IFC Sections 304 and 808.1 simply require lids on containers and do not reference "tight-fitting lids." The phrase "tight-fitting" is subjective. Does it require a means to keep the lid closed if the container is tipped? Some containers come with a security mechanism to limit access to the container. Is that what will be required? Requiring a lid to be in the closed position addresses the issue of containers being too full of material.
- **Section O103.4 Construction Materials** has a proposed exception for balconies in buildings with automatic sprinkler systems . The NFPA Life Safety Technical Committee on Residential Occupancies included several similar exceptions to the container requirements in a Second Revision approved by the Committee. It should be noted that the Second Revision was not upheld by the NFPA Standards Council based upon action taken on several Certified Amending Motions. The proposed language does not include all of the exceptions approved by the NFPA Committee; but rather, limits the exceptions to containers located on exterior egress balconies when the balcony and entire building are protected with an automatic sprinkler system. The proposed exception is consistent with provisions in Section 304 that address waste containers.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

While the proposal does not impact the cost of construction of a building, the proposed language will decrease the cost of containers required for valet trash.

F237-21