



# 2020 Minnesota State Fire Code Update

**MINNESOTA STATE FIRE MARSHAL DIVISION**  
445 Minnesota Street; Suite 145 Saint Paul, MN 55101

# Introduction

# WELCOME

## Topics to be Covered

- Understanding the Process
- Identify significant changes made to the 2020 Minnesota State Fire Code

# Introduction

A lot of people were involved in the adoption of this code and development of this training.

## SFMD Contributors

Tom Jenson

Kevin McGinty

Forrest Williams

Jake Lindquist

John Swanson

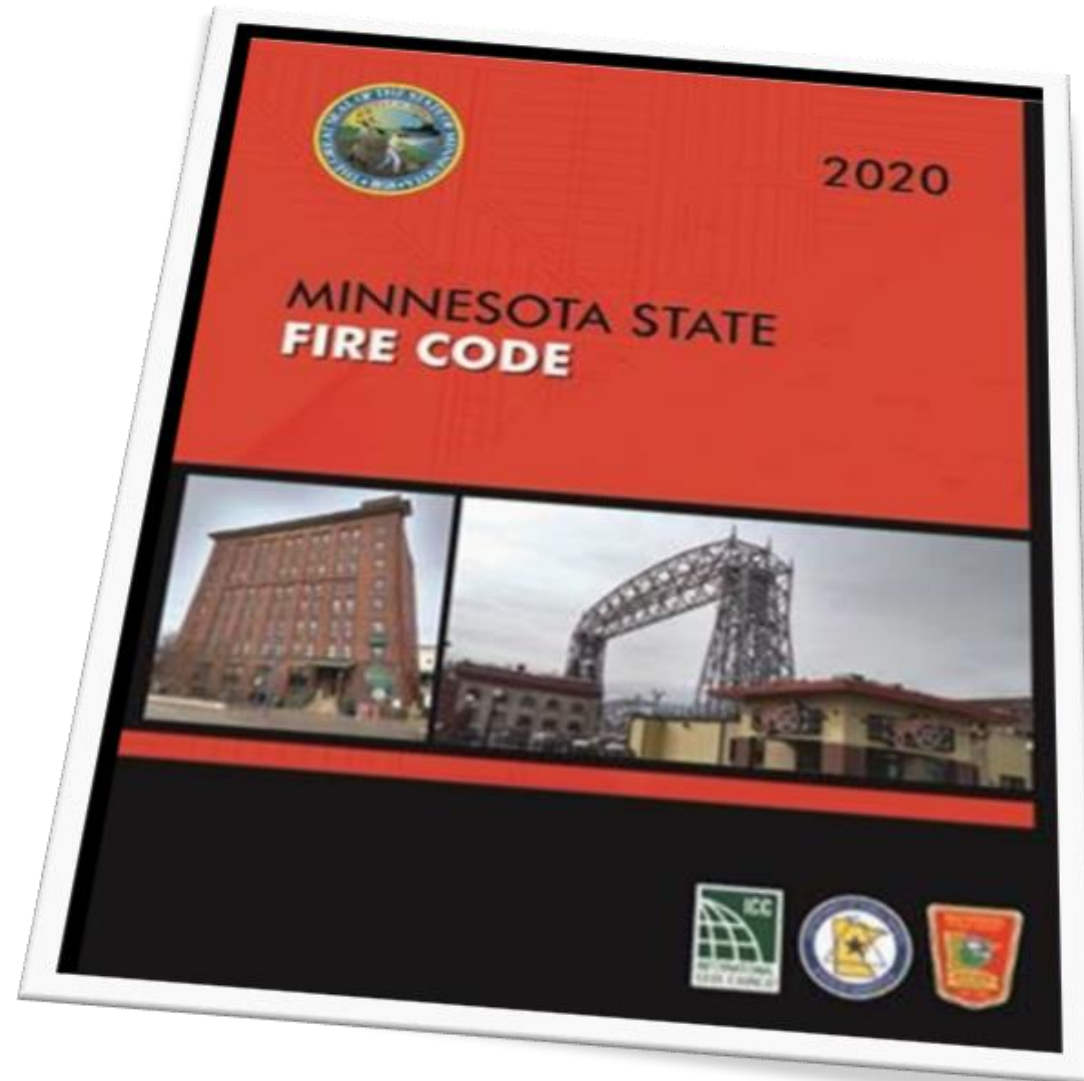
Bob Rexeisen

# Introduction

## Questions

- Code Language
- Interpretation
- Intent

# Understanding the Process



# Understanding the Process

- Laws that are passed by the Minnesota Legislature.
- Must pass both “houses” of the Legislature.



# Understanding the Process - APA

- The APA is frequently modified by the Legislature.
  - Provide oversight
  - Increase accountability
  - Ensure uniformity
  - Increase public access
  - Increase public participation
  - Ensure fairness
  - Simply the legal process



# Understanding the Process

## Laws in Minnesota are developed by one of two available processes

- Statutory (i.e. Minnesota Statutes),
- Rule-making (i.e. Minnesota Rules).

Both have the force of “law” once adopted.





# Code Adoption

The commissioner of labor and industry, consistent with the recommendations of the state fire marshal, shall adopt a State Fire Code and make amendments thereto in accordance with the Administrative Procedure Act in chapter 14.



# Model Codes

The code and its amendments shall conform insofar as practicable to model fire codes generally accepted and in use throughout the United States, with consideration given to existing statewide specialty codes presently in use in the state of Minnesota.



# Marking MN Ammendments

When we make changes to the model code the book signifies:

- The Minnesota only section
- New or changed sections

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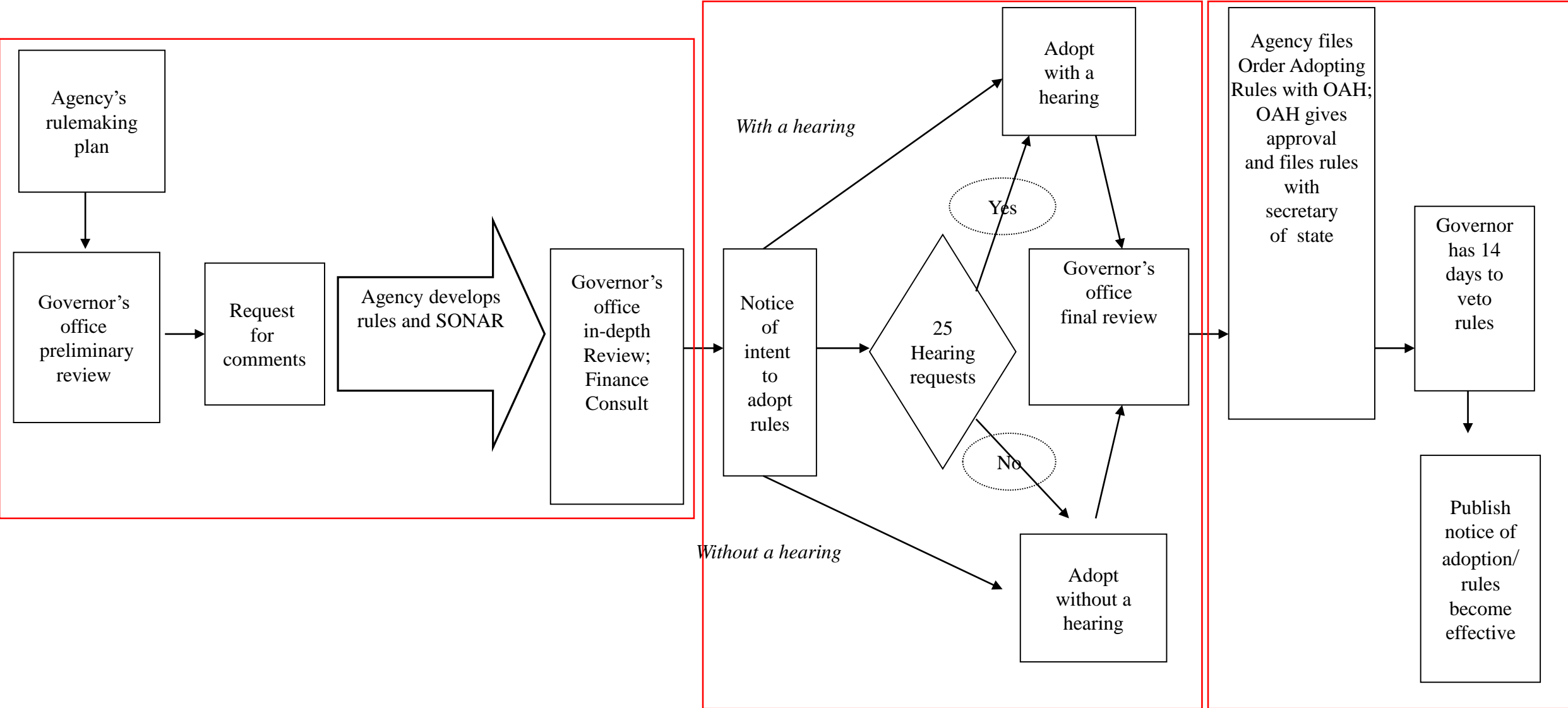
# Understanding the Process

## Code Adoption Process

### Committee member participation

- 10 from MSFCA
- 3 from FMAM
- 3 from SFMD
- 2 from Local Building Officials
- 1 from AIA (Architects)
- 1 from SFPE (Fire Protection Engineers)
- 1 from CCLD

# Rule Making Timeline

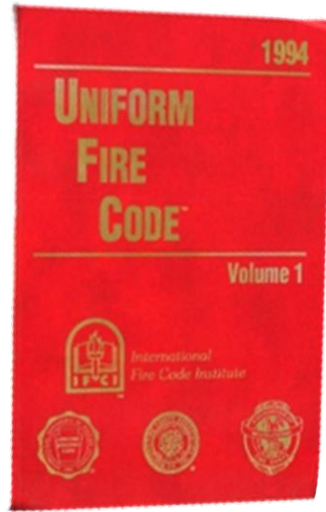


# Understanding the Process

- Effective date was Monday, March 31, 2020,
- Commonly referred to as the **2020 MSFC**
- *Based off of the 2018 International Fire Code (IFC)*

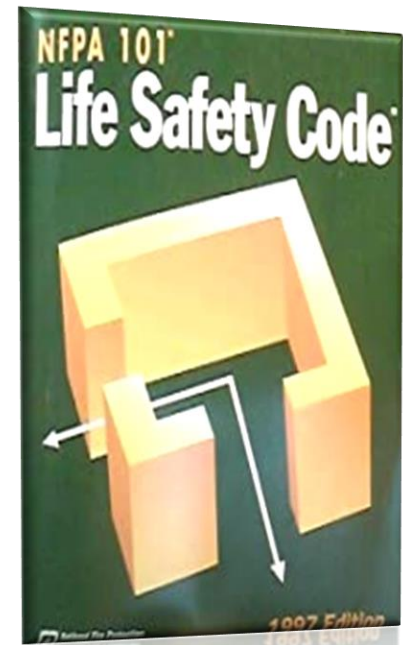
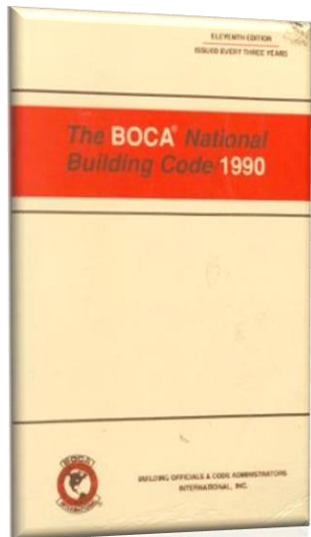


# Understanding the Process – Early Years



## Prior to 2000 Code Era

- Uniform Codes
- BOCA
- Southern Standard
- NFPA 1 and 101

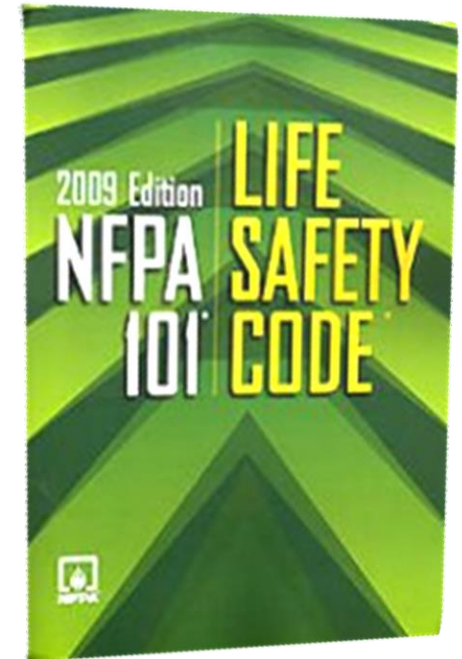


# Understanding the Process – Early Years



## Post 2000 Code Era

- IFC (ICC)
- NFPA 1 and 101
  
- 2000 the NFPA 1 is no longer used as a primary code document





# Understanding the Process

## **MN Statute 326B.106**

Beginning with the 2018 edition of the model building codes and **every six years** thereafter, the commissioner shall review the new model building codes and adopt the model codes as amended for use in Minnesota, **within two years of the published edition date.**

# Understanding the Process - History

<b>Effective Date</b>	<b>Code Name</b>	<b>Code Year</b>	<b>Code Publication Date</b>	<b>Time from Publication to Adoption</b>	<b>Adoption Responsibility</b>
<b>October 3, 1975</b>	Uniform Fire Code	<b>1973</b>	1973 (no month given)	15 months	DPS / SFM
<b>April 11, 1983</b>	Uniform Fire Code	<b>1982</b>	1982 (no month given)	18 months	DPS / SFM
<b>October 2, 1989</b>	Uniform Fire Code	<b>1988</b>	May, 1988	17 months	DPS / SFM
<b>August 23, 1993</b>	Uniform Fire Code	<b>1991</b>	May, 1991	27 months	DPS / SFM
<b>June 29, 1998</b>	Uniform Fire Code	<b>1997</b>	March, 1997	15 months	DPS / SFM
<b>March 31, 2003</b>	International Fire Code	<b>2000</b>	December, 1999	39 months	Admin
<b>July 10, 2007</b>	International Fire Code	<b>2006</b>	January, 2006	18 months	DOLI
<b>May 2, 2016</b>	International Fire Code	<b>2012</b>	May, 2011	60 months	DOLI

# Understanding the Process - Availability

## The 2020 MSFC is available in various forms

- Hardcopy
- Electronic (PDF)
- Online at the SFM Website
  
- Access to the SONAR

The screenshot shows the top navigation bar of the Minnesota State Fire Marshal website. It includes a dark blue header with the Minnesota Department of Public Safety logo and name. Below this is a secondary navigation bar with links for Home, Divisions, Media Center, Contact DPS, and Translate. A search bar is located on the right side of this bar. A third navigation bar contains links for SFM Home, About, Fire Code, Services, Training, Fire Reporting, For Fire Departments, and Fire Safety. A final navigation bar at the bottom contains links for State Response Teams and Contact.

The screenshot shows the main content area of the Minnesota State Fire Code webpage. On the left is a sidebar menu titled "Fire Code" with a list of sub-items: Fire Code Information Sheets, Interpretations, Policies, Presentations, Sample Inspection Checklists, State Fire Code, and COVID-19 Resources for Businesses. The main content area is titled "STATE FIRE CODE" and "Minnesota State Fire and Building Code". It features a section for purchasing a print copy of the 2020 State Fire Code, a section for electronic versions (highlighted with a red box), a section for errata for the 2020 MSFC, and a section for supplemental state fire code information. The supplemental information section mentions that Minnesota Rule 7511 includes rules not published in the printed code and that the 2020 Statement of Need and Reasonableness (SONAR) is also available online.

# Understanding the Process

**Can I have Input ?**



# Understanding the Process

## ICC Process

- Propose changes to IFC
- Open to all

## MN Amendments

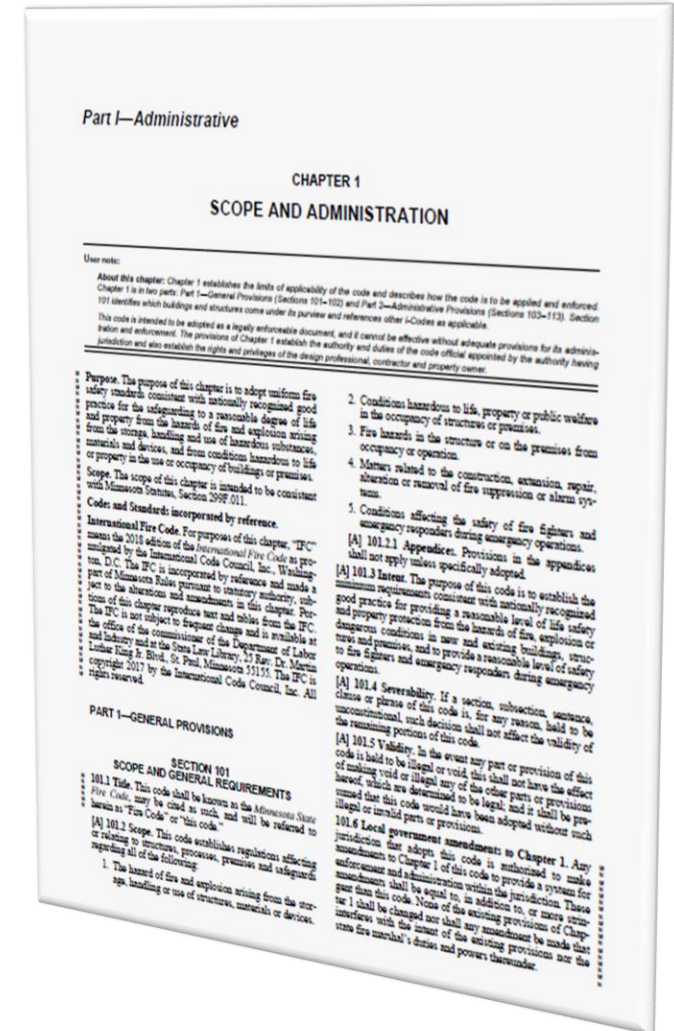
- Contact MSFCA committee member
- Solid rationale and evidence
- Present to committee



# Chapter 1 - Scope and Administration

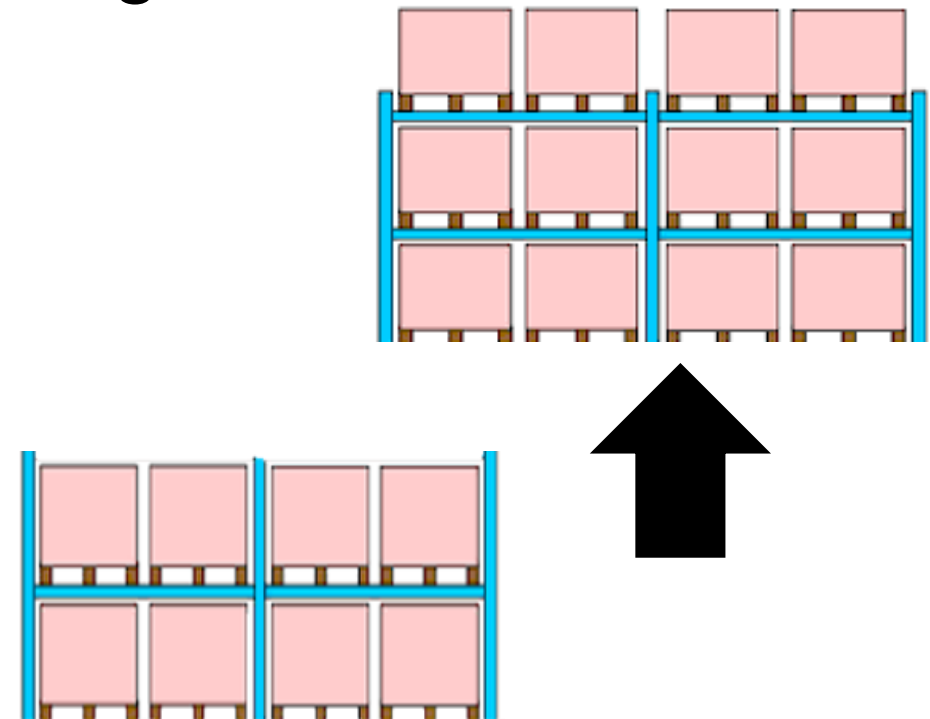
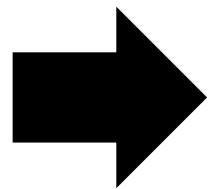
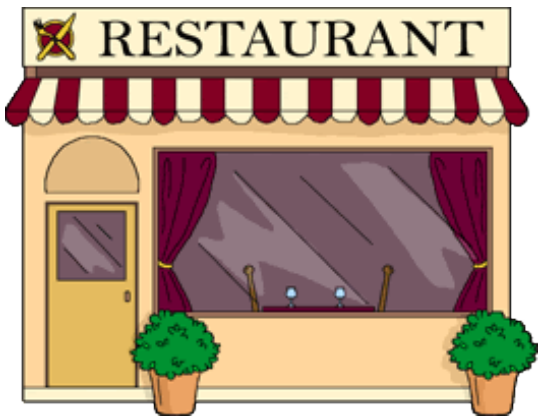
Chapter 1 establishes:

- the limits of applicability of the code,
- describes how the code is to be applied and enforced,
- Describes powers of code enforcement officials,
- Outlines permit requirements.



# General- Change of Use or Occupancy

A change of occupancy shall not be made unless the use or occupancy is made to comply with the requirements of this code and the International Existing Building Code.



**Section 102.3**

## Exception: Change of Use or Occupancy

Where approved by the fire code official, a change of occupancy shall be permitted without complying with the requirements of this code and the International Existing Building Code, provided that the new or proposed use or occupancy is less hazardous, based on life and fire risk, than the existing use or occupancy.

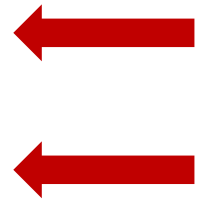


# Compressed Gasses

An operational permit is required for the storage, use or handling at normal temperature and pressure (NTP) of compressed gases in excess of the amounts listed in Table 105.6.8.

TABLE 105.6.8  
PERMIT AMOUNTS FOR COMPRESSED GASES

TYPE OF GAS	AMOUNT (cubic feet at NTP)
Carbon dioxide used in carbon dioxide enrichment systems	875 (100 lbs.)
Carbon dioxide used in insulated liquid carbon dioxide beverage dispensing applications	875 (100 lbs.)
Corrosive	200
Flammable (except cryogenic fluids and liquefied petroleum gases)	200
Highly toxic	Any Amount
Inert and simple asphyxiant	6,000
Oxidizing (including oxygen)	504
Pyrophoric	Any Amount
Toxic	Any Amount



For SI: 1 cubic foot = 0.02832 m<sup>3</sup>.

# Mobile Food Preparation Vehicles

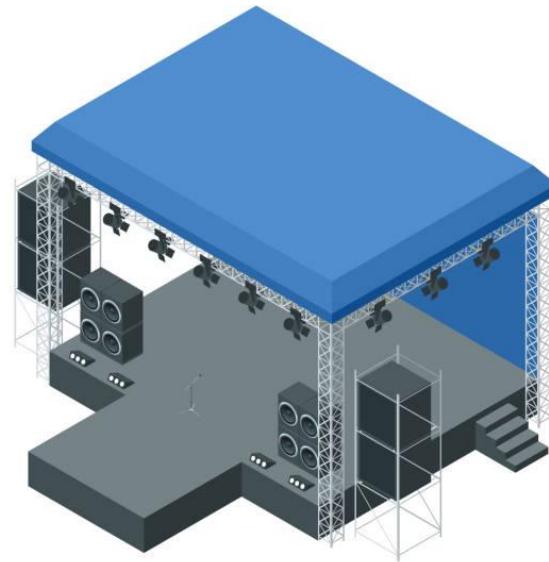
A permit is required for mobile food preparation vehicles equipped with appliances that produce smoke or grease-laden vapors.



**Section 105.6.30**

# Outdoor Assembly Event

An operational permit is required to conduct an outdoor assembly event where planned attendance exceeds 1,000 persons.



**Section 105.6.36**

# Plant Extraction Systems

## Plant Extraction Systems

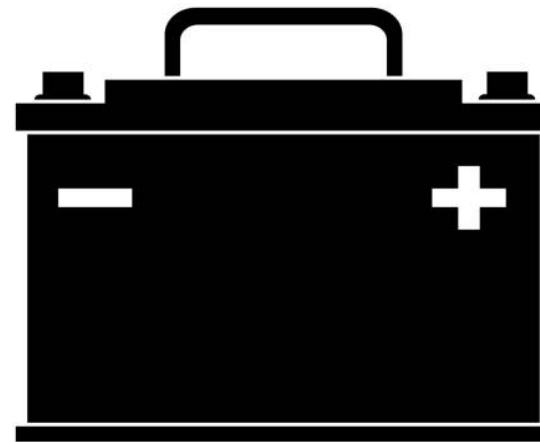
An operational permit is required to use plant extraction systems.



**Section 105.6.38**

# Battery Systems

A construction permit is required to install stationary storage battery systems regulated by Section 1206.2.



**Section 105.7.2**

# Chapter 1 - Scope and Administration

## Capacitor Energy Storage Systems

A construction permit is required to install capacitor energy storage systems regulated by Section 1206.3.



**Section 105.7.2**

# Chapter 1 - Scope and Administration

## Fuel cell power systems

A construction permit is required to install stationary fuel cell power systems.



**Section 105.7.10**

# Chapter 1 - Scope and Administration

## Gas detection systems

A construction permit is required for the installation of or modification to gas detection systems.



**Section 105.7.11**



# Chapter 1 - Scope and Administration

## Special event structure

A single construction permit is required to erect and take down a temporary special event structure.



**Section 105.7.22**

# Chapter 1 - Scope and Administration

## Inspection- Concealed work

It shall be the duty of the permit applicant to cause the work to remain visible and able to be accessed for inspection purposes.



**Section 107.3**

# Chapter 1 - Scope and Administration

## Inspection- Concealed work

Where any installation subject to inspection prior to use is covered or concealed without having first been inspected, the fire code official shall have the authority to require that such work be made visible and able to be accessed for inspection.

**Section 107.3**

# Chapter 1 - Scope and Administration

## Concealed work

Neither the fire code official or the jurisdiction shall be liable for expense entailed in the removal or replacement of any material required to allow inspection

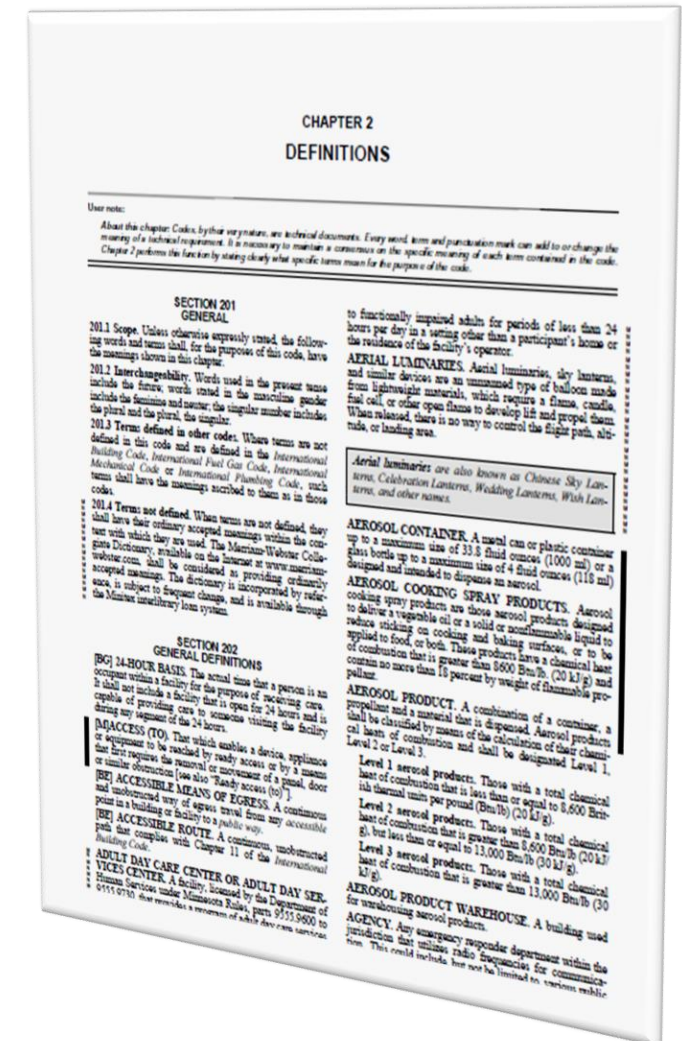


**Section 107.3**

# Chapter 2 - Definitions

Unless otherwise expressly stated, the following words and terms shall, for the purposes of this code, have the meanings shown in chapter 2.

- When a term is not defined, we must rely on their ordinary accepted meanings within the context with which they are used. The Merriam-Webster Collegiate Dictionary, available on the Internet at [www.merriamwebster.com](http://www.merriamwebster.com), shall be considered as providing ordinarily accepted meanings.



## Chapter 2 – Adult Day Care

### **ADULT DAY CARE CENTER OR ADULT DAY SERVICES CENTER\***

A facility, licensed by the Department of Human Services under Minnesota Rules, parts 9555.9600 to 9555.9730, that provides a program of adult day care services to functionally impaired adults for periods of less than 24 hours per day in a setting other than a participant's home or the residence of the facility's operator.

## Chapter 2 – Automotive Motor Fuel Dispensing Facility\*

That portion of property where flammable or combustible liquids or gases used as motor fuels are stored and dispensed from fixed equipment into the fuel tanks of motor vehicles. For purposes of this definition, a motor vehicle is any self-propelled vehicle that: (1) conveys an operator, such as an automobile, truck, motorcycle, recreational vehicle, camper, all-terrain vehicle, snowmobile, lawn care vehicle, tractor, or dozer; and (2) is used for personal, commercial, recreational, maintenance, or construction purposes.

## Chapter 2 – Definitions

### **FLEET VEHICLE MOTOR FUEL-DISPENSING FACILITY\***

That portion of a commercial, industrial, governmental, or manufacturing property where liquids used as fuels are stored and dispensed into the fuel tanks of motor vehicles that are used in connection with such businesses, by persons within the employ of such businesses. **For purposes of this definition, a motor vehicle is any self-propelled vehicle that: (1) conveys an operator, such as an automobile, truck, motorcycle, recreational vehicle, camper, all-terrain vehicle, snowmobile, lawn care vehicle, tractor, or dozer; and (2) is used for personal, commercial, recreational, maintenance, or construction purposes.**





# Chapter 2 – Definitions

## TABLE 202.1: CARE FACILITY CLASSIFICATIONS\*

### Changes:

- Merged adult day care and adult day services
- Adjusted for new “condition” definitions for Groups I-1 and I-2
- Added to table:
  - Mental health treatment programs (merged with chemical dependency programs licensed by DHS)
  - Added day training and habilitation programs (licensed by DHS)
  - Ambulatory care facility
  - Nursing home
  - Hospitals

# Chapter 2 – Definitions

## TABLE 202.1: R-3 vs R-3 dwelling unit

Boarding and lodging	≤ 16 residents in sleeping rooms or ≤ 2 dwelling units in one building	R-3
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Adult foster care home	1–5 impaired adults	R-3 Dwelling unit
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### Example:

- A boarding and lodging facility in single family dwelling with 16 or fewer residents is classified as an R-3
  - Per 903.2.8, Group R-3 occupancies require sprinkler protection
- An adult foster care home with 1-5 impaired adults is classified as an R-3 dwelling unit
  - Per 903.8, a Group R-3 dwelling unit less than 4,500 ft<sup>2</sup> is exempt from sprinkler requirements unless specifically required under condition of licensing

## Chapter 2 – General Evacuation Signal\*

“General evacuation signal” means a fire alarm occupant notification system in accordance with Section 907.5.

**NFPA\***

National Fire Protection Association

## Chapter 2 – Standpipe Classes\*

“Classes of standpipe system” means the following:

**Class I system.** “Class I system” means a system providing 2-1/2 inch (64 mm) and 1-1/2 inch (38 mm) hose connections to supply water for use by fire departments and those trained in handling heavy fire streams.

**Class II system.** “Class II system” means a system providing 1-1/2 inch (38 mm) hose stations to supply water for use primarily by the building occupants or by the fire department during initial response.

# Chapter 2 – Group I-1 Conditions

## Group I-1 Conditions (residential care facilities)

- **Condition 1:** Where all persons in custodial care are capable of responding and evacuating without assistance during an emergency
- **Condition 2:** Where one or more persons in custodial care require limited verbal or physical assistance to respond and evacuate during an emergency

# Chapter 2 – Group I-2 Conditions

## Group I-2 Conditions (24 hour medical care - nursing homes, hospitals)

- **Condition 1:** Does not provide emergency care, surgery, obstetrics, or in-patient stabilization units for psychiatric or detoxification (e.g. nursing homes)
- **Condition 2:** Provides nursing and medical care and could provide emergency care, surgery, obstetrics, or in-patient stabilization units for psychiatric or detoxification (e.g. hospitals)

## Chapter 2 – Group I-4, day care & day services facilities\*

- **Revised language for Classification as Group E**
- Includes classification options from Chapter 81 for adult day care/day services
  - All persons capable of self-preservation, or
  - Not more than 50% incapable of self-preservation, and
    - Care rooms located on LED
    - Exits discharge direct to grade without intervening stairs
    - Fire alarm system including smoke detection in egress corridors



# Integrated Testing



A testing procedure to establish the operational status, interaction and coordination of two or more fire protection and safety systems.

# Chapter 2 – Group R Care Facilities (Residential)\*

- **Revised for clarity**
- **R-3 and R-4 care facilities**
  - Group R-3 and R-4 occupancies located in a one- or two-family dwelling or townhouse and classified as a “dwelling unit” in Table 202.1:
    - Constructed in accordance with either the Building Code or the Minnesota Residential Code, and
    - Equipped with an automatic sprinkler system where required by Section 903.2.8.

# Chapter 2 – Group R Lodging\*

## – **Group R-3 owner-occupied 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 MN Residential Code.



## Chapter 2 – Group R-4 Conditions (Residential Care)

- **Condition 1:** Where all persons in custodial care are capable of responding and evacuating without assistance during an emergency
- **Condition 2:** Where one or more persons in custodial care require limited verbal or physical assistance to respond and evacuate during an emergency

# 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,
- Corridors.



# Mobile Food Preparation Vehicle

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

- Food Trucks
- Food Trailers
- Modular-Mobile Kitchens such as container units



# Miscellaneous Group U Communications Equipment Structures

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.

- Communication equipment structures with a gross floor area of less than 1,500 square feet

# Subordinate (Fire Protection/Life Safety)

A system that is activated by another fire protection or life safety system. For example, where a fire alarm system activates a smoke removal or elevator recall system, the smoke removal or elevator recall system is considered to be “subordinate” to the fire alarm system.





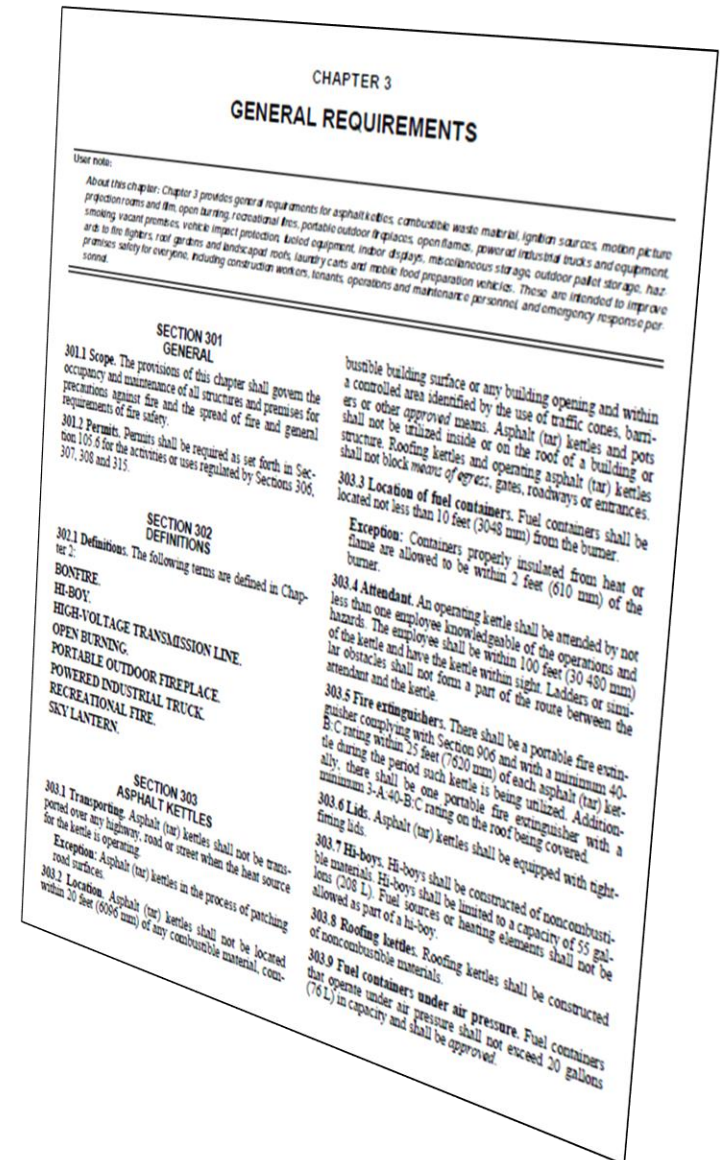
# Umbrella Structure

A structure, enclosure or shelter with or without sidewalls or drops, constructed of fabric or pliable material supported by a central pole or poles.



# Chapter 3 – General Requirements

- No significant formatting changes
- Some notable changes/additions



# Chapter 3 – Sky Lanterns

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

**2015 MSFC amendment deleted**

~~**308.1.9 Aerial luminaries.** The use of aerial luminaries is prohibited.~~

# Chapter 3 – Clothes Dryers

## Clothes dryers\*

Clothes dryers and their exhaust systems shall be cleaned as necessary to keep lint traps, exhaust ducts, and mechanical and heating components free from excessive lint accumulation.



**Section 304.4**

# Chapter 3 – Fire Protection Impairment

## Vacant Premise

- Fire alarm,
- Sprinkler system
- Standpipe system

must be maintained in an operable condition at all times.



# Chapter 3 – Fire Protection Impairment

When approved by the fire code official fire alarm and sprinkler systems are permitted to be placed out of service in seasonally occupied buildings provided:

- That will not be heated,
- Fire protection systems will be exposed to freezing, temperatures,
- Fire areas do not exceed 12,000 square feet,
- No motor vehicles or hazardous material storage.

# Chapter 3 – Vehicle Impact Protection

## VEHICLE IMPACT PROTECTION

- Minimum 4 inch diameter concrete-filled steel posts
- Set at least 3 feet deep in a 15 inch diameter concrete footing
- Top of post at least 3 feet above ground
- Maximum 4 feet between posts
- Located at least 3 feet from protected object



# Chapter 3 – Vehicle Impact Protection

## Other barriers

- **Alternative barriers, where approved**
  - Designed to resist, deflect or visually deter vehicular impact based on anticipated impact scenario





# Chapter 3 – Ceiling Clearance

## Ceiling clearance\*

Added exceptions from the model code to clarify that the 18 inch and 24 inch ceiling clearances do not apply to storage along walls

### 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

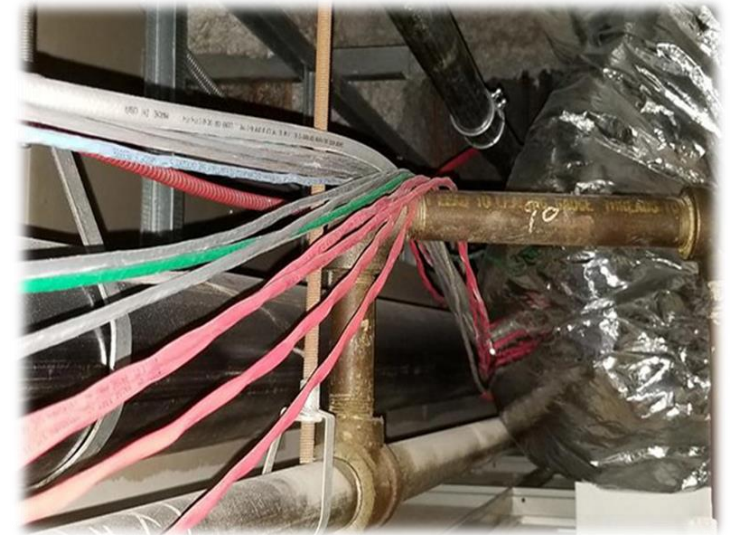
# Chapter 3 – General Requirements



# Chapter 3 – Storage in Plenums

## Storage in plenums

- Prohibits storage in plenums
- Abandoned cables that are accessible shall be:
  - Identified with a tag for future use, or
  - Deemed as storage and removed



# Outdoor Pallet Storage

Pallets stored outdoors shall comply with Sections 315.7.1 through 315.7.7.

Pallets stored within a building shall be protected in accordance with Chapter 32.

**NEW MINNESOTA**



# Chapter 3 – General Requirements

## Includes provisions for the general storage pallets outdoors

- Location beneath overhead building projections
  - Sprinkler protection if building is sprinklered
- 10 feet from property lines
- 20 feet maximum storage height
- 400 square feet maximum for individual pallet piles



# Chapter 3 – Outdoor Pallet Storage

## New IFC language regulated general outdoor pallet storage

- **Separation from other pallets and onsite storage**
  - Tables 315.7.6
- **Shall not be stored beneath:**
  - High-transmission power lines
  - Elevated roadways or railways



# Pallet - On-Site Storage Separation

Pallets stacks must be separated from buildings using

- Table 315.7.6(1) for wood pallets
- Table 315.7.6(2) for plastic pallets



# Pallet - Building Separation

TABLE 315.7.6(1)  
SEPARATION DISTANCE BETWEEN WOOD PALLET STACKS AND BUILDINGS

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

For SI: 1 foot = 304.8 mm.

Table 315.7.6(1)



# Pallet - Building Separation

TABLE 315.7.6(2)  
SEPARATION DISTANCE BETWEEN PLASTIC PALLET STACKS AND BUILDINGS

WALL CONSTRUCTION	OPENING TYPE	PLASTIC PALLET SEPARATION DISTANCE (feet)		
		≤ 50 Pallets	51 to 200 Pallets	>200 Pallets
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 315.7.6(2)**

# Pallet - On-Site Storage Separation

Pallets piles must be separated from other pallet piles and other storage in using

- Table 315.7.6(3) for wood pallets
- Table 315.7.6(4) for plastic pallets



# Pallet - On-Site Storage Separation

TABLE 315.7.6(3)  
SEPARATION FROM OTHER PALLET PILES AND ON-SITE STORAGE (WOOD PALLETS)

	WOOD PALLET SEPARATION DISTANCE (feet)		
	≤ 50 Pallets	51 to 200 Pallets	>200 Pallets
Between pallet piles	7.5	15	45
Other on-site storage	7.5	15	45

For SI: 1 foot = 304.8 mm.

# Pallet - On-Site Storage Separation

TABLE 315.7.6(4)  
SEPARATION FROM OTHER PALLET PILES AND ON-SITE STORAGE (PLASTIC PALLETS)

	PLASTIC PALLET SEPARATION DISTANCE (feet)		
	≤ 50 Pallets	51 to 200 Pallets	>200 Pallets
Between pallet piles	15	40	75
Other on-site storage	15	40	75

For SI: 1 foot = 304.8 mm.

# Chapter 3 – Pallet Listing

## 315.7.5 Pallet types\* Deleted.

### Model code section deleted

- IFC language would have required composite or plastic pallets stored outdoors to be listed to UL 2335 or FM 4996
- Section applies to new and existing pallets
- Significant hardship

# Mobile Food Preparation Vehicles

## Section 319 Mobile Food Preparation Vehicles

### Includes:

Food Trucks and Food Trailers

Any vehicles that produce grease laden vapors must comply with section 319



**Section 319**

# Mobile Food Preparation Vehicles

## Exhaust Hood

Cooking equipment that produces grease-laden vapors shall be provided with a kitchen exhaust hood in accordance with Section 607.

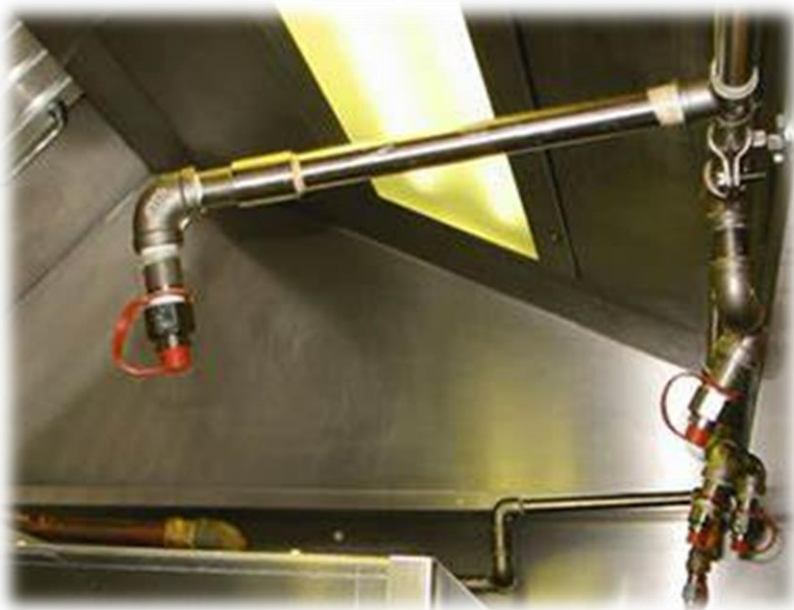


**Section 312**

# Mobile Food Preparation Vehicles

## Fire protection and fire extinguishers

Cooking equipment shall be protected by automatic fire extinguishing systems in accordance with Section 904.12.



**Section 312**



# Mobile Food Preparation Vehicles

## Fire extinguishers

Fire Extinguishers must be provided in accordance with section 906.4

- Section 906.4 requires fire extinguishers to be provided for the protection of cooking equipment shall be of an approved type compatible with the automatic fire-extinguishing system agent.
- Cooking equipment involving solid fuels or vegetable or animal oils and fats shall be protected by a Class K-rated portable extinguisher

# Mobile Food Preparation Vehicles

## LP and CNG gas

- Section 319.8 and 319.9 provide requirements for the cooking fuel source which is typically either liquid propane or natural gas.
- Each section addresses:
  - Maximum volumes
  - Protection of the cylinder(s)
  - Container construction



**Section 312**

# Chapter 3 – Covered Mall Buildings

## COVERED MALL BUILDINGS\*

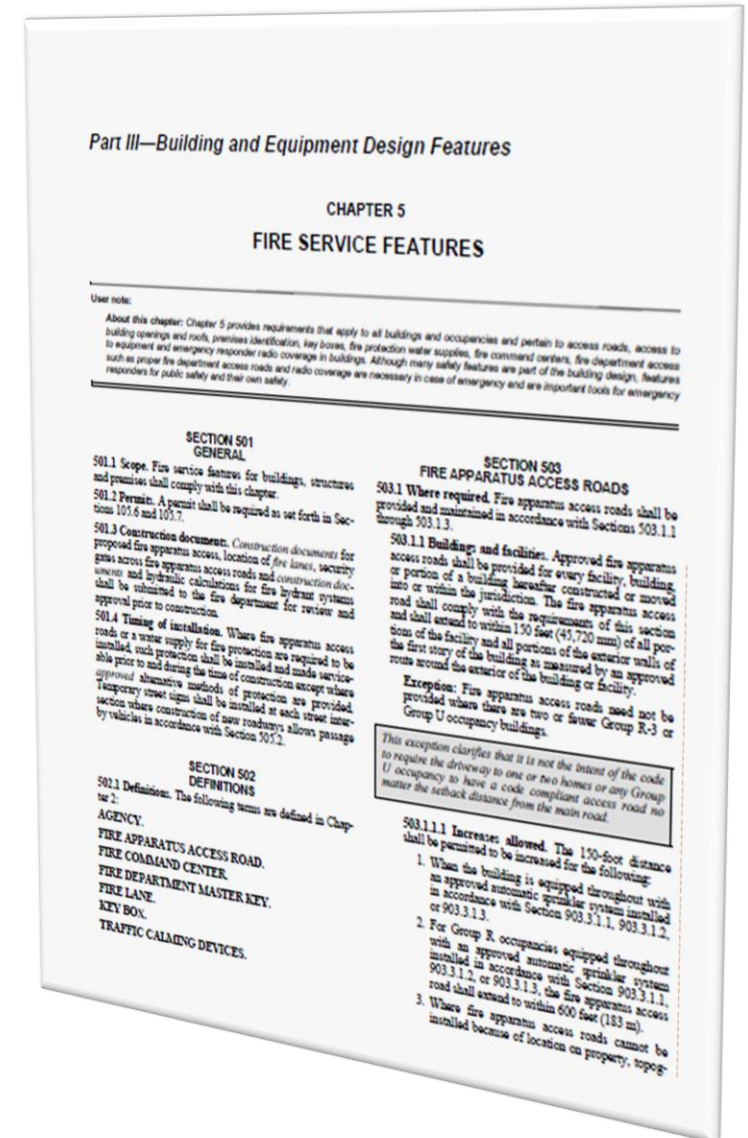
State amendment for egress width and kiosk construction, location and protection moved from Chapter 4 to Chapter 3

**321.1 Egress.** The minimum egress width in covered mall buildings shall be maintained in conformance with the Building Code.

**321.2 Kiosks.** Kiosks and similar structures, whether temporary or permanent, and located in covered mall buildings shall be constructed, protected, and located in conformance with the Building Code.

# Chapter 4 - Emergency Planning and Preparedness

Chapter 4 addresses the human contribution to life safety in buildings when a fire or other emergency occurs.



# Chapter 4 - Emergency Planning and Preparedness

**Group F occupancies** An approved fire safety and evacuation plan in accordance with Section 404 shall be prepared and maintained for buildings containing a Group F occupancy where any of the following conditions apply:

- The Group F occupancy has an occupant load of 500 or more persons.
- The Group F occupancy has an occupant load of more than 100 persons above or below the lowest level of exit discharge
- Group F pallet manufacturing and recycling facilities as required by Section 2810

# Chapter 4 - Emergency Planning and Preparedness

**Emergency Guide** Fire emergency guides shall be provided for Group R-2 occupancies. Guide contents, maintenance and distribution shall comply with Sections 403.10.2.2.1 through 403.10.2.2.3.

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



**Section 403.10.2.2.1**

# Chapter 4 - Emergency Planning and Preparedness

**Buildings With High-Piled Storage** An approved fire safety and evacuation plan in accordance with Section 404 shall be prepared for buildings with high-piled combustible storage in any of the following situations:

- The high-piled storage area exceeds 500,000 square feet for Class I-IV commodities,
- The high-piled storage area exceeds 300,000 square feet for high-hazard commodities,
- The high-piled storage is located in a Group H occupancy,

# Chapter 4 - Emergency Planning and Preparedness

**Buildings With High-Piled Storage** An approved fire safety and evacuation plan in accordance with Section 404 shall be prepared for buildings with high-piled combustible storage in any of the following situations: *(Continued)*

- The high-piled storage is located in a Group F occupancy with an occupant load of 500 or more persons or more than 100 persons above or below the lowest level of exit discharge.
- The high-piled storage is located in a Group M occupancy with an occupant load of 500 or more persons or more than 100 persons above or below the lowest level of exit discharge.



# Chapter 4 - Emergency Planning and Preparedness

**Buildings With High-Piled Storage** An approved fire safety and evacuation plan in accordance with Section 404 shall be prepared for buildings with high-piled combustible storage in any of the following situations: *(Continued)*

- Where required by the fire code official for other high-piled storage areas.

# Chapter 4 - Emergency Planning and Preparedness

**Crowd managers** Where facilities or events involve a gathering of more than 500 people, crowd managers shall be provided in accordance with Sections 403.12.3.1 through 403.12.3.3.

# Chapter 4 - Emergency Planning and Preparedness

**Crowd managers** Where facilities or events involve a gathering of more than 500 people, crowd managers shall be provided in accordance with Sections 403.12.3.1 through 403.12.3.3.

**(403.12.3.1) Number of Crowd Managers** Not fewer than two trained crowd managers, and not fewer than one trained crowd manager for each 250 persons or portion thereof, shall be provided for the gathering.

# Chapter 4 - Emergency Planning and Preparedness

## **(403.12.3.1) Exceptions:**

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

# Chapter 4 - Emergency Planning and Preparedness

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

**(404.2.3.1) Lockdown plan contents** Lockdown plans shall include the following:

1. Identification of individuals authorized to issue a lockdown order.
2. Security measures used during normal operations, when the building is occupied, that could adversely affect egress or fire department operations.
3. A description of identified emergency and security threats addressed by the plan, including specific lockdown procedures to be implemented for each threat condition.

**Section 404.2.3**

# Chapter 4 - Emergency Planning and Preparedness

**(404.2.3.1) Lockdown plan contents** Lockdown plans shall include the following: *(Continued)*

4. Means and methods of initiating a lockdown plan for each threat, including:

- The means of notifying occupants of a lockdown event, which shall be distinct from the fire alarm signal.
- Identification of each door or other access point that will be secured.
- A description of the means or methods used to secure doors and other access points.
- A description of how locking means and methods are in compliance with the requirements of this code for egress and accessibility.

**Section 404.2.3**

# Chapter 4 - Emergency Planning and Preparedness

**(404.2.3.1) Lockdown plan contents** Lockdown plans shall include the following: *(Continued)*

5. Procedures for reporting to the fire department any lockdown condition affecting egress or fire department operations.
6. Procedures for determining and reporting the presence or absence of occupants to emergency response agencies during a lockdown.
7. Means for providing two-way communication between a central location and each area subject to being secured during a lockdown.

# Chapter 4 - Emergency Planning and Preparedness

**(404.2.3.1) Lockdown plan contents** Lockdown plans shall include the following: *(Continued)*

8. Identification of the prearranged signal for terminating the lockdown.
9. Identification of individuals authorized to issue a lockdown termination order.
10. Procedures for unlocking doors and verifying that the means of egress has been returned to normal operations upon termination of the lockdown.
11. Training procedures and frequency of lockdown plan drills.



# Chapter 4 - Emergency Planning and Preparedness

## Drills

Lockdown plan drills shall be conducted in accordance with the approved plan. Such drills shall not be substituted for fire and evacuation drills required by Section 405.2.

## Section 405.2 Frequency of Emergency Evacuation Drills

Required emergency evacuation drills shall be held at the intervals specified in Table 405.2

**Section 404.2.3**

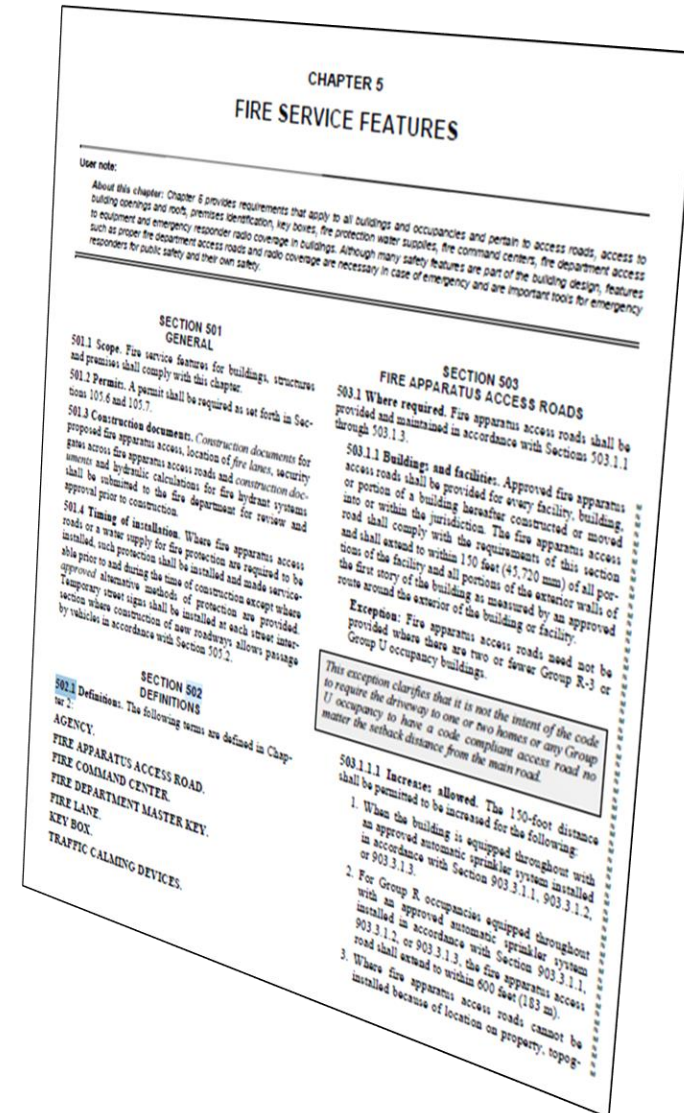
**FIRE AND EVACUATION DRILL  
FREQUENCY AND PARTICIPATION**

<b>GROUP OR OCCUPANCY</b>	<b>FREQUENCY</b>	<b>PARTICIPATION</b>
Group A	Quarterly	Employees
Group B <sup>b</sup>	Annually	All occupants
Group B <sup>c</sup> (Ambulatory care facilities)	Quarterly on each shift <sup>a</sup>	Employees
Group B <sup>b</sup> (Clinic, outpatient)	Annually	Employees
Group E	Monthly <sup>a</sup>	All occupants
Group F	Annually	Employees
Group I-1	Semiannually on each shift	All occupants
Group I-2	Quarterly on each shift <sup>a</sup>	Employees
Group I-3	Quarterly on each shift <sup>a</sup>	Employees
Group I-4	Monthly on each shift <sup>a</sup>	All occupants
Group R-1	Quarterly on each shift	Employees
Group R-2 <sup>d</sup>	Four annually	All occupants
Group R-4	Semiannually on each shift <sup>a</sup>	All occupants

- a. In severe climates, the fire code official shall have the authority to modify the emergency evacuation drill frequency.
- b. Emergency evacuation drills are required in Group B buildings having an occupant load of 500 or more persons or more than 100 persons above or below the lowest level of exit discharge.
- c. Emergency evacuation drills are required in ambulatory care facilities in accordance with Section 403.3.
- d. Emergency evacuation drills in Group R-2 college and university buildings shall be in accordance with Section 403.10.2.1. Other Group R-2 occupancies shall be in accordance with Section 403.10.2.2.

# Chapter 5 – Fire Service Features

– Only one substantive change



# Chapter 5 – Fire Service Features

## **FIRE COMMAND CENTER: 508.1.3 Size**

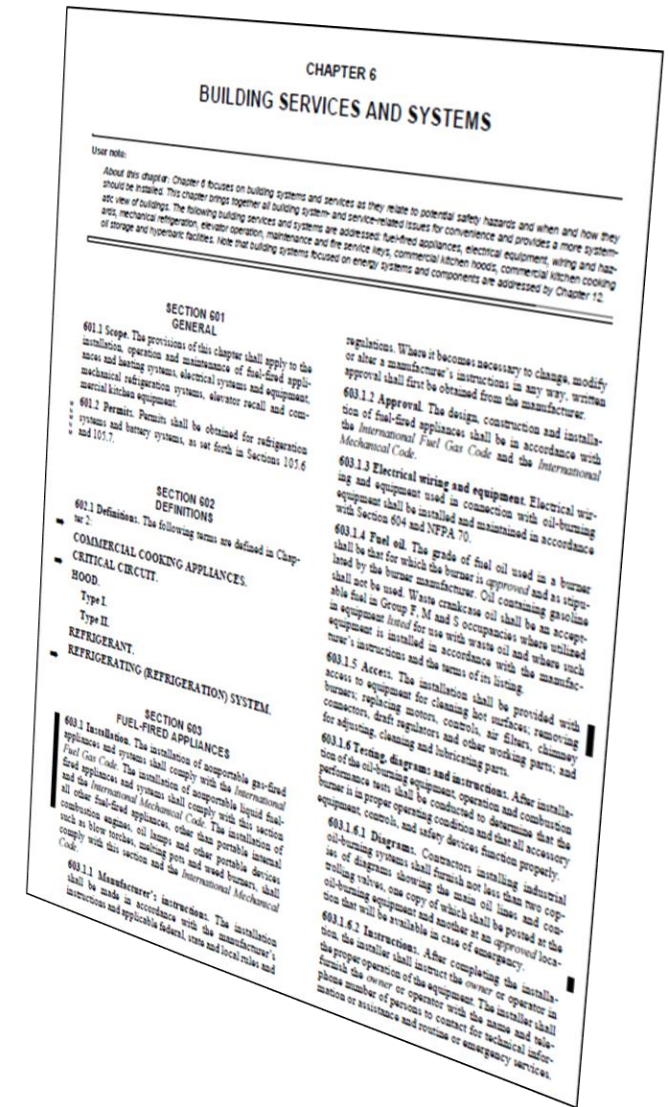
~~The fire command center shall be a minimum of 200 square feet in area with a minimum dimension of 10 feet.~~

- ~~– Not less than 0.015 percent of the total building area, or 200 square feet in area, whichever is greater~~
- ~~– Minimum dimension of 0.7 times the square root of the room area or 10 feet, whichever is greater~~

# Chapter 6 – Building Services and Systems

## Several significant changes in Chapter 6

- Indoor fuel-oil storage
- Electrical
- Mechanical refrigeration
- Commercial kitchen hoods
- Commercial cooking systems
- Electrical energy storage systems



# Chapter 6 – Building Services and Systems

## COMMERCIAL KITCHEN HOODS

**607.3 Operations and maintenance.\*** Commercial cooking systems shall be operated and maintained in accordance with Sections 607.3.1 through 607.3.4, **and NFPA 96.**

- NFPA 96 adopted for maintenance provisions
  - Includes maintenance provisions for specific appliances
    - E.G. Inspection, cleaning and maintenance for solid-fuel appliances

**Section 607.3**

# Chapter 6 – Building Services and Systems

## 603.3.2 Fuel oil storage inside buildings

- IFC section rewritten for clarity and new language added
- Allows an increased amount of indoor fuel-oil storage for fuel-fired equipment, generators or fire pumps
- Tanks to be connected to appliances via closed piping systems

# Chapter 6 – Building Services and Systems

## Indoor fuel oil storage for appliances:

- Limited to 660 gallons aggregate in UL 80, UL 142, or UL 2085 listed tanks, or...



**Section 603.3.2**



# Chapter 6 – Building Services and Systems

## 603.3.2 Fuel oil storage inside buildings

- Up to 1,320 gallons aggregate when:
  - Sprinklered building per NFPA 13, and
  - UL 142 listed tanks



# Chapter 6 – Building Services and Systems

## 603.3.2 Fuel oil storage inside buildings

- Up to 3000 gallons within protected above-ground tanks listed to UL 2085, and...
- Room has sprinkler protection per NFPA 13



# Chapter 6 – Building Services and Systems

## 603.3.2 Fuel oil storage inside buildings

- Does not count toward the maximum allowable quantity (MAQ) per control area
- Not required to be located within a control area

# Chapter 6 – Building Services and Systems

## 603.3.2.5 Separation (fuel oil storage systems)

- New IFC language taken from NFPA 37
- Rooms with fuel oil tanks for **internal combustion engines** must be separated with one-hour fire-barrier construction
  - Exception for protected tanks (UL 2085) installed per 5704.2.9.7

# Chapter 6 – Building Services and Systems

## 603.3.2.6 Spill containment (indoor fuel oil storage)

- Spill containment required to contain a release from the largest tank for:
  - Tanks exceeding 55 gallon capacity, or
  - Aggregate capacity exceeds 1,000 gallons

# Chapter 6 – Building Services and Systems

## SECTION 604

### EMERGENCY AND STANDBY POWER SYSTEMS

Relocated to Chapter 12 – Energy Systems

## SECTION 1203

### EMERGENCY AND STANDBY POWER SYSTEMS

# Chapter 6 – Building Services and Systems

## 604.5 Extension cords (and flexible cords)

### New provisions:

- Listed and labeled in accordance with UL 817
  - **UL 817** Standard for Cord Sets and Power-Supply Cords
- Extension cords marked for indoor use shall not be used outdoors



# Chapter 6 – Building Services and Systems

**604.7 ~~Appliances~~ Equipment and fixtures.** Electrical ~~appliances~~ **equipment** and fixtures shall be tested and listed by an approved agency and installed and maintained in accordance with all instructions included as part of such listing.

**“Appliances” replaced with “equipment”**

- Definition from the NFPA 70 (NEC)

**Equipment.** A general term, including fittings, devices, appliances, luminaires, apparatus, machinery, and the like used as a part of, or in connection with, an electrical installation.



# Chapter 6 – Building Services and Systems

## Portable electric space heaters

### 604.10.5 Group I-2 occupancies **and ambulatory care facilities**

- **In addition to Group I-2, now includes ambulatory care facilities:**
  - Heating elements are limited to a maximum temp of 212°F.
  - Use limited to nonsleeping staff and employee areas

# Chapter 6 – Building Services and Systems

## Mechanical refrigeration

### 605.1 Scope

#### New language for refrigerant system standards:

- Non-ammonia systems: ASHRAE 15
- Ammonia systems:
  - IIR-2: system design and installation
  - IIR-7: operating procedures
  - IIR-8 : decommissioning

ASHRAE: American Society of Heating, Refrigerating and Air-Conditioning Engineers

IIR: The International Institute of Ammonia Refrigeration

# Chapter 6 – Building Services and Systems

## Mechanical Refrigeration

### 605.8 Refrigerant detection

- Separate requirements for refrigerant detection and alarms based on refrigerant type:
  - **Ammonia:** detection shall comply with IIAR 2
  - **Other refrigerants:** Section 605.8.1

# Chapter 6 – Building Services and Systems

## Mechanical Refrigeration

### [M] 605.17 Special requirements for Group A2L refrigerant machinery rooms

- Must comply with Class I, Division 2 electrical per the NEC, or
- Detection system per Section 605.8, plus:
  - Detectors shall activate at or below 25% of the LFL
  - Detection activates an emergency ventilation system
  - Detection system is supervised

# Chapter 6 – Building Services and Systems

## 605.11 Solar photovoltaic power systems\*

### 2015 MSFC state amendment

- Deleted IFC provisions for PV systems, and
- Required installation and maintenance per the building code and electrical code

### Change

- IFC relocated PV systems language to Chapter 12, Energy Systems
- PV provisions revised via state amendment, and no longer deleted from the MSFC

# Chapter 6 – Building Services and Systems

## Type I Commercial kitchen hoods: [M] 607.2 Where required

### New exceptions added:

- Factory built hoods listed to UL 710: select MMC provisions are exempted
- Recirculating systems listed to UL 710B: select MMC provisions are exempted



# Chapter 6 – Building Services and Systems

## Type I Commercial kitchen hoods: [M] 607.2 Where required

### New exceptions added:

- Cooking appliances equipped with integral down-draft exhaust systems and listed for the application in accordance with NFPA 96
- Electric cooking appliances where effluent contains 5 mg/m<sup>3</sup> or less of grease when tested at an exhaust flow rate of 500 cfm per UL 710B.



# Chapter 6 – Building Services and Systems

## Commercial cooking systems

### 607.3 Operations and maintenance\*

Commercial cooking systems shall be operated and maintained in accordance with Sections 607.3.1 through 607.3.4, and NFPA 96.

#### – NFPA 96 adopted for maintenance provisions

- Includes maintenance provisions for specific appliances
  - E.G. Inspection, cleaning and maintenance for solid-fuel appliances



# Chapter 6 – Building Services and Systems

## **SECTION 608**

### **STATIONARY STORAGE BATTERY SYSTEMS**

Relocated to Chapter 12 – Energy Systems

## **SECTION 1206**

### **ELECTRICAL ENERGY STORAGE SYSTEMS**

# Chapter 6 – Building Services and Systems

## Commercial kitchen cooking oil storage 608.3 Nonmetallic storage tanks

- New language for nonmetallic tanks used for cooking oil storage
- Listed to UL 2152
  - Outline of Investigation for Special Purpose Nonmetallic Containers and Tanks for Specific Combustible or Noncombustible Liquids
- Installed per manufacturer's instructions
- 200 gallon maximum tank capacity



# Chapter 6 – Building Services and Systems

## Commercial cooking systems

### 607.4 Appliance connection to building piping

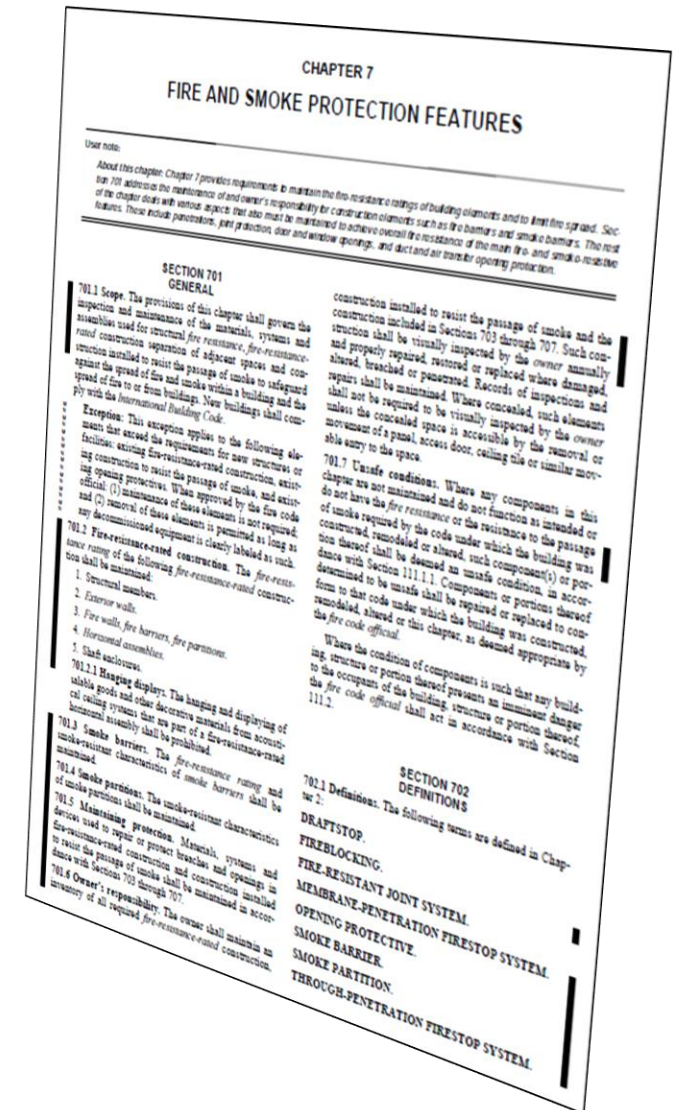
- **Gas-fired cooking appliances on castors or moved for cleaning:**
  - Piping connector listed to ANSI Z21.69
  - Appliances restrained (tethered) per connector/appliance manufacturer's instructions



# Chapter 7 – Fire and Smoke Protection Features

## Significant reformatting in IFC Chapter 7

- Not many substantive changes
- Notable changes include added definitions for:
  - **MEMBRANE-PENETRATION FIRESTOP SYSTEM**
  - **OPENING PROTECTIVE**
  - **SMOKE BARRIER**
  - **SMOKE PARTITION**
  - **THROUGH-PENETRATION FIRESTOP SYSTEM**



# Chapter 7 – Fire and Smoke Protection Features

## Significant reformatting in IFC Chapter 7

- SECTION 703: FIRE-RESISTANCE-RATED CONSTRUCTION expanded to multiple sections:
  - **703 – PENETRATIONS**
  - **704 – JOINTS AND VOIDS**
  - **705 - DOOR AND WINDOW OPENINGS**
  - **706 – DUCT AND AIR TRANSFER OPENINGS**
  - **707 - CONCEALED SPACES**

# Chapter 7 – Fire and Smoke Protection Features

## 701.1 Scope\*

Added an exception for the maintenance of protection features that exceed the requirements for new

### **Where approved by the code official:**

- Not required to be maintained
- Removal is permitted
- Decommissioned equipment must be clearly labeled

# Chapter 7 – Fire and Smoke Protection Features

## 705.2 Inspection and maintenance\*

- **Opening protectives** in fire rated assemblies and smoke barriers to be inspected/maintained to NFPA 80 and NFPA 105.

### **Exception added:**

- Exempts side-swinging fire and smoke door assemblies from annual inspection and testing
- Maintenance provisions of side-swinging doors still apply

# Chapter 7 – Fire and Smoke Protection Features

## 706.1 Maintaining protection\*

**Dampers** protecting ducts and air-transfer openings to be inspected/maintained per NFPA 80 and NFPA 105.

### **Exception added:**

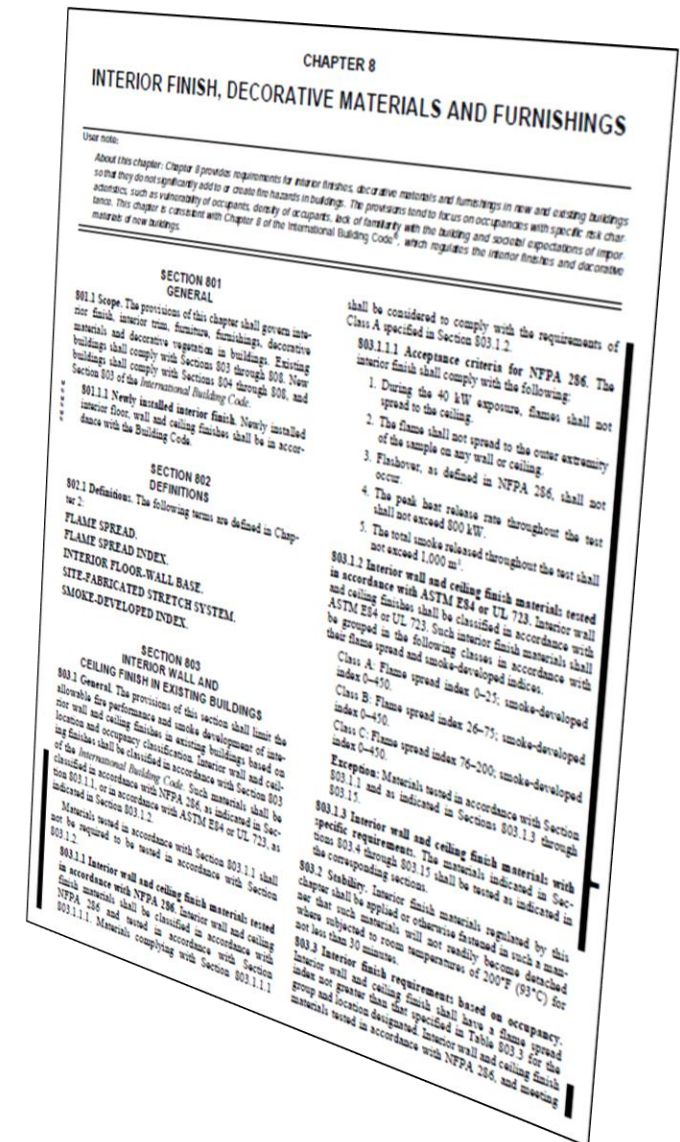
- Allows the code official to exempt inaccessible smoke and heat dampers from periodic inspection and testing
- Maintenance provisions of NFPA 80 or NFPA 105 still apply



# Chapter 8 – Interior Finish, Decorative Materials and Furnishings

## Significant reformatting and substantive changes in IFC Chapter 8

- Reformatting to add clarity to its application
- Several changes



# Chapter 8 – Interior Finish, Decorative Materials and Furnishings

## Interior wall and ceiling finish in existing buildings: 803.1 General

- Rewritten to improve readability and clarity
- Groups NFPA 286 and ASTM E84 testing information together
- Clarifies that interior finish materials can be tested to either ASTM E84 or NFPA 286
  - When tested per NFPA 286, testing to ASTM E84 is not required
- Explains there are also interior finish materials having specific requirements

shall be considered to comply with the requirements of Class A specified in Section 803.1.2.

**803.1.1.1 Acceptance criteria for NFPA 286.** The interior finish shall comply with the following:

1. During the 40 kW exposure, flames shall not spread to the ceiling.
2. The flame shall not spread to the outer extremity of the sample on any wall or ceiling.
3. Flashover, as defined in NFPA 286, shall not occur.
4. The peak heat release rate throughout the test shall not exceed 800 kW.
5. The total smoke released throughout the test shall not exceed 1,000 m<sup>2</sup>.

**803.1.2 Interior wall and ceiling finish materials tested in accordance with ASTM E84 or UL 723.** Interior wall and ceiling finishes shall be classified in accordance with ASTM E84 or UL 723. Such interior finish materials shall be grouped in the following classes in accordance with their flame spread and smoke-developed indices.

Class A: Flame spread index 0–25; smoke-developed index 0–450.

Class B: Flame spread index 26–75; smoke-developed index 0–450.

Class C: Flame spread index 76–200; smoke-developed index 0–450.

**Exception:** Materials tested in accordance with Section 803.1.1 and as indicated in Sections 803.1.3 through 803.15.

**803.1.3 Interior wall and ceiling finish materials with specific requirements.** The materials indicated in Sections 803.4 through 803.15 shall be tested as indicated in the corresponding sections.

# Chapter 8 – Interior Finish, Decorative Materials and Furnishings

## Table 803.3 - New footnote (m) added regarding ambulatory care facilities

**TABLE 803.3**  
**INTERIOR WALL AND CEILING FINISH REQUIREMENTS BY OCCUPANCY<sup>k</sup>**

GROUP	SPRINKLERED <sup>l</sup>			NONSPRINKLERED		
	Interior exit stairways and ramps and exit passageways <sup>a, b</sup>	Corridors and enclosure for exit access stairways and ramps	Rooms and enclosed spaces <sup>c</sup>	Interior exit stairways and ramps and exit passageways <sup>a, b</sup>	Corridors and enclosure for exit access stairways and ramps	Rooms and enclosed spaces <sup>c</sup>
A-1 and A-2	B	B	C	A	A <sup>d</sup>	B <sup>e</sup>
A-3 <sup>f</sup> , A-4, A-5	B	B	C	A	A <sup>d</sup>	C
B, E, M, R-1, R-4	B	C <sup>m</sup>	C	A	B <sup>m</sup>	C

**m.** Corridors in ambulatory care facilities shall have a Class B or better interior finish material.

# Chapter 8 – Interior Finish, Decorative Materials and Furnishings

## 803.4 Fire-retardant coatings

- When used to achieve flame-spread and/or smoke development requirements:
  - The fire-retardant paint, coating or solution shall have been assessed by testing over the same substrate to be used in the application.



# Chapter 8 – Interior Finish, Decorative Materials and Furnishings

## 803.5 Textile wall coverings, 803.6 Textile ceiling coverings, 803.7 Expanded vinyl wall coverings, 803.8 Expanded vinyl ceiling coverings

- Provisions for textile and expanded vinyl wall vs ceiling coverings are now separated
  - **Textile wall coverings to comply with either:**
    - NFPA 286, NFPA 265, or Class A flame spread rating per ASTM E84 + sprinkler protection
  - **Textile ceiling coverings to comply with either:**
    - NFPA 286 or Class A flame spread rating per ASTM E84 + sprinkler protection

# Chapter 8 – Interior Finish, Decorative Materials and Furnishings

## **803.12 Facings or wood veneers intended to be applied onsite over a wood substrate**

**The facing or veneer shall comply with either:**

- Required flame spread rating per Table 803.3 when tested to **ASTM E84** with test specimen preparation and mounting per ASTM E2404
- **NFPA 286** using the product mounting system as described in Section 5.8.9 of NFPA 286.

## Chapter 8 – Interior Finish, Decorative Materials and Furnishings

**803.13 Laminated products factory produced with an attached wood substrate.**

**The laminated product shall comply with either:**

- Required flame spread rating per **ASTM E84** with test specimen preparation and mounting per **ASTM E2579**
- **NFPA 286** using the product mounting system using the product **mounting system of actual use**.

# Chapter 8 – Interior Finish, Decorative Materials and Furnishings

## Decorative materials and artificial decorative vegetation

### 807.1 General (all occupancies)

- Explosive or highly flammable decorative materials or furnishings are prohibited
- Fire retardant coatings in existing buildings to be maintained
- Materials or furnishings must not obstruct egress or its visibility





# Chapter 8 – Interior Finish, Decorative Materials and Furnishings

## 807.2 Combustible decorative materials\*

### Suspended fabrics in Groups A, B, E, I, M, R-1, and R-2 dormitories

- Flame resistant and cannot exceed 20% of wall or ceiling surface area
  - Curtains
  - Draperies
  - Films, and
  - Similar suspended materials



# Chapter 8 – Interior Finish, Decorative Materials and Furnishings

## Decorative Materials are not by definition:

- Educational materials displayed in an approved manner
- Ordinary window shades
- Interior finish surface coverings (e.g. wallpaper)



# Chapter 8 – Interior Finish, Decorative Materials and Furnishings

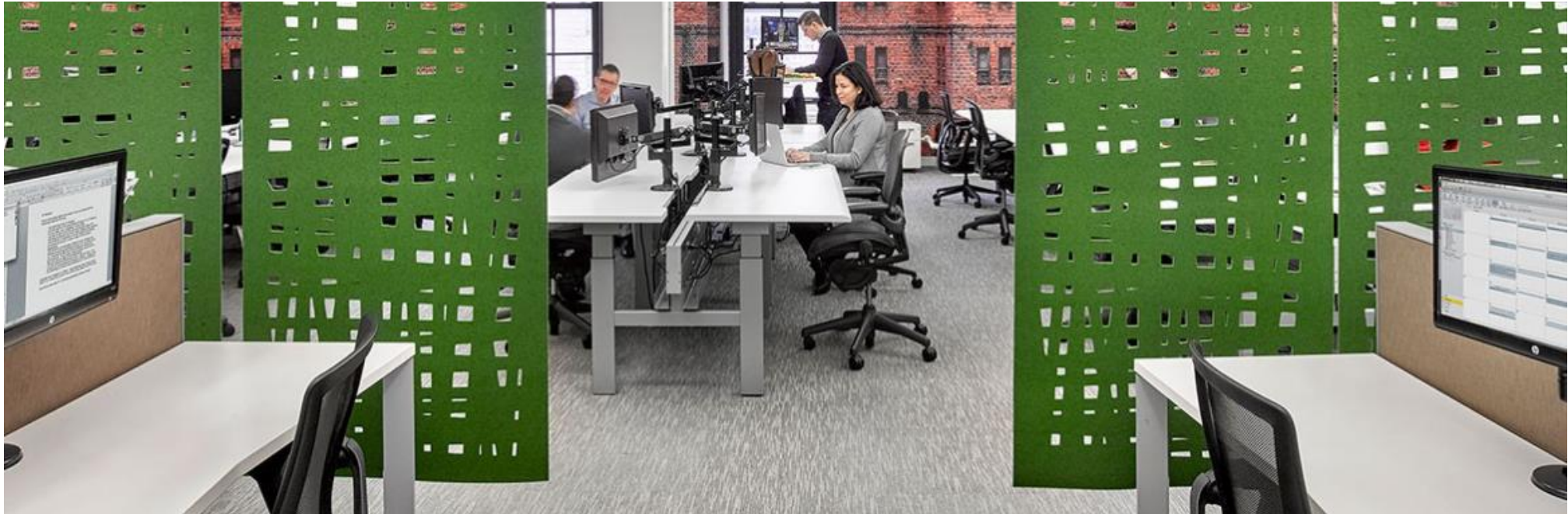
## Exceptions to the 20% coverage limitation for suspended fabrics

- **Group A auditorium** surface area coverage limits
  - New: up to 75% where sprinklered
  - Existing: no limits
- **Group R-2 dorms** surface area coverage limits
  - 50% in sleeping & dwelling units where sprinklered
- **In all occupancies**, the 20% coverage limits do not apply to window coverings

# Chapter 8 – Interior Finish, Decorative Materials and Furnishings

## Exceptions to 807.2

- **Suspended fabric partitions in Groups A, B, E, & M**
  - No coverage limitations



# Chapter 8 – Interior Finish, Decorative Materials and Furnishings

## Acceptance Criteria

- **NFPA 701** Standard Methods of Fire Tests for Flame Propagation of Textiles and Films
- **NFPA 289** Standard Method of Fire Test for Individual Fuel Packages



**Section 807.3**

# Chapter 8 – Interior Finish, Decorative Materials and Furnishings

## 807.4 Artificial decorative vegetation

- Testing per NFPA 701 or NFPA 289 not required in fully sprinklered **Groups I-1; I-2, Condition 1; R-2; R-3; or R-4** for the following:
  - Wreaths or other ADV on doors not exceeding 50% of the surface area
  - ADV on walls not exceeding 30% of the wall area on which attached
  - ADV not on doors or walls cannot exceed 3 feet in any dimension



# **Chapter 8 – Interior Finish, Decorative Materials and Furnishings**

## **807.5 Occupancy-based requirements**

# Chapter 8 – Interior Finish, Decorative Materials and Furnishings

## Classroom artwork and teaching materials in Groups E & I-4

- **Group E\***
  - Limited to 50% of the aggregate wall area
- **Group I-4**
  - Limited to 50% of the specific wall area to which they are attached



**Section 807.5.2.3 + 807.5.5.3**

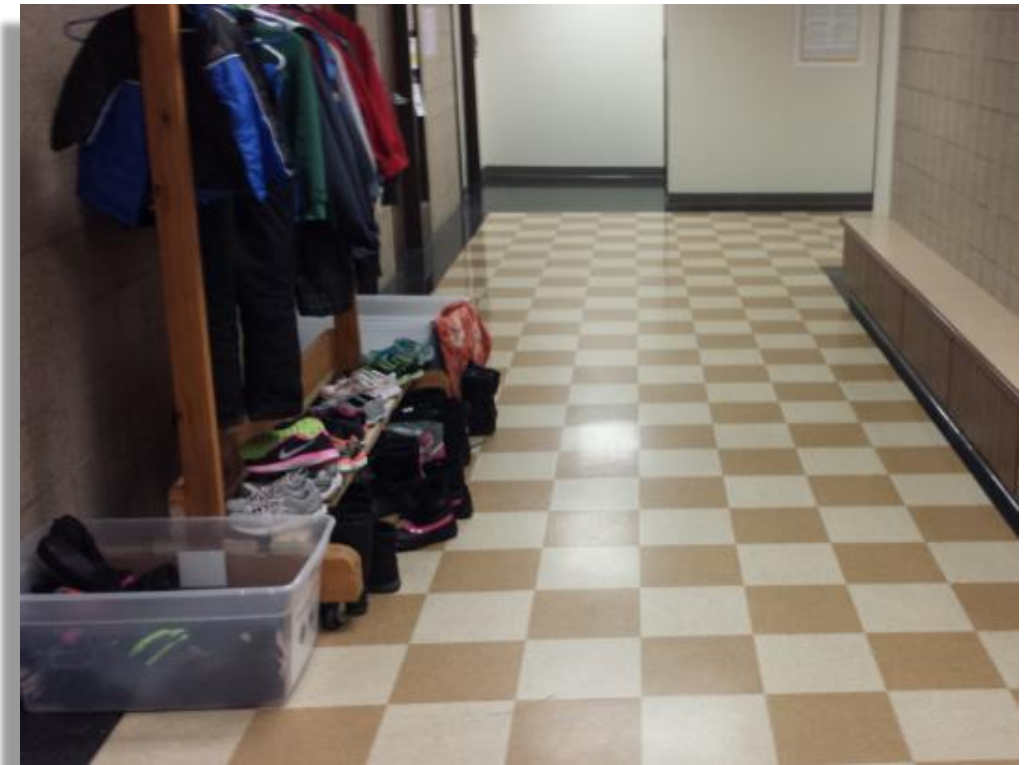


# Chapter 8 – Interior Finish, Decorative Materials and Furnishings

## Personal effects in Group E and I-4 corridors

### 807.5.2 Group E\*

- Stored in metal lockers, unless:
  - **Sprinkler protected, or**
  - **Fire alarm system with corridor smoke detection**
- Minimum required egress width must be maintained



# Chapter 8 – Interior Finish, Decorative Materials and Furnishings

## Combustible decorative materials

### 807.5.6 Dormitories in Group R-2

- Within sleeping units and dwelling units:
  - **Limited to quantities that do not pose a fire development or fire spread hazard**

# Chapter 8 – Interior Finish, Decorative Materials and Furnishings

## 808.1 Wastebaskets and linen containers in Group I-1, I-2 and I-3 occupancies and Group B ambulatory care facilities

- **Recycling clean waste containers**
  - Not required to be stored in a waste and linen collection room constructed per building code
  - Limited to 96 gallon individual capacity



# Chapter 8 – Interior Finish, Decorative Materials and Furnishings

## Wastebaskets and linen containers in Group I-1, I-2 and I-3 occupancies and Group B ambulatory care facilities

### 808.1.1 Capacity density

- **Average capacity density** of containers in a room or space other than waste and linen collection rooms
  - No greater than 0.5 gal/ft<sup>2</sup>
- Example: 100 ft<sup>2</sup> room can have up to 50 gallons of container capacity (100/0.5 = 50 gallons)



# Definition Changes Associated with Chapter 9

**New - Access (to)**- allows access to equipment through an access panel or door.

- Typically where locked a key is required to be readily accessible.

**New - Ready Access (to)**- requires equipment to be reached without removing panels, opening locked doors or any similar obstruction.



# Pump and Riser Room Access

- Automatic sprinkler system risers, fire pumps and controllers shall be provided with ready access.
- Where located in a fire pump room or automatic sprinkler system riser room, the door shall be permitted to be locked provided that the key is available at all times. Access

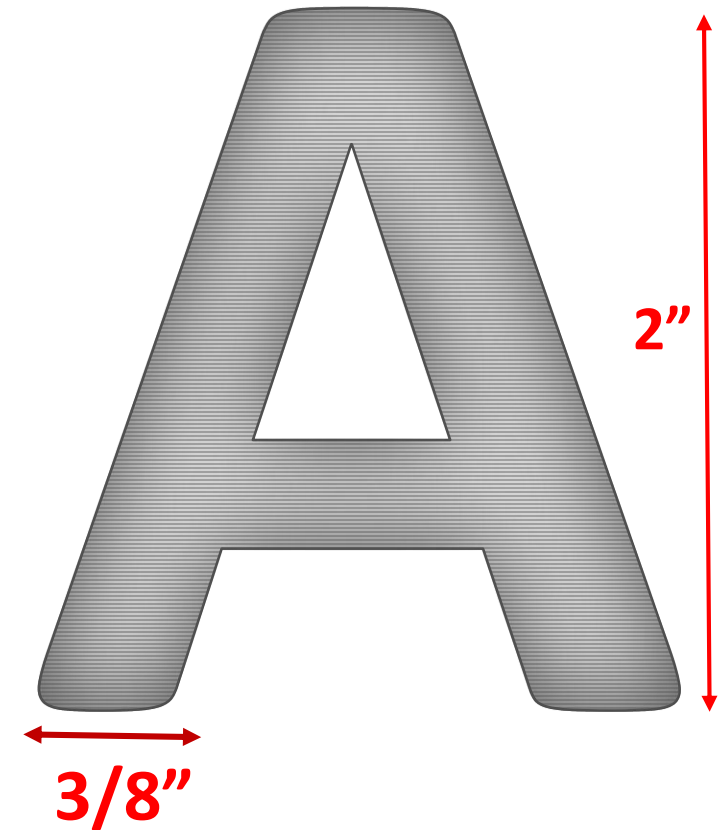


Fire Department Keyless Entry

# Pump and Riser Room Signage

## Markings on access doors

- Access doors for automatic sprinkler system riser rooms and fire pump rooms shall be labeled with an approved sign.
- The lettering shall
  - be contrasting color to the background
  - have a minimum height of 2 inches
  - have a minimum stroke of 3/8 inch.



**Section 901.4.6.2**



# Pump and Riser Room Environment

- It is important to safeguard against freezing so pump rooms must be maintained at a temperature more than 40°F at all times.
- Heating units must be permanently installed when required.



**Section 901.4.6.3**

# Pump and Riser Room Lighting

Permanently installed lighting is required to installed



**Section 901.4.6.4**

# Chapter 9 – Fire Protection and Life Safety Systems

## Inspection, testing and maintenance (ITM)

Fire detection and alarm systems, emergency alarm systems, gas detection systems, fire-extinguishing systems, mechanical smoke exhaust systems and smoke and heat vents shall be maintained in an operative condition at all times, and shall be replaced or repaired where defective.

- Non required *fire protection systems* and equipment shall be inspected, tested and maintained or removed.

# Chapter 9 – Fire Protection and Life Safety Systems

## **Integrated testing**

Where two or more fire protection or life safety systems are interconnected, the intended response of subordinate fire protection and life safety systems shall be verified when required testing of the initiating system is conducted. In addition, integrated testing shall be performed in accordance with Sections 901.6.2.1 (highrises) and 901.6.2.2 (smoke control).

# Integrated Testing

Where two or more fire protection or life safety systems are interconnected, the intended response of subordinate fire protection and life safety systems shall be verified when required testing of the initiating system is conducted.

Integrated testing must be performed for

- high-rise buildings 901.6.2.1
- smoke control systems 901.6.2.2

# Chapter 9 – Fire Protection and Life Safety Systems

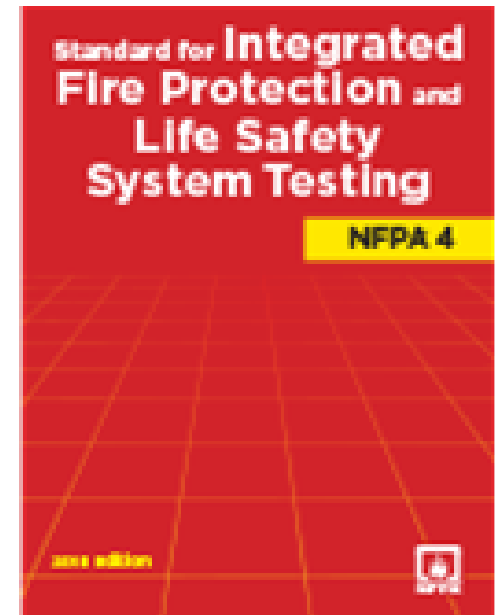
## High-rise buildings and smoke control

Integrated testing must comply with NFPA 4, with an

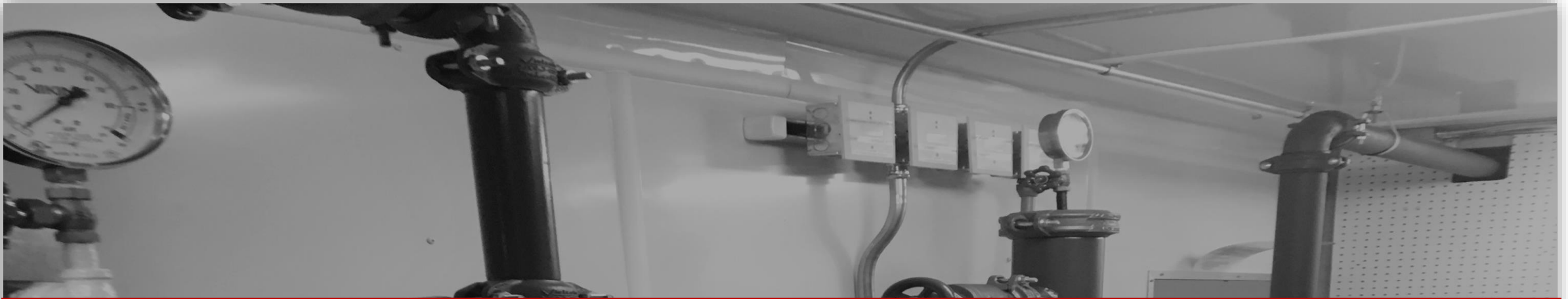
- integrated test performed prior to issuance of the certificate of occupancy

and

- intervals not exceeding 10 years, unless otherwise specified by an integrated system test plan prepared in accordance with NFPA 4.



**Section 901.6.2.1**



# Automatic Fire Sprinkler Systems



# 2020 MSFC Grandstands and Bleachers

## Spaces under Grandstands and Bleachers

A sprinkler system is required where:

- The enclosed area is 1000 square feet or less and not constructed in accordance with section 1029.1.1.1
  - 1029.1.1.1 pertains to construction of bleachers or grandstands
- The enclosed area is greater than 1000 square feet



**Section 903.2.1.5**



# Chapter 9 – Ambulatory care facilities

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.



# Chapter 9 - Ambulatory Care Facilities

**Not New-** Sprinklers are required on the entire floor of a building containing an ambulatory care facility where there are more than 4 people incapable of self preservation or 1 person incapable of self preservation on a level above or below exit discharge.

**New-** An Exception was added to the 2020 MSFC to remove open parking garages from this requirement.

# Chapter 9 - Attics

## Attics

Automatic Fire Sprinkler Protection is required in attics:

- That are intended for living or storage
- Contains fuel fired equipment
  - When it contains fuel fired equipment it is required to have no less than 1 quick response intermediate temp head above the equipment.



NFPA Journal

**Section 903.3.1.2.3**

# Chapter 9 - Attics

## Attics

Attics in type IBC-Type III, IV, V structures higher than 55 feet (FD Access) are required to have one of the following:

- have automatic fire sprinkler protection,
- be made of non-combustible materials,
- be made of fire retardant treated wood,
- have non-combustible insulation.



NFPA Journal

**Section 903.3.1.2.3**

## Chapter 9 - Attics

Group R-4 (Assisted Living, Congregate Care, Half-way houses, rehab centers) with 6-16 people not including staff.

Two categories:

- Condition 1 – occupants can evacuate themselves. Sprinkler requirements would be the same as an R-3
- Condition 2 – Occupants need assistance to evacuate. Sprinklers would be required, typically a 13R system is adequate, but would require review.



# Chapter 9 - Attics

Attics in R-4 occupancy Condition 2 must have one of the following:

- have automatic fire sprinkler protection,
- have heat detection tied to the alarm
- be made of non-combustible materials,
- be made of fire retardant treated wood,
- have non-combustible insulation.



**Section 903.3.1.2.3**

# Chapter 9 – Obstructed Locations

## Obstructed locations.

Where obstructions may delay activation or obstruct the water distribution pattern automatic sprinklers shall be installed in or under

- covered kiosks,
- displays,
- Booths,
- concession stands,
- equipment that exceeds 4 feet in width.



**Section 903.3.3**





# 2020 MSFC Automatic Sprinkler System Changes

**Modification**- Definition Change - Combines Class I & III standpipe definitions into Class I which requires both 2 ½-inch and 1 ½-inch connections for fire department use.

**This can be accomplished**

- with two separate connections

Or

- with the use of a 2 ½-inch connection and 2 ½-inch by 1 ½-inch reducer coupling



**Section 905.3**

# 2020 MSFC Automatic Sprinkler System Changes

Class II standpipes continue to be 1 ½-inch connection primarily for occupant use.

**New** – Class II standpipes must be provided *ready access*



**Section 905.3**

# 2020 MSFC Automatic Sprinkler System Changes

**New - Locking standpipe outlet caps** The *fire code official* is authorized to require locking caps on the outlets on dry standpipes where the responding fire department carries key wrenches for the removal that are compatible with locking FDC connection caps.



**Section 905.11**

A black and white photograph of a commercial kitchen hood. The hood is made of stainless steel and has a corrugated metal interior. A light fixture is mounted on the underside of the hood. The image is split horizontally by a red banner containing the title.

# Commercial Cooking Suppression Systems

# Chapter 6 – Commercial Cooking Hoods

**A type I hood must be installed to control grease laden vapors and Smoke.**

## **Grease laden vapors**

- Grease laden vapors are produced by frying or cooking proteins (meat). Any fat or fry oil produces grease laden vapors.

## **Smoke**

- Protection against smoke is for regular smoke and not for burning of what is being cooked.

**Section 607.2**

## Chapter 9 – Fire Protection and Life Safety Systems

**Domestic Cooking Systems.** Cooktops and ranges installed in the following occupancies shall be protected with a suppression system

- In Group I-1 occupancies where domestic cooking facilities are installed
- In Group I-2 Condition 1 occupancies where domestic cooking facilities are installed
- Group R-2 congregate living facilities where domestic cooking facilities are installed (MN Amendment)



# Chapter 9- Cooking Equipment Fires

Fire extinguishers provided for the protection of cooking equipment shall be of an approved type compatible with the automatic fire-extinguishing system agent.



The Suppression system and fire extinguisher do not have to be the same manufacturer but commonly are.

**Section 906.4**



# Chapter 9- Cooking Equipment Fires

Cooking equipment involving solid fuels or vegetable or animal oils and fats shall be protected by a Class K-rated portable extinguisher.



**Section 906.4**

# Chapter 9- Cooking Equipment Fires

Cooking equipment involving solid fuels or vegetable or animal oils and fats shall be protected by a Class K-rated portable extinguisher.



**Section 906.5**

# Carbon Monoxide Alarm

DO NOT PAINT.  
WARNING: IF...

## Carbon Monoxide

PPM of CO - Move to Fresh Air  
Lb = Low Battery or No Battery  
End-End of unit life



TEST / RESET



PEAK LEVEL

ADDITIONAL MESSAGES ON BATTERY THE BATTERY...

# Chapter 9 – Fire Protection & Life Safety Systems

## SECTION 915: CARBON MONOXIDE DETECTION\*

- Adopted model code language
  - Amendments made to coordinate with M.S. 299F.51
- Requirements for new **Groups I-1, I-2, I-4, R, and in Group E classrooms**
  - Provisions for existing Group R (Chapter 11)
- Not the easiest language to read and interpret
- SFMD website has an info-sheet available

# Chapter 9 – Fire Protection & Life Safety Systems

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# Chapter 9 – Fire Protection & Life Safety Systems

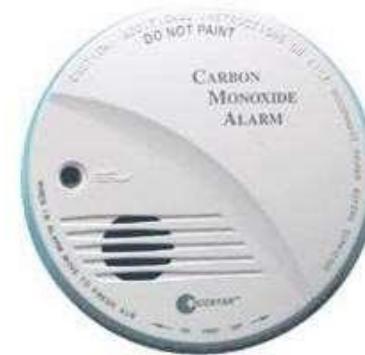
## SECTION 915: CARBON MONOXIDE DETECTION\*

### What is meant by “CO DETECTION” in 915?

- A method of CO detection (either alarm or detection system)



Carbon Monoxide  
Detector



Carbon Monoxide  
Alarm

# Chapter 9 – Fire Protection & Life Safety Systems

## SECTION 915: CARBON MONOXIDE DETECTION\*

### Carbon monoxide alarm vs. detection system

- A CO alarm is a self-contained device that both detects and initiates an audible alarm
- A CO detection system uses separate components (control panel, detector, notification, etc.)
- **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.

# Chapter 9 – Fire Protection & Life Safety Systems

## SECTION 915: CARBON MONOXIDE DETECTION\*

### Occupant notification for CO detection systems (NFPA 720)

**5.8.6.2.1** Except as permitted in 5.8.6.2.2, occupant notification shall be throughout the protected premises.

- Note: 5.8.6.2.2 allows for an alarm signal to be transmitted to a constantly attended on-site location or off-premises monitoring station service, and
  - Public mode occupant notification can be limited to the immediate zone where the alarm signal was initiated





# Chapter 9 – Fire Protection & Life Safety Systems

## SECTION 915: CARBON MONOXIDE DETECTION\*

### Dwelling unit vs sleeping unit

- **DWELLING UNIT.** A single unit providing complete, independent living facilities for one or more persons, including permanent provisions for living, sleeping, eating, cooking and sanitation.
- **SLEEPING UNIT.** A single unit providing rooms or spaces for one or more persons that includes permanent provisions for sleeping and can include provisions for living, eating and either sanitation or kitchen facilities but not both. Such rooms and spaces that are also part of a dwelling unit are not sleeping units.

# Chapter 9 – Fire Protection & Life Safety Systems

## SECTION 915: CARBON MONOXIDE DETECTION\*

### Provisions are categorized by scenario

- Dwelling units, sleeping units or classrooms that contain a fuel-burning appliance
- Dwelling units, sleeping units or classrooms that are served by a fuel-burning forced air furnace
- Buildings than contain a fuel-fired appliance
- Buildings with attached private garages

# Chapter 9 – Fire Protection & Life Safety Systems

## SECTION 915: CARBON MONOXIDE DETECTION\*

### Provisions for Groups I-1, I-2, I-4, R and Group E classrooms

- CO detection required in dwelling units, sleeping units and classrooms **that contain a fuel-burning appliance**

# Chapter 9 – Fire Protection & Life Safety Systems

## SECTION 915: CARBON MONOXIDE DETECTION\*

### Provisions for Groups I-1, I-2, I-4, R and Group E classrooms

- CO detection required in dwelling units, sleeping units and classrooms **served by a fuel-burning forced-air furnace**

- **Exception:**

A CO detector is provided in the first room or area served by each main duct leaving the furnace, and the carbon monoxide alarm signals are automatically transmitted to an approved location

# Chapter 9 – Fire Protection & Life Safety Systems

## SECTION 915: CARBON MONOXIDE DETECTION\*

### Provisions for Groups I-1, I-2, I-4, R and Group E classrooms

- CO detection required in dwelling units, sleeping units and classrooms **in buildings that contain fuel-burning appliances**
  - **Exception 1**

Where there are no communicating openings between the fuel-burning appliance and the dwelling unit or sleeping unit

# Chapter 9 – Fire Protection & Life Safety Systems

## SECTION 915: CARBON MONOXIDE DETECTION\*

### Provisions for Groups I-1, I-2, I-4, R and Group E classrooms

- CO detection required in dwelling units, sleeping units and classrooms **in buildings that contain fuel-burning appliances**
  - **Exception 2**
    - Where a CO detector is provided in an approved location between the fuel-burning appliance and the dwelling unit, sleeping unit or classroom, or
    - Where a CO detector is provided on the ceiling of the room containing the fuel-burning appliance

**Section 915.1.4**

# Chapter 9 – Fire Protection & Life Safety Systems

## SECTION 915: CARBON MONOXIDE DETECTION\*

### Provisions for Groups I-1, I-2, I-4, R and Group E classrooms

- CO detection required in dwelling units, sleeping units and classrooms **in buildings with attached private garages**
  - **Exempt garages include:**
    - Open parking garages per MBC 406.5
    - Enclosed parking garage per MBC 406.6

# Chapter 9 – Fire Protection & Life Safety Systems

## SECTION 915: CARBON MONOXIDE DETECTION\*

### Specific location requirements for dwelling units

- Detection required outside of each separate sleeping area within 10 feet of bedrooms
- Detection required in each bedroom containing a fuel-burning appliance or being served by a fuel-burning forced-air furnace
- Bedrooms having attached bathrooms that contain a fuel-burning appliance, or are served by a forced air furnace, must be provided with CO detection

**Section 915.2.1**



# Chapter 9 – Fire Protection & Life Safety Systems

## SECTION 915: CARBON MONOXIDE DETECTION\*

### Specific location requirements for sleeping units

- CO detection required in each sleeping unit
  - **Exception:** CO detection shall be allowed to be installed outside of each separate sleeping area within 10 feet of the sleeping unit where the sleeping unit, or its attached bedroom, does not contain a fuel-burning appliance and is not served by a forced air furnace

# Chapter 9 – Fire Protection & Life Safety Systems

## SECTION 915: CARBON MONOXIDE DETECTION\*

### Specific location requirements for Group E classrooms

- CO detection required in each classroom
- CO alarm signals transmitted to an onsite location staffed by school personnel
  - **Exception:** Alarm transmission to an onsite staffed location not required for Group E having an occupant load of 30 or less



**Section 915.2.3**

# Chapter 9 – Fire Protection & Life Safety Systems

## SECTION 915: CARBON MONOXIDE DETECTION\*

### Where 915 requires CO detection:

- CO alarms may be used in dwellings and sleeping units
  - CO detection systems may be used in lieu of CO alarms
- CO detection systems must be used for all other applications outside of dwellings and sleeping units

# Chapter 9 – Fire Protection & Life Safety Systems

## SECTION 915: CARBON MONOXIDE DETECTION\*

### SFMD Policy for CO detection in Group E not having, or required to have, a fire alarm system

- CO alarms may be used in Group E classrooms in lieu of a detection system
- CO alarms complying with the requirements of MSFC 915.4.1 and 915.4.2 are installed in every room or area providing care or instruction
- The required fire safety plan includes manufacturer information regarding the testing, inspection and maintenance of CO alarms
- The inspection report issued by the AHJ shall detail such requirements per MSFC 104.8 – Modifications.

# Chapter 9 – Fire Protection & Life Safety Systems

## SECTION 915: CARBON MONOXIDE DETECTION\*

### Power supply for CO alarms:

- Shall receive primary power from the building's wiring where served by a commercial source, and equipped with battery backup
- Listed to UL 2034
- Combination CO/smoke alarms are acceptable where listed to UL 2034 and UL 217

# Chapter 9 – Fire Protection & Life Safety Systems

## SECTION 915: CARBON MONOXIDE DETECTION\*

### Where CO detection systems are used:

- Systems shall comply with NFPA 720
  - Specified detector locations in Section 915 supersede that of NFPA 720
- CO detectors shall be listed to UL 2075
- Combination CO/smoke detectors are acceptable where listed to UL 2075 and UL 268.

NFPA 720 - Standard for the Installation of Carbon Monoxide (CO) Detection and Warning Equipment

**Section 915.5**

# Chapter 9 – Fire Protection & Life Safety Systems

## SECTION 915: CARBON MONOXIDE DETECTION\*

### Maintenance of CO alarms and detection systems

- Maintained per NFPA 720
  - Annual testing for systems
  - Monthly testing for single- or multi-station alarms
- Alarms or detectors that become inoperable or produce end-of-life signals shall be replaced

The image displays a variety of fire alarm system components. In the background, there are two large, dark-colored control panels with multiple screens and buttons. In the foreground, a computer workstation is visible, featuring a monitor displaying a map, a keyboard, and a mouse. To the right of the computer, there are two smaller, light-colored control panels. In front of these are two white, dome-shaped detectors. The entire scene is set against a plain, light-colored background.

# Fire Alarm Systems



# Chapter 9 – Multi Channel Voice Evacuation for High Rise Buildings

In buildings with an occupied floor more than 120 feet above the lowest level of fire department vehicle access, voice evacuation systems for high-rise buildings shall be multiple-channel systems.



Multi-Channel Voice allows emergency responders to select a floor or area and manually deliver a live message through a handheld mic.

**Section 907.2.12.3**

## Chapter 9 – Visual Alarms for Group R-2 Occupancies

In Group R-2 occupancies required by Section 907 to have a fire alarm system, each story that contains dwelling units and sleeping units shall be provided with the future capability to support visible alarm notification appliances. Such capability shall accommodate wired or wireless equipment.

Such capability shall accommodate wired or wireless equipment.

## Chapter 9 – Visual Alarms for Group R-2 Occupancies

The future capability shall include one of the following:

1. The interconnection of the building fire alarm system with the unit smoke alarms.
2. The replacement of audible appliances with combination audible/visible appliances.
3. The future extension of the existing wiring from the unit smoke alarm locations to required locations for visible appliances

# Chapter 9 – Fire Protection & Life Safety Systems

## SECTION 915: CARBON MONOXIDE DETECTION\*

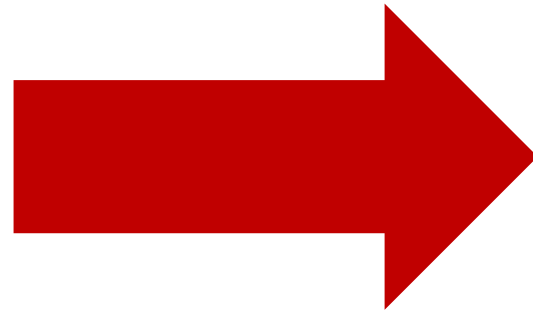
### Provisions for Groups I-1, I-2, I-4, R and Group E classrooms

- CO detection required in dwelling units, sleeping units and classrooms **in buildings with attached private garages**
  - **Exceptions**
    - No communicating openings
    - Located more than one story above or below the garage
    - Garage connects to building through an open-ended corridor
    - Where a carbon monoxide detector is provided in an approved location between garage-to-building communicating openings

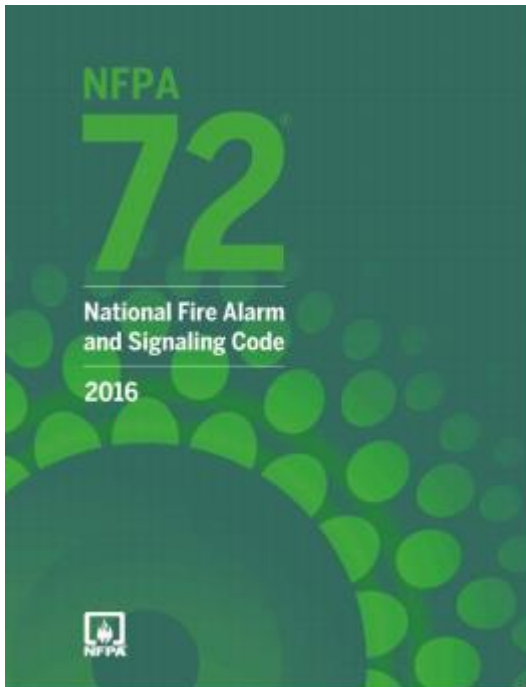
**Section 915.1.5**

# NFPA 72 Standard for Fire Alarm Systems

**2010 NFPA 72**



**2016 NFPA 72**



**2013 NFPA 72**

**Section 915.4.3**

# 2013 NFPA 72 POTS Lines

**New-** one-way private radio alarm system, a two-way RF multiplex system or any transmission means that comply with NFPA 72 such as IP and cellular are now required.

- A secondary POTS line is not permitted for multi-path communications unless there is no cellular, IP or radio available in the area and the AHJ has approved of its use.



# 2013 NFPA 72 POTS Lines

**New-** Nothing in Chapter 26 restricts the use of alternate communication methods as long as it is listed and approved and meets the performance requirements of NFPA 72.

One way communication with consistent monitoring capabilities are allowed.



**Section 26.6.2**

# NFPA 72 Circuits and Pathways

**New-** subsection 12.3.6 to address the Class N pathway performance designation.

- Must monitored the same as standard fire alarm cable
- Anytime there are more than one device that could be impacted by a fault, redundant pathways are required
- All network components must have backup power
- Cannot be accessed by the public
- Separate from Voltage lines that create interference.

**Section 12.3.6**



# NFPA 72 Notification Appliances

**New-** 18.4.2.3.2 now permits the mass notification system to interrupt the minimum repetition of audible alert and evacuation signals.



**Section 18.4.2.3.2**

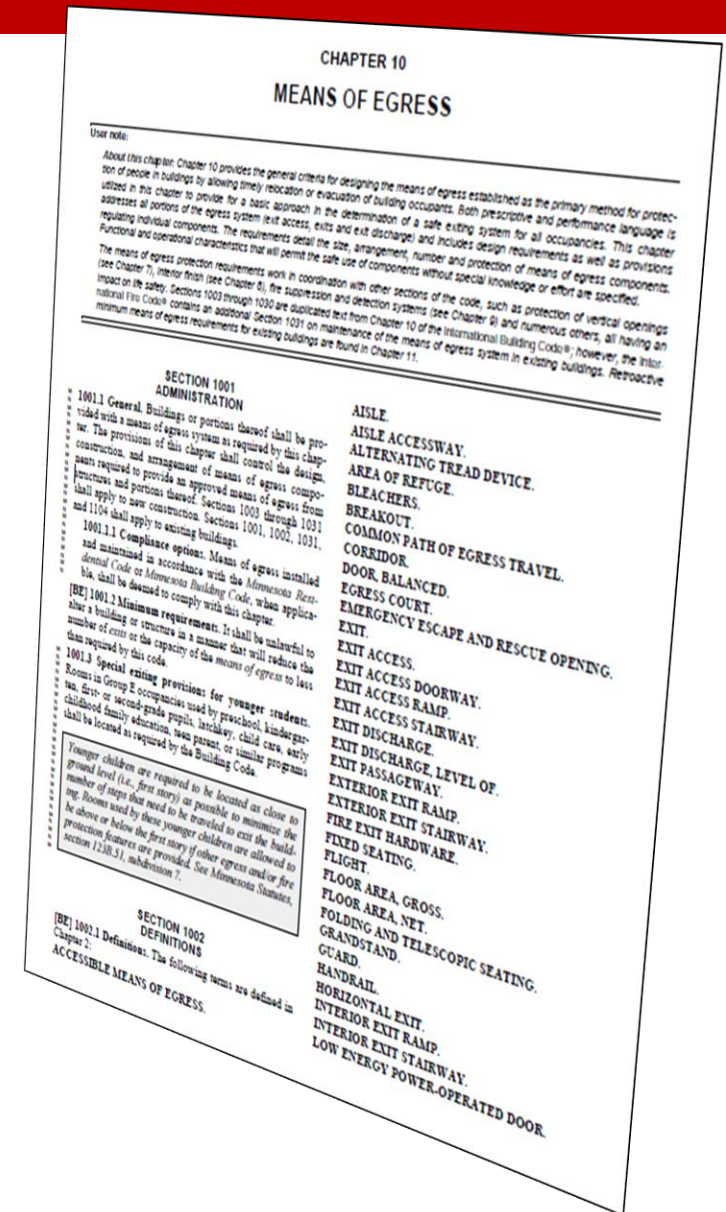
# NFPA 72 Notification Appliances

**Modification-** ~~Effective January 1, 2014~~, Audible appliances provided for the sleeping areas to awaken occupants shall produce a low frequency alarm signal that complies with the following:

- (1) The alarm signal shall be a square wave or provide equivalent awakening ability.
- (2) The wave waveform shall have a fundamental frequency of 520 Hz  $\pm$  10 percent.
- (3) The notification equipment shall be listed for producing the low frequency waveform

# Chapter 10 – Means of Egress

- Some reformatting
- Several significant changes



# Chapter 10 – Means of Egress

## **[BE] 1004.3 Multiple-function occupant load**

- Clarifies that for spaces having multiple functions with different occupant load factors:
  - Each function shall be calculated independently

# Chapter 10 – Means of Egress

## [BE] 1004.8 Concentrated business use areas

### – Occupant load factors for business areas

- Increased from 100 to 150 ft<sup>2</sup>/person, gross
- For concentrated business use areas, the actual occupant load may be used, but not less than 50 ft<sup>2</sup>/person
  - Telephone call centers
  - Trading floors
  - Data processing centers, and
  - Similar uses with a higher occupant densities

Business areas	150 gross
Concentrated business use areas	See Section 1004.8

1004.5 & 1004.8

# Chapter 10 – Means of Egress

## [BE] 1004.9 Posting of occupant load

- Section revised to require the posting of occupant loads for all intended configurations



**Section 1004.9**

# Chapter 10 – Means of Egress

## 1006.2.2.4 Group E and I-4 means of egress\*

- The model code language required two means of egress from rooms or spaces where care is provided for more than 10 children 2.5 years of age or less
- State amendment to include Group E

# Chapter 10 – Means of Egress

## MEANS OF EGRESS ILLUMINATION

### 1008.2.3 Exit discharge

#### – New model code section:

- Clarifies that normal egress illumination is required from each exit discharge and along the path of travel to the public way
- Provides an alternative to provide illumination along the path of travel to a safe dispersal area per Section 1028.5
  - This includes illumination for the entire dispersal area

**Section 1008.2.3**



# Chapter 10 – Means of Egress

## SECTION 1009: ACCESSIBLE MEANS OF EGRESS

- **Historically deleted from the state fire code**
  - Was considered a building code issue
- Did not delete from the 2020 MSFC at request of MSFCA Code Committee
- **Rationale: Section 1009 contains fire-centric provisions, including**
  - Areas of refuge
  - Exterior areas for assisted rescue
  - Two-way emergency communication systems
  - Elevators
  - Signage

**Section 1009**

# Chapter 10 – Means of Egress

## **[BE] 1010.1.4.4 Locking arrangements in educational occupancies**

- **Applies to Groups E and B educational occupancies**
- Allows classrooms, offices & similar areas to have locking arrangements to prevent entry:
  - Capable of being unlocked from the access side
  - Door is operable for egress per Section 1010.1.9
  - No modifications to panic, fire door, or door closing hardware
  - Remote operation of locks is permitted

**Section 1010.1.4.4**

# Examples of Door Security/Barricade Devices



# Chapter 10 – Means of Egress

## [BE] 1010.1.4.4 Locking arrangements in educational occupancies

- To comply with 1010.1.9 for door operation, a security or barricade device must:
  - Not require a key, special knowledge or effort
  - Release the door with a single operation
  - Be mounted 34" to 48" above floor level



# Chapter 10 – Means of Egress

## Examples of compliant security/barricade devices



# Chapter 10 – Means of Egress

The remote operation of locks is permitted



**Section 1010.1.4.4**

# Chapter 10 – Means of Egress

## 1010.1.9.7 Controlled egress doors in Groups I-1, I-2, R-3, or R-4 occupancies\*



# Chapter 10 – Means of Egress

## 1010.1.9.7 Controlled egress doors in Groups I-1, I-2, R-3, or R-4 occupancies\*

- Formerly titled “Special locking arrangements in Group I-1, I-2, R-3, or R-4 occupancies”
- Section rewritten via state amendment to better coordinate with mode code
- **Change:** The controlled egress door locking system units shall be listed to UL 294 – *Standard for Access Control System Units*
- **Change:** Emergency lighting provided at both sides of the door

**Section 1010.1.9.7**



# Chapter 10 – Means of Egress

## 1010.1.9.7 Controlled egress doors in Groups I-1, I-2, R-3, or R-4 occupancies\*

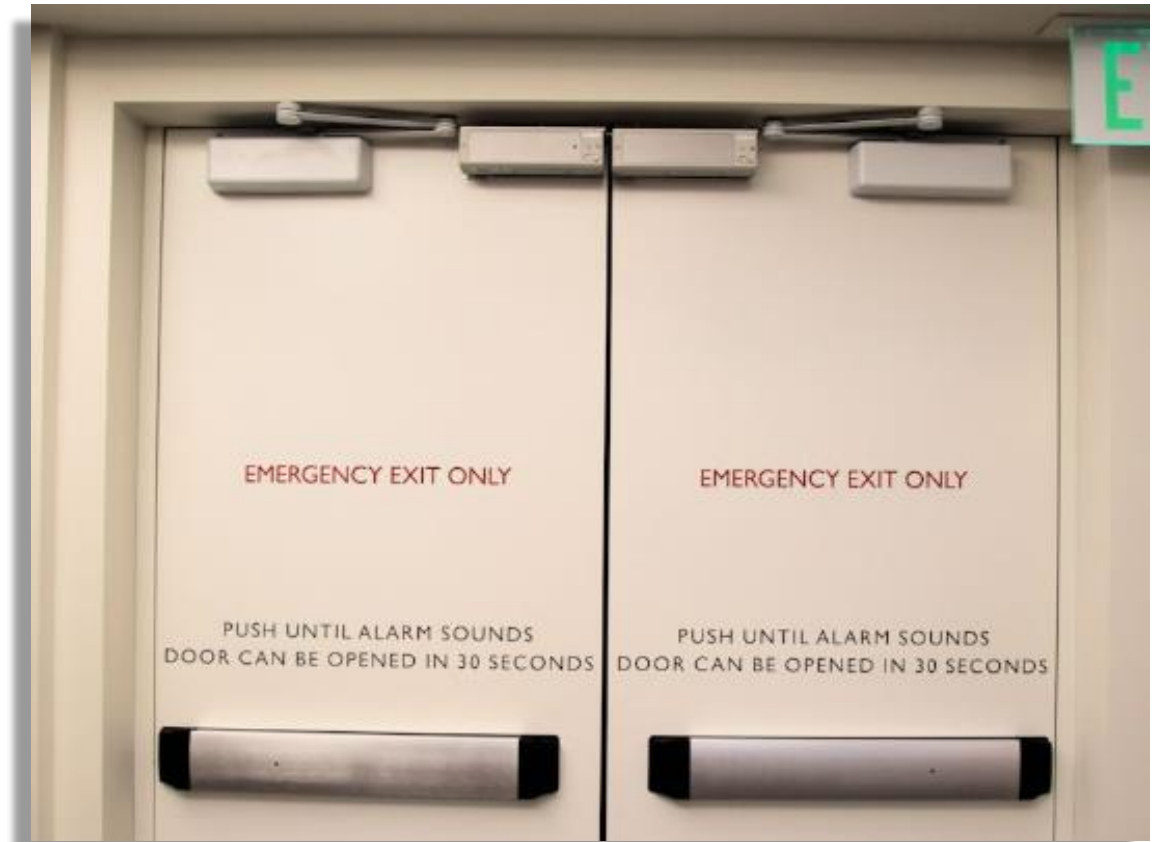
- Floor levels to be divided into a least 2 smoke barrier compartments: Exceptions for existing Group R-3 or R-4, **Condition 1\***
  - Smoke barrier construction is not practical, and
  - Sleeping rooms are of smoke-tight construction, and
  - Sleeping rooms provided with an emergency escape/rescue opening per Section 1030

**Section 1010.1.9.7**

# Chapter 10 – Means of Egress

## 1010.1.9.8 Delayed egress door locks\*

- Amendment rewritten for clarity and to better coordinate with the model code
- **2020 MSFC Errata:**  
**1010.1.9.8.1 Delayed egress locking system.** The delayed egress locking system shall be installed and operated in accordance with ~~one~~ all of the following:



# Chapter 10 – Means of Egress

## 1010.1.9.8 Delayed egress door locks\*

### Changes include:

- Prohibited in Groups A and H
  - New exception that allows delayed egress on courtroom doors, provided that:
    - The building is fully sprinklered (NFPA 13), and
    - Delayed egress is not installed on the main exit or exit access door



**Section 1010.1.9.8**

# Chapter 10 – Means of Egress

## 1010.1.9.8 Delayed egress door locks\*

### Changes include:

- Occupants shall not pass through more than one delayed egress door before entering an exit, except for:
  - May pass through 2 systems with a combined delay  $\leq 30$  seconds in **Group I-2 or I-3**
  - May pass through 2 systems with a combined delay  $\leq 30$  seconds in **Group I-1 or I-4 in fully sprinklered buildings (NFPA 13)**

# Chapter 10 – Means of Egress

## 1010.1.9.8 Delayed egress door locks\*

### Changes include:

- Delayed egress locking system units shall be to UL 294 – *Standard for Access Control System Units*
- Door signage: PUSH UNTIL ALARM SOUNDS. DOOR CAN BE OPENED IN 15 SECONDS.
  - **Exception:** Group I (where approved) where care recipients, because of clinical needs, require restraint or containment
- Emergency lighting required on the egress side of the door

**Section 1010.1.9.8**

# Chapter 10 – Means of Egress

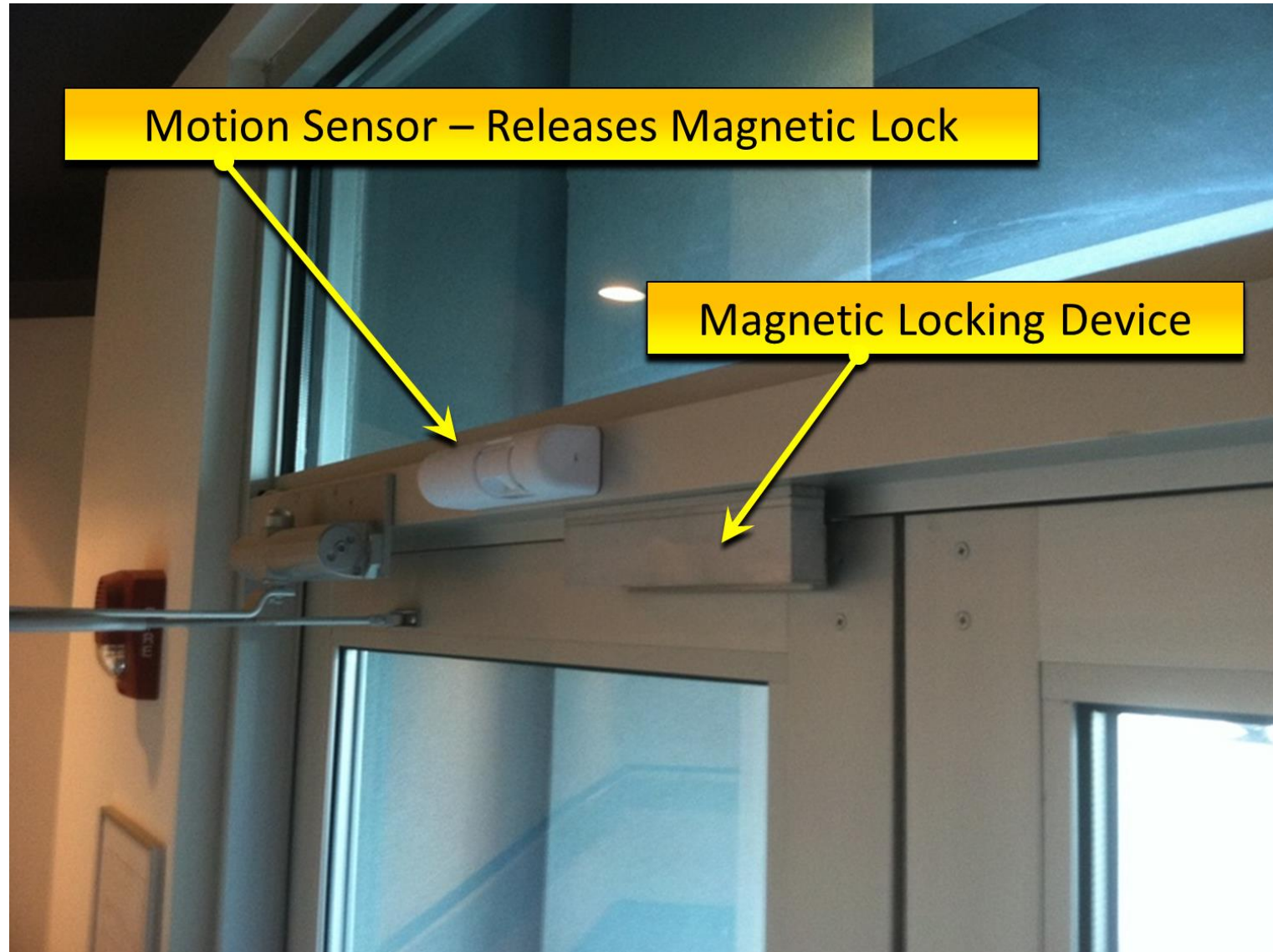
## [BE] 1010.1.9.9 Sensor release of electrically locked egress doors

- Previously called “Access-controlled egress doors”



**Section 1010.1.9.9**

# Sensor Release of Electrically Locked Egress Doors







# Chapter 10 – Means of Egress

## [BE] 1010.1.9.9 Sensor release of electrically locked egress doors

### – Changes include:

- Allowed in any occupancy except Group H
- Sensor installed on the egress side arranged to detect an approaching occupant shall cause the locking system to unlock

# Chapter 10 – Means of Egress

## [BE] 1010.1.9.9 Sensor release of electrically locked egress doors

### – Changes include:

- Manual release switch must directly interrupt power to the lock independent of **all other electronics**
- Loss of power to **lock or locking system** shall release the door

# Chapter 10 – Means of Egress

## [BE] 1010.1.9.10 Door hardware release of electrically locked egress doors

- Previously called “electromagnetically locked egress doors”



# Chapter 10 – Means of Egress

## [BE] 1010.1.9.10 Door hardware release of electrically locked egress doors

### Changes include:

- Allowed in any occupancy except Group H
- Loss of power to the electric locking system releases the door
- Locking system units listed to UL 294 – *Standard for Access Control System Units*

# Chapter 10 – Means of Egress

## [BE] 1010.1.10 Panic and fire exit hardware

### Changes include:

- Specifies that this section applies specifically to swinging doors
- **New exception 2:**
  - Doors provided with panic hardware or fire exit hardware and serving a Group A or E occupancy shall be permitted to be electrically locked in accordance with Section 1010.1.9.9 or 1010.1.9.10.



# Chapter 10 – Means of Egress

## [BE] 1010.3.2 Security access turnstiles

- New section added for turnstiles that inhibit travel in the direction of egress
- Applies to turnstiles greater than 39 inches in height
- No restrictions for occupant capacities exceeding 300



**Section 1010.3.2**

# Chapter 10 – Means of Egress

## [BE] 1010.3.2 Security access turnstiles

### – Commonly used at:

- Military bases
- Nuclear and energy facilities
- Distribution warehouses
- Manufacturing



**Section 1010.3.2**

# Chapter 10 – Means of Egress

## [BE] 1010.3.2 Security access turnstiles

### Provisions include:

- Fully sprinklered building per NFPA 13
- Clear passage width of 22 inches per device
  - If  $< 32$  inches, max egress capacity credit of 50
  - If  $\geq 32$  inches, capacity as calculated per Section 1005



# Chapter 10 – Means of Egress

## [BE] 1010.3.2 Security access turnstiles

### Provisions include:

- Physical barrier to automatically retract or swing open on the following conditions:
  - Loss of power to turnstile or access control system
  - Manual release device with direct power interruption located either:
    - On the egress side of each turnstile lane, or
    - An approved location to be actuated by an employee assigned to the area at all times while building is occupied



**Section 1010.3.2**

# Chapter 10 – Means of Egress

## [BE] 1010.3.2 Security access turnstiles

### Provisions include:

- Physical barrier to automatically retract or swing open on the following conditions:
  - Actuation of the fire sprinkler system
  - Actuation of the fire alarm system (if provided)
    - Exception of a manual fire alarm box



# Chapter 10 – Means of Egress

## Exit Signs

### [BE] 1013.2 Floor-level exit signs in Group R-1

- The bottom of the sign shall be not less than 10 inches nor more than ~~12~~ 18 inches above the floor level



**Section 1013.2**

# Chapter 10 – Means of Egress

## Exit Signs – Emergency power

### [BE] 1013.6.3 Power source

- In the event of primary power loss exit signs must have emergency power provided by one of the following:
  - Unit equipment batteries
  - External storage batteries, or
  - An on-site generator
    - **Exception:** Exit signs in Group I-2, Condition 2, cannot receive emergency power solely through unit equipment storage batteries



# Chapter 10 – Means of Egress

## [BE] TABLE 1020.1 CORRIDOR FIRE-RESISTANCE RATING

– 2015 MSFC Table 1018.1

[B] TABLE 1018.1  
CORRIDOR FIRE-RESISTANCE RATING

OCCUPANCY	OCCUPANT LOAD SERVED BY CORRIDOR	REQUIRED FIRE-RESISTANCE RATING (hours)	
		Without sprinkler system	With sprinkler system <sup>c</sup>
H-1, H-2, H-3	All	Not Permitted	1
H-4, H-5	Greater than 30	Not Permitted	1
A, B, E, F, M, S, U	Greater than 30	1	0
<b>R</b>	Greater than 10	1	<b>0.5</b>

**Section 1020.1**

# Chapter 10 – Means of Egress

## [BE] TABLE 1020.1 CORRIDOR FIRE-RESISTANCE RATING

[BE] TABLE 1020.1  
CORRIDOR FIRE-RESISTANCE RATING

OCCUPANCY	OCCUPANT LOAD SERVED BY CORRIDOR	REQUIRED FIRE-RESISTANCE RATING (hours)	
		Without sprinkler system	With sprinkler system <sup>c</sup>
H-1, H-2, H-3	All	Not Permitted	1
H-4, H-5	Greater than 30	Not Permitted	1
A, B, E, F, M, S, U	Greater than 30	1	0
<b>R</b>	Greater than 10	1	0.5 <sup>c</sup> / <b>1</b> <sup>d</sup>

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.

### Section 1020.1

# Chapter 10 – Means of Egress

## INTERIOR EXIT STAIRWAYS AND RAMPS

### [B] 1022.3.1 Extension

Where exit stairways and ramps are extended through an exit passageway, the stairway/ramp and exit passageway must be separated with fire-barrier construction

#### – **New exceptions:**

- There are no openings into the exit passageway, or
- Both the exit stairway/ramp and the exit passageway are pressurized per the building code (Section 909.20.5)

**Section 1022.3.1**

# Chapter 10 – Means of Egress

## INTERIOR EXIT STAIRWAYS AND RAMPS\*

### 1023.5 Penetrations

New model code language would have allowed penetrations in exit stairways and ramps for security and two-way communications systems

#### – State amendments:

- Limits penetrations for security and two-way communications systems to those serving the exit stairway or ramp
- Adds a general exception for wiring that serves the stairway for ramp
- Deletes exception that would allow for miscellaneous membrane penetrations on the outside of the enclosure



# Chapter 10 – Means of Egress

## EXIT PASSAGEWAYS\*

### 1024.6 Penetrations

New model code language would have allowed penetrations in exit passageways for security and two-way communications systems

#### – State amendments:

- Limits penetrations for security and two-way communications systems to those serving the exit passageway
- Adds a general exception for wiring that serves the passageway
- Deletes exception that would allow for miscellaneous membrane penetrations on the outside of the passageway

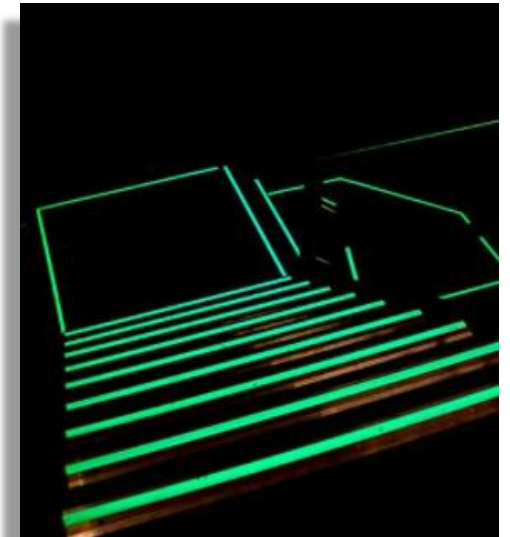
**Section 1024.6**

# Chapter 10 – Means of Egress

## LUMINOUS EGRESS PATH MARKINGS

**[BE] 1025.1 General.** Approved luminous egress path markings delineating the exit path shall be provided in high-rise buildings of Group A, B, E, ~~I~~, I-1, M or R-1 occupancies in accordance with this section.

- Luminous egress path markings are no longer required in:
  - I-2 and I-3 due to trained staff and defend-in-place strategies
  - I-4 because it would be very rare for a high-rise building to be classified as an I-4



# Chapter 10 – Means of Egress

## SECTION 1030: EMERGENCY ESCAPE AND RESCUE\*

- Requires emergency escape and rescue openings in Group R basements and sleeping rooms below the 4<sup>th</sup> story
- **Changes:**
  - Basements are not required to have emergency escapes where having a ceiling height of less than 80 inches **and not used for purposes other than mechanical equipment or storage**
  - **Group R-3 having NFPA 13D sprinkler systems no longer exempt from emergency escape openings (13 or 13R systems only)**

# Chapter 10 – Means of Egress

## SECTION 1030: EMERGENCY ESCAPE AND RESCUE\*

- Requires emergency escape and rescue openings in Group R basements and sleeping rooms below the 4th story
- **Changes:**
  - Exception regarding existing basement and basement bedroom windows has been deleted (now addressed in Chapter 11)
  - **1029.6 Replacement windows.** Relocated to Chapter 11

# Chapter 10 – Means of Egress

## MAINTENANCE OF THE MEANS OF EGRESS

### [BE] 1031.2.2 Locking arrangements in educational occupancies

- Applies to existing Groups E and B educational occupancies, and Group I-4
- Allows classrooms, offices & similar areas to have locking arrangements to prevent entry:
  - Capable of being unlocked from the access side
  - Door is operable for egress per Section 1010.1.9
  - Modifications to fire door assemblies per NFPA 80



### Section 1031.2.2

# Chapter 10 – Means of Egress

## MAINTENANCE OF THE MEANS OF EGRESS

### 1031.10 Emergency lighting equipment inspection and testing

– Requires a monthly 30 second activation test and an annual 30 minute power test

#### – Changes

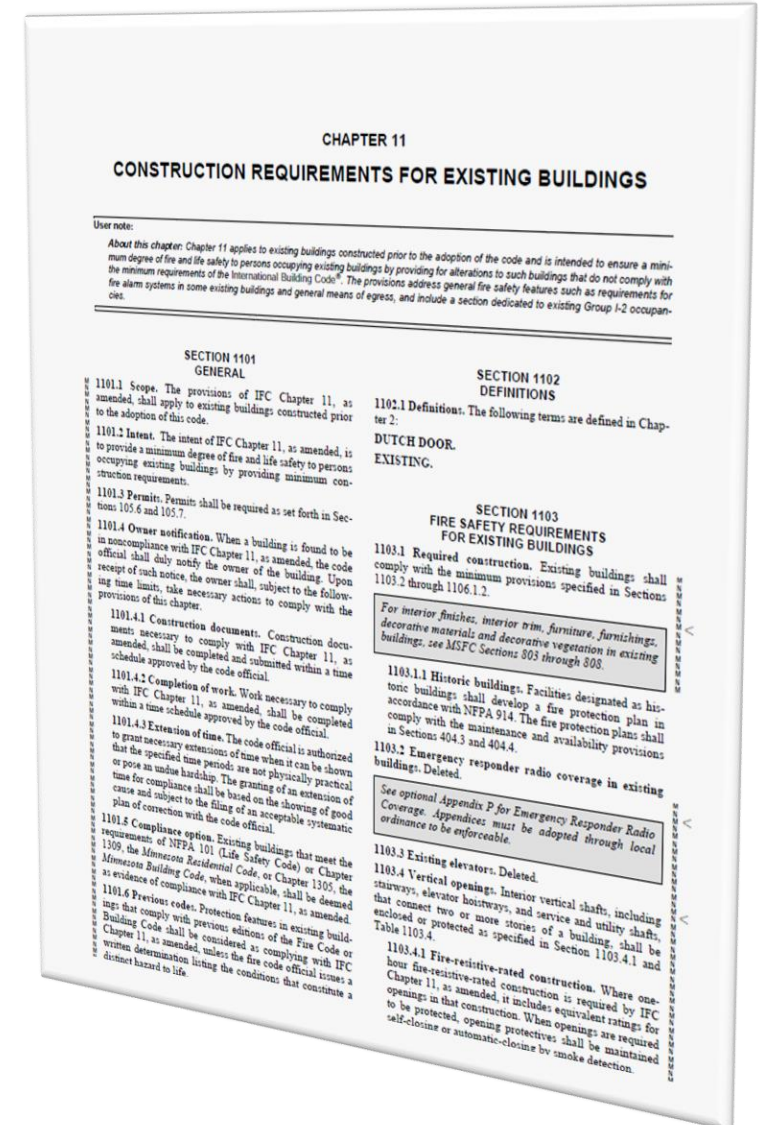
- Section relocated from Chapter 6 to Chapter 10
- Manual activation test not required for self-testing/self-diagnostic units

FAULT TYPE	LED CODE		BUZZER
Mains is on and the system is OK	No flashing, LED continuously burning	●●●●●●●●	Off
Battery voltage low	Continuous flashing	●○●○●○●○ 🔊	Beep every hour
Battery voltage too high	Three flashes followed by a pause	●●●○●●○○ 🔊	Beep every hour
Low capacity battery	Two flashes followed by a pause	●●○●○○○○ 🔊	Beep every hour
Lamp fault	One flash followed by a pause	●○○○○○○○○ 🔊	Beep every hour
No mains	LED off	○○○○○○○○	Off

**Section 1031.10**

# Chapter 11 – Construction Requirements for Existing Buildings

- Some renumbering
- Not many significant changes



# Chapter 11 – Construction Requirements for Existing Buildings

## Fire alarm systems – audible notification

### 1103.7.6.1 Maximum sound pressure\*

#### – Section amended by adding the following:

- Fire alarm system audibility levels shall not exceed 35 dB above the average ambient sound level described in Section 907.5.2.1.1 or 35 dB above the peak ambient sound level



**Section 1103.7.6.1**



# Chapter 11 – Construction Requirements for Existing Buildings

## 1103.9 Carbon monoxide alarms

- Requires carbon monoxide alarms in existing dwelling units and sleeping units consistent with Section 915
  - **Exceptions:**
    - May be solely battery powered where allowed by the code in effect at the time of construction did not require CO alarms
    - CO alarms may be solely batter powered in buildings not served by a commercial power source
    - A CO detection system per Section 915.5 is an acceptable alternative CO alarms

**Section 1103.9**

# Chapter 11 – Construction Requirements for Existing Buildings

## CORRIDOR CONSTRUCTION

### 1104.17 Corridors.

~~Corridors and the openings therein shall provide an effective barrier to resist the movement of smoke.~~

Corridors, common path of travel, and travel distance shall comply with Sections 1104.17.1 through 1104.17.4.1. Corridors complying with Section 1020.1 need not be fire-resistance rated.

**Section 1104.17**

# Chapter 11 – Construction Requirements for Existing Buildings

**TABLE 1104.17.4\***

## **COMMON PATH, DEAD-END, AND TRAVEL DISTANCE LIMITS**

OCCUPANCY	COMMON PATH LIMIT	
	Unspr (feet)	Spr (feet)
Group I-4 (Day Care)	<del>NR</del> 75	<del>NR</del> 100

OCCUPANCY	COMMON PATH LIMIT	
	Unspr (feet)	Spr (feet)
Group R-2 (Apartments)	75	<del>75</del> 125

**Section 1104.17.4**

# Chapter 11 – Construction Requirements for Existing Buildings

## 1104.26.6 Replacement windows for emergency escape and rescue openings\*

- Allows replacement windows under the following conditions:
  - The window is the manufacturer's largest size that will fit into the existing frame, and
  - Is the same operating style or a style providing an equal or greater, and
  - In state licensed or registered facilities, the window opening must provide at least 4.5 square feet of clear opening
  - The replacement of the window is not part of a change of occupancy

# Chapter 11 – Construction Requirements for Existing Buildings

## 1105.3 Incidental use areas\*

- Requires one-hour fire-resistance rated separation or sprinkler protection for incidental use areas

- **Change:**

Incidental use areas are defined as shops, laboratories, containing hazardous materials, ~~storage rooms exceeding 100 square feet in size~~, laundry rooms exceeding 100 square feet in size, and rooms containing boilers or central heating plants where the largest piece of fuel equipment exceeds 400,000 Btu per hour input.

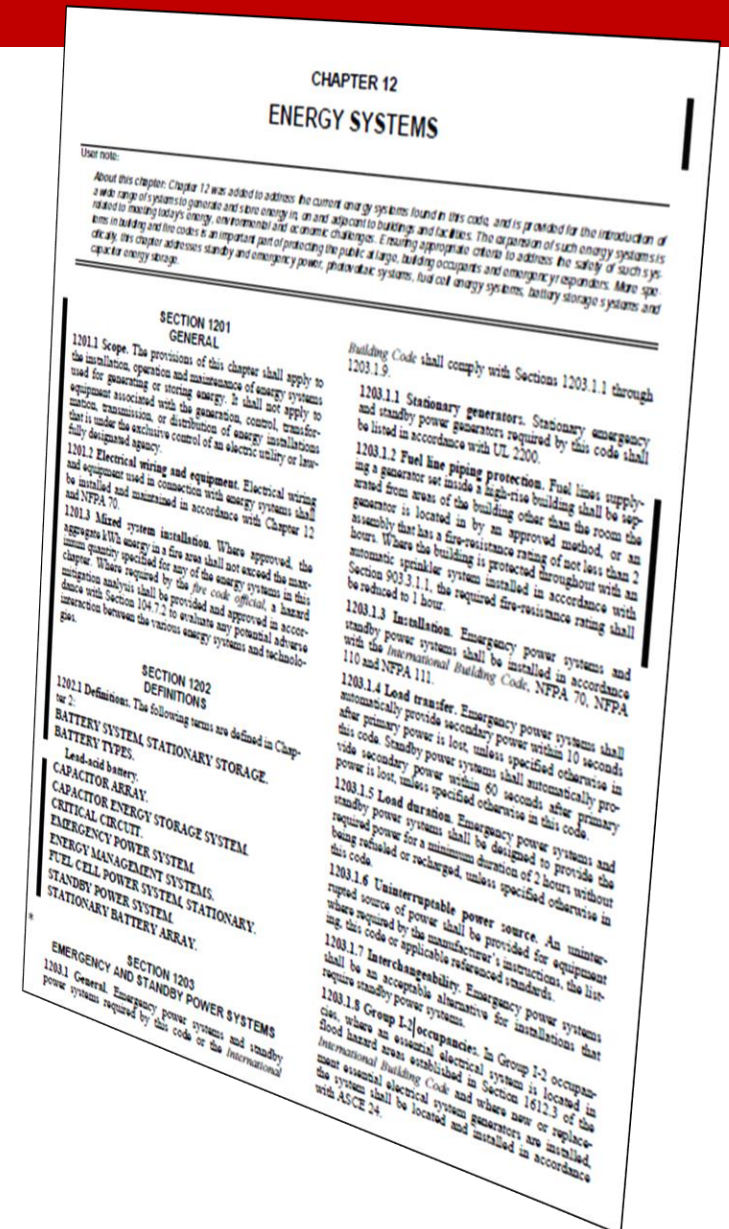
# Chapter 12 – Energy Systems

## New IFC Chapter 12

### CHAPTER 12 ENERGY SYSTEMS ..... 243

#### Section

1201	General	243
1202	Definitions	243
1203	Emergency and Standby Power Systems	243
1204	Solar Photovoltaic Power Systems	245
1205	Stationary Fuel Cell Power Systems	248
1206	Electrical Energy Storage Systems	249



# Chapter 12 – Energy Systems

## New IFC Chapter 12

### SECTION 1202 DEFINITIONS

**1202.1 Definitions.** The following terms are defined in Chapter 2:

**BATTERY SYSTEM, STATIONARY STORAGE.**

**BATTERY TYPES.**

**Lead-acid battery.**

**CAPACITOR ARRAY.**

**CAPACITOR ENERGY STORAGE SYSTEM.**

**CRITICAL CIRCUIT.**

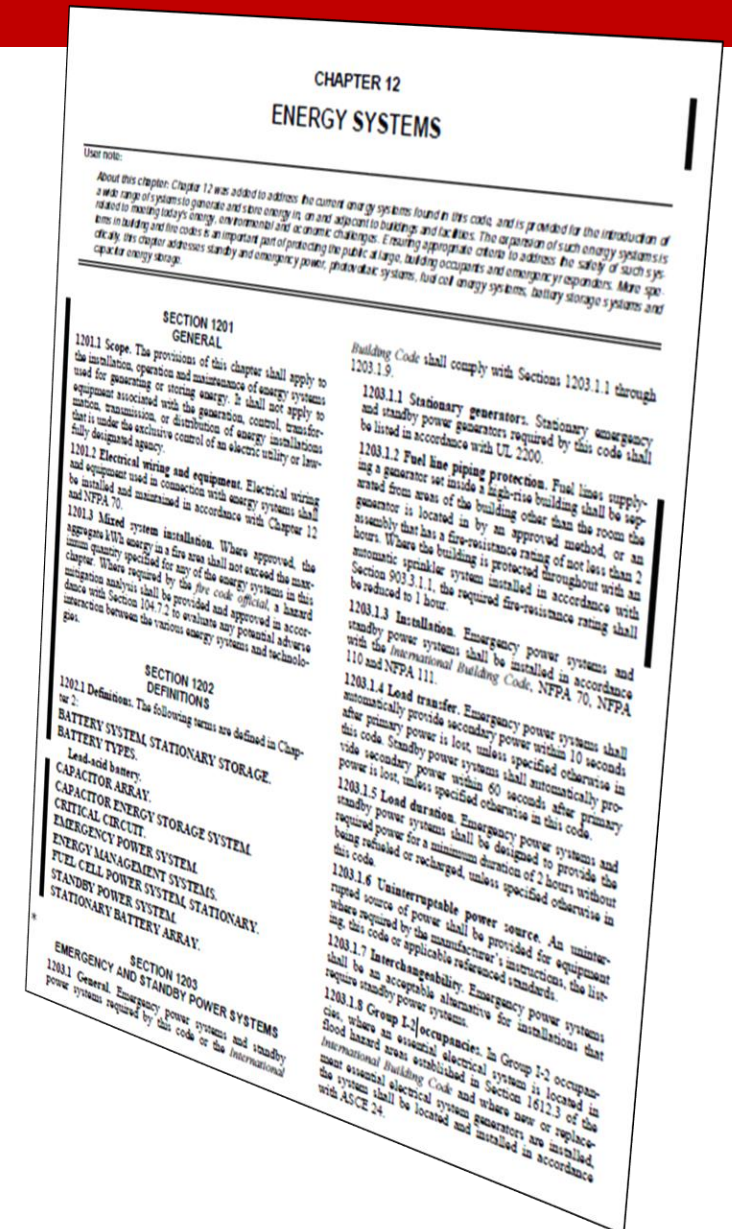
**EMERGENCY POWER SYSTEM.**

**ENERGY MANAGEMENT SYSTEMS.**

**FUEL CELL POWER SYSTEM, STATIONARY.**

**STANDBY POWER SYSTEM.**

**STATIONARY BATTERY ARRAY.**



# Chapter 12 – Energy Systems

## EMERGENCY AND STANDBY POWER SYSTEMS

### 1203.1.2 Fuel line piping protection

- Requires fuel lines serving a gen-set in high-rise buildings to be separated from other areas of the building by:
  - An approved method, or
  - A 2-hour fire-resistance-rated assembly
- Separation reduced to 1-hour in sprinklered buildings (NFPA 13)
- Does not apply to fuel lines within the generator room





# Chapter 12 – Energy Systems

## EMERGENCY AND STANDBY POWER SYSTEMS

### – 1203.2.1 Ambulatory care facilities

- Essential electrical systems for ambulatory care facilities shall be in accordance with Section 422.6 of the building code
  - MBC 422.6 references Chapter 27 – *Emergency & Standby Power Systems*, and NFPA 99 – *Health Care Facilities Code*

### – 1203.2.13 Laboratory suites

- Standby or emergency power shall be provided in accordance with Section 5004.7 where laboratory suites are located above the sixth story above grade plane or located in a story below grade plane.

# Chapter 12 – Energy Systems

## EMERGENCY AND STANDBY POWER SYSTEMS

### – **1203.2.6 Gas detection systems**

- Requires emergency or standby power for required gas detection systems in accordance with those specific sections

### – **1203.4.1 & 1203.5.1 Group I-2 (maintenance & ITM)**

- In Group I-2 occupancies, emergency and standby power systems shall be maintained in accordance with NFPA 99
- In Group I-2 occupancies, emergency and standby power systems shall be inspected and tested under load in accordance with NFPA 99

# Chapter 12 – Energy Systems

## EMERGENCY AND STANDBY POWER SYSTEMS

### 1203.3 Critical circuits

- **Required critical circuits shall be protected with one of the following methods**
  - Cables listed to UL 2196 and a minimum fire-resistance rating of 1 hour
  - Electrical circuit protective systems having a minimum fire-resistance rating of 1 hour
  - Construction having a minimum fire-resistance rating of 1 hour

**CRITICAL CIRCUIT.** A circuit that requires continuous operation to ensure safety of the structure and occupants.

# Chapter 12 – Energy Systems



## Photovoltaic Solar Installations

# Chapter 12 – Energy Systems

- **Installed per:**
  - MSFC 1204\*
  - Minnesota Building Code
    - Permit through MBC
  - Minnesota Electrical Code
- **Notification:**
  - Design professional must notify the fire code official of any PV installation (MBC 3111.1.4)
- **Application:**
  - Does not apply to MRC buildings
  - Rooftop access provisions do not apply where rooftop operations will not occur

# Chapter 12 – Energy Systems

## SECTION 1204\*

### SOLAR PHOTOVOLTAIC POWER SYSTEMS

#### – Three components of roof access:

- Unobstructed fire department access from ground to roof landing area
- Roof landing and pathways to ridge or venting locations
- Ridgeline pathway & venting location requirements

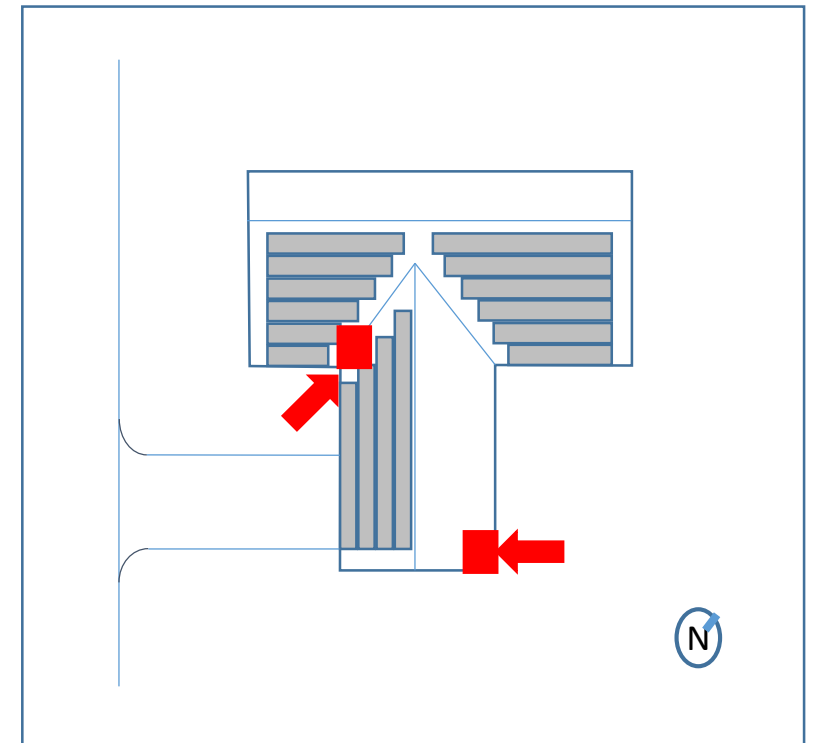


# Chapter 12 – Energy Systems

## 1204.2.1 Solar photovoltaic system for roof slopes greater than 2:12 (pitched roofs)

### – Ground to Roof Access and Access Separation:

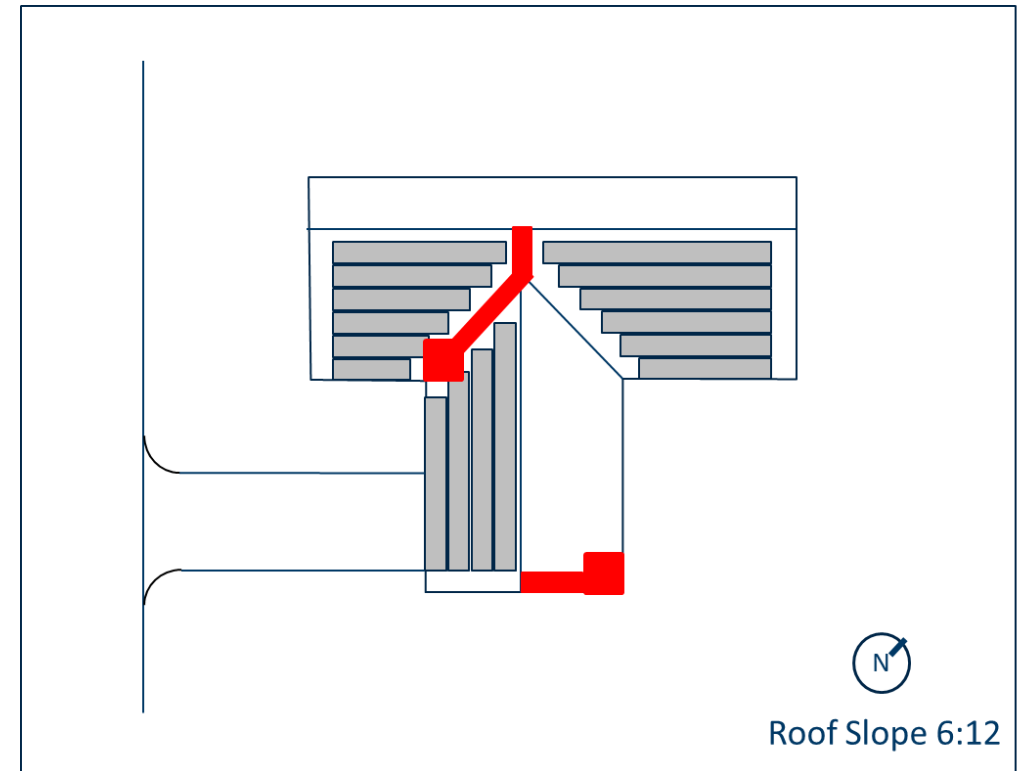
- Not less than 2 clear access points with at least one access on the street/driveway side
- Not above windows or doors
- Structure sufficient for fire fighters
- No overhead obstructions (e.g. power lines)
- Access point separation not less than 1/3 diagonal of roof
- Minimum 6 feet x 6 feet landings



# Chapter 12 – Energy Systems

## 1204.2.1 Solar photovoltaic system for roof slopes greater than 2:12 (pitched roofs)

- Two or more 36 inch wide access pathways from landing to ridge
  - One pathway on street/driveway side

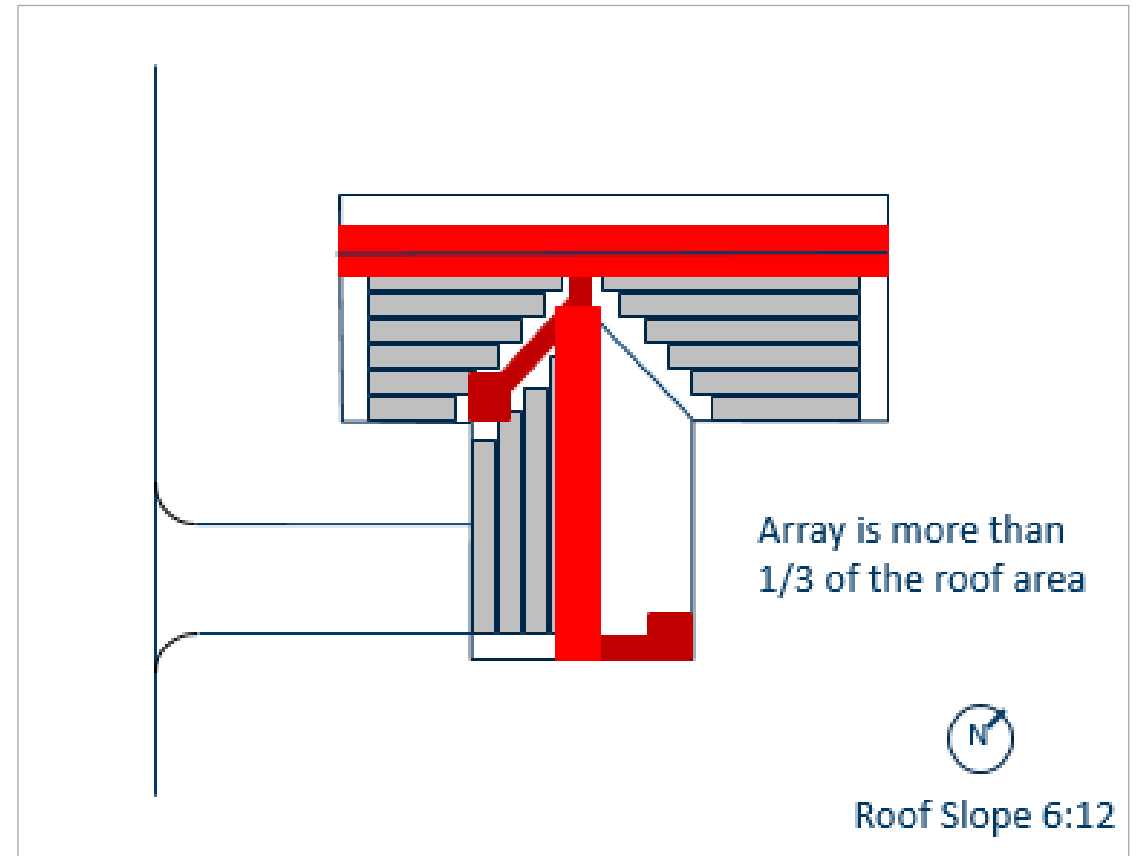




# Chapter 12 – Energy Systems

## 1204.2.1 Solar photovoltaic system for roof slopes greater than 2:12 (pitched roofs)

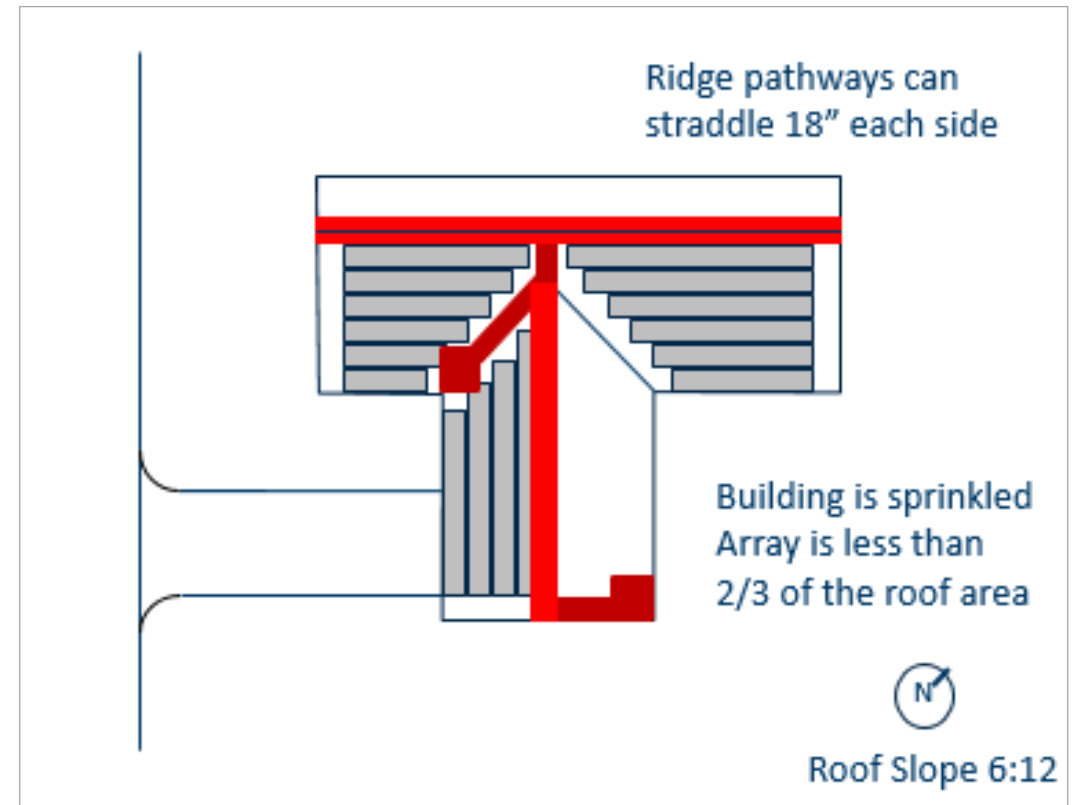
- **Setbacks at ridge in non-sprinklered buildings**
  - 18 inch setback on each side for arrays < 33% of total roof area
  - Otherwise 36 inch setback on each side of ridge



# Chapter 12 – Energy Systems

## 1204.2.1 Solar photovoltaic system for roof slopes greater than 2:12 (pitched roofs)

- **Setbacks at ridge in sprinklered buildings**
  - 18 inch setback on each side for arrays < 66% of total roof area
  - Otherwise 36 inch setback on each side of ridge



# Chapter 12 – Energy Systems

## SOLAR PHOTOVOLTAIC POWER SYSTEMS

### 1204.2.2 Emergency escape and rescue openings

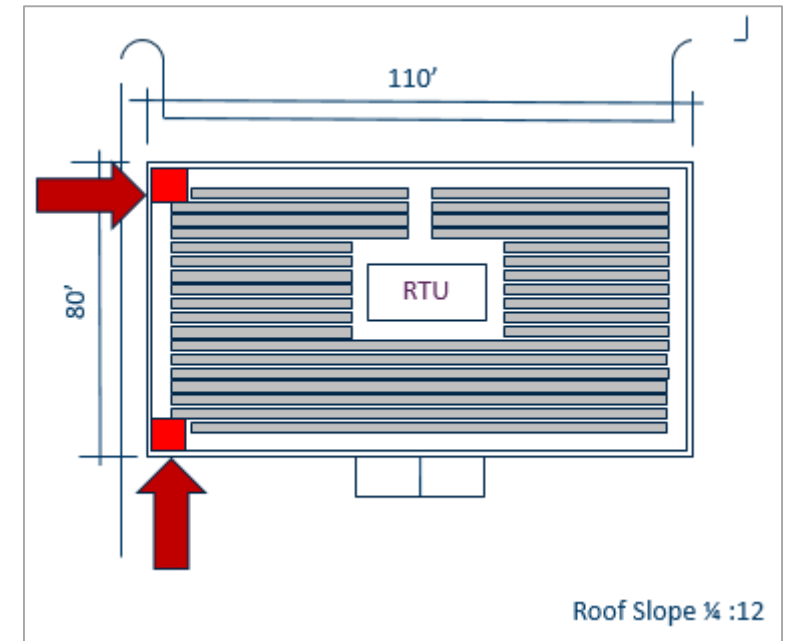
- **Panels and modules** installed on **Group R** buildings shall not be placed below an emergency escape and rescue opening
- **A pathway** of not less than 36 inches wide shall be provided from the roof edge to the emergency escape and rescue opening

# Chapter 12 – Energy Systems

## 1204.3 Solar photovoltaic systems for roofs with slopes of 2:12 or less (flat roofs)

### – Ground to Roof Access and Access Separation

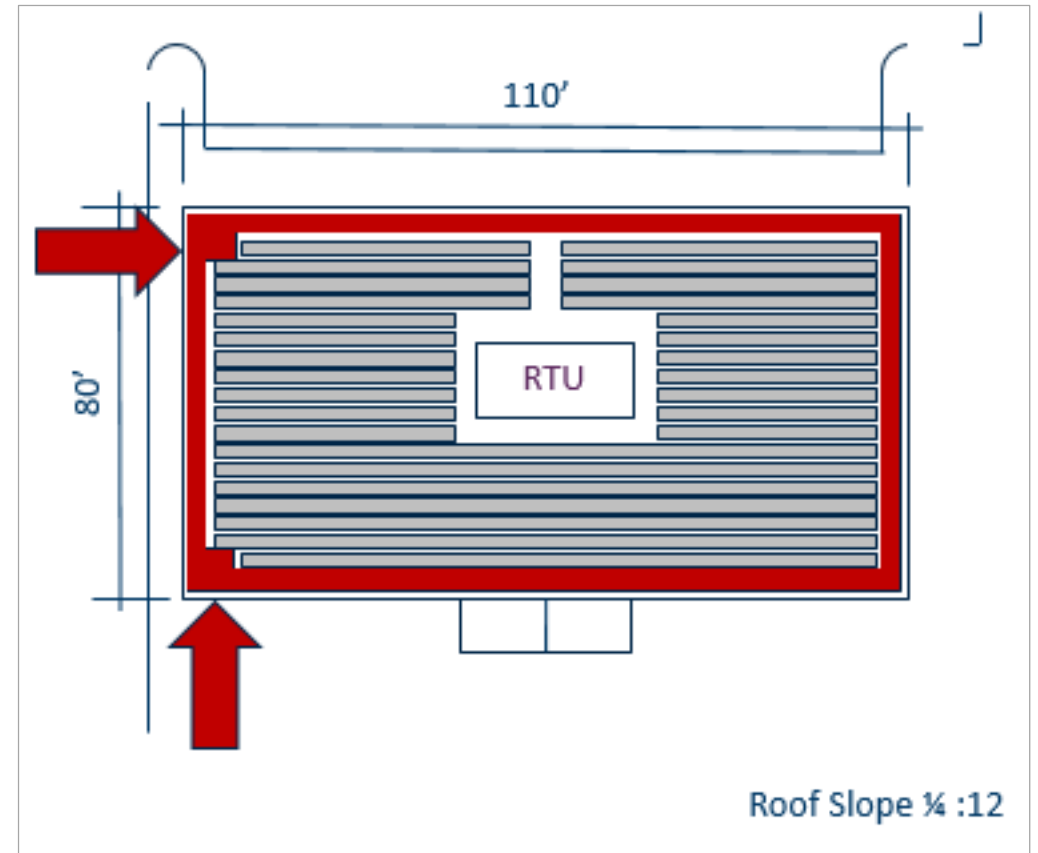
- Not less than 2 clear access points with at least one access on the street/driveway side
- Not above windows or doors
- Structure sufficient for fire fighters
- No overhead obstructions (e.g. power lines)
- Access point separation not less than  $\frac{1}{3}$  diagonal of roof
- Minimum 6 feet x 6 feet landings



# Chapter 12 – Energy Systems

## 1204.3 Solar photovoltaic systems for roofs with slopes of 2:12 or less (flat roofs)

- Perimeter pathways around roof edges
  - 6 feet wide, or
  - 4 feet wide where either axis of the building is 250 feet or less

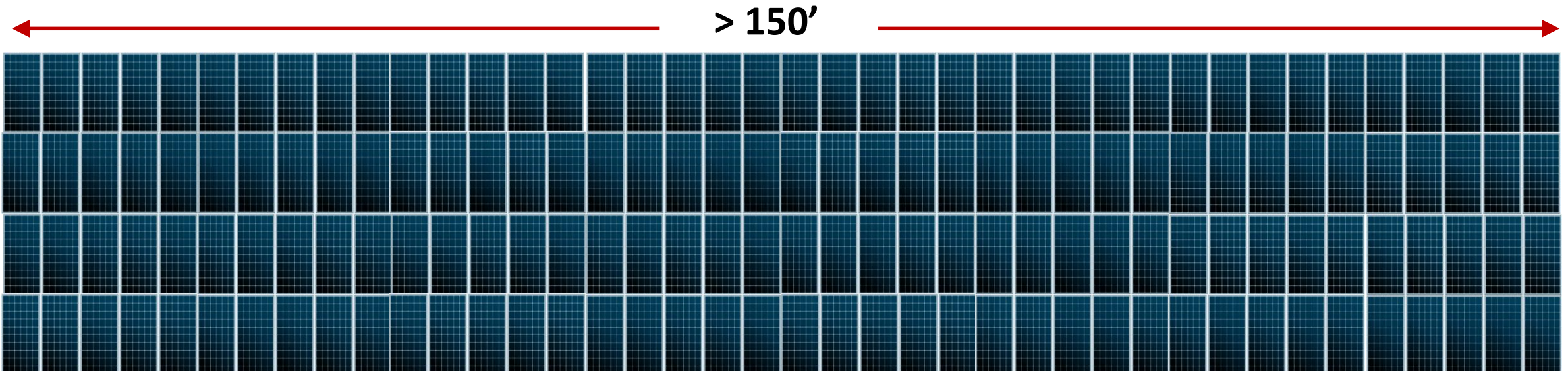


# Chapter 12 – Energy Systems

## 1204.3 Solar photovoltaic systems for roofs with slopes of 2:12 or less (flat roofs)

### – Interior pathways between array sections

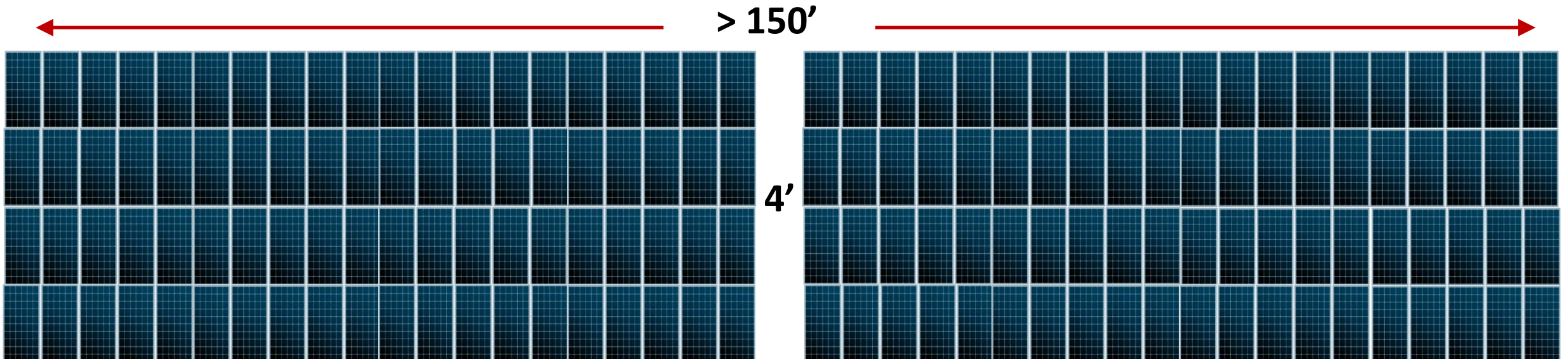
- At intervals not greater than 150 feet throughout the length and width of the roof



# Chapter 12 – Energy Systems

## 1204.3 Solar photovoltaic systems for roofs with slopes of 2:12 or less (flat roofs)

- Interior pathways between array sections (4 feet wide)
  - At intervals not greater than 150 feet throughout the length and width of the roof



# Chapter 12 – Energy Systems

## 1204.3 Solar photovoltaic systems for roofs with slopes of 2:12 or less (flat roofs)

### – Additional interior pathways (4 feet wide)

- Straight line pathways leading to roof standpipes or ventilation hatches
- Around roof access hatches, and at least one pathway leading to a roof edge or parapet
- From the perimeter pathway to an emergency escape and rescue opening



# Chapter 12 – Energy Systems

## 1204.3 Solar photovoltaic systems for roofs with slopes of 2:12 or less (flat roofs)

### – Smoke ventilation design

- For non-gravity-operated smoke and heat vents, a pathway not less than 4 feet wide bordering all sides

### – Ventilation options between arrays

- A pathway not less than 8 feet wide
- For gravity-operated dropout smoke and heat vents, a pathway not less than 4 feet wide on at least one side
- A pathway not less than 4 feet wide bordering 4-foot by 8-foot venting cutouts every 20 feet on alternating sides of the pathway

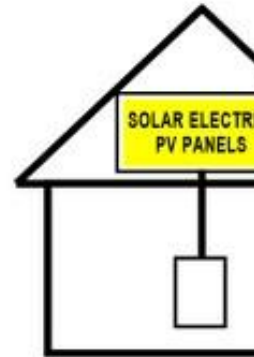
# Chapter 12 – Energy Systems

## 1204.5 Buildings with rapid shutdown



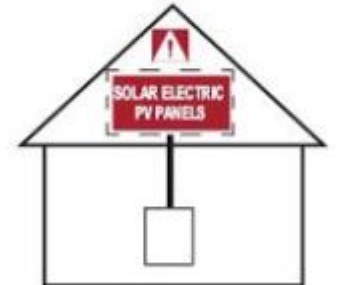
**SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN**

TURN RAPID SHUTDOWN SWITCH TO THE "OFF" POSITION TO SHUTDOWN PV SYSTEM AND REDUCE SHOCK HAZARD IN ARRAY



**SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN**

TURN RAPID SHUTDOWN SWITCH TO THE "OFF" POSITION TO SHUT DOWN CONDUCTORS OUTSIDE THE ARRAY. CONDUCTORS WITHIN ARRAY REMAIN ENERGIZED IN SUNLIGHT



# Chapter 12 – Energy Systems

## 1204.5 Buildings with rapid shutdown

### – 1204.5.1.2 Location.

- Within 3 feet from the service disconnecting means to which the photovoltaic systems are connected
- Shall indicate the location of all identified rapid shutdown switches if not at the same location

# Chapter 12 – Energy Systems



# Chapter 12 – Energy Systems

## SECTION 1205: STATIONARY FUEL CELL POWER SYSTEMS

- New section added to the 2018 IFC
- Summary of provisions
  - Applies to both new and existing installations
  - Permit required
  - Equipment listed to CSA FC 1
  - Technical report and review for field-fabricated systems
  - Other standards include NFPA 70, NFPA 853, and NFPA 2



# Chapter 12 – Energy Systems

## SECTION 1205: STATIONARY FUEL CELL POWER SYSTEMS

- New section added to the 2018 IFC
- Summary of provisions
  - Fire-resistance-rated separation of 1 or 2 hours based on occupancy
  - Vehicle impact protection
  - Ventilation and exhaust per NFPA 853
  - Fire suppression per NFPA 853
  - Gas detection system within enclosure

NFPA 853 - Standard for the Installation of Stationary Fuel Cell Power Systems



# Chapter 12 – Energy Systems

## 1206.2 Stationary storage battery systems

### Summary of new provisions

- Added a table of battery storage threshold quantities
- Contents of construction documents
- Hazard mitigation analysis of various system failures
- Vehicle impact protection
- Prohibited on floors more than 75 feet above the lowest level of FD access or more than 30 feet below the floor of the lowest level of exit discharge



# Chapter 12 – Energy Systems

## 1206.2 Stationary storage battery systems

### Threshold quantities triggering the provisions of Section 1206.2

TABLE 1206.2  
BATTERY STORAGE SYSTEM THRESHOLD QUANTITIES.

BATTERY TECHNOLOGY	CAPACITY <sup>a</sup>
Flow batteries <sup>b</sup>	20 kWh
Lead acid, all types	70 kWh
Lithium, all types	20 kWh
Nickel cadmium (Ni-Cd)	70 kWh
Sodium, all types	20 kWh <sup>c</sup>
Other battery technologies	10 kWh

For SI: 1 kilowatt hour = 3.6 megajoules.

a. For batteries rated in amp-hours, kWh shall equal rated voltage times amp-hour rating divided by 1000.

b. Shall include vanadium, zinc-bromine, polysulfide-bromide, and other flowing electrolyte-type technologies.

c. 70 kWh for sodium-ion technologies.



# Chapter 12 – Energy Systems

## 1206.2 Stationary storage battery systems

### Summary of new provisions

- Maximum size of battery arrays and separation
  - 50 kW with 3 feet separation
- Requirements for outdoor installations
- Maximum allowable quantities (per fire area)
- Listings for packaged and pre-engineered systems



# Chapter 12 – Energy Systems

## 1206.2 Stationary storage battery systems

TABLE 1206.2.9  
MAXIMUM ALLOWABLE BATTERY QUANTITIES

BATTERY TECHNOLOGY	MAXIMUM ALLOWABLE QUANTITIES <sup>a</sup>	GROUP H OCCUPANCY
Flow batteries <sup>b</sup>	600 kWh	Group H-2
Lead acid, all types	Unlimited	Not Applicable
Lithium, all types	600 kWh	Group H-2
Nickel cadmium (Ni-Cd)	Unlimited	Not Applicable
Sodium, all types	600 kWh	Group H-2
Other battery technologies	200 kWh	Group H-2 <sup>c</sup>

For SI: 1 kilowatt hour = 3.6 megajoules.

- For batteries rated in amp-hours, Kilowatt-hours (kWh) shall equal rated battery voltage times the amp-hour rating divided by 1,000.
- Shall include vanadium, zinc-bromine, polysulfide-bromide, and other flowing electrolyte-type technologies.
- Shall be a Group H-4 occupancy if the fire code official determines that a fire or thermal runaway involving the battery technology does not represent a significant fire hazard.

# Chapter 12 – Energy Systems

## 1206.2 Stationary storage battery systems

### Summary of new provisions

- **Fire sprinkler system required**
  - Alternative extinguishing system for EESS having water-reactive materials
- Gas detection system
  - Where required by the hazard mitigation analysis, or
  - For systems capable of producing toxic or highly toxic gases
- Specific provisions based on battery type



# Chapter 12 – Energy Systems

## 1206.3 Capacitor energy storage systems

- **New section on the requirements for capacitor energy storage systems**
  - Similar in scope to stationary storage battery systems



# Significant Changes in the “Upper” Chapters

## CHAPTER 57 FLAMMABLE AND COMBUSTIBLE LIQUIDS

User note:

About this chapter: Chapter 57 provides requirements that are intended to reduce the likelihood of fires involving the storage, handling, use or transportation of flammable and combustible liquids. Adherence to these practices may also limit damage in the event of an accidental fire involving these materials. These liquids are used for fuel, lubricants, cleaners, solvents, medicines and even drinking. The danger associated with flammable and combustible liquids is that the vapors from these liquids, when combined with air in their flammable range, will burn or explode at temperatures near normal living and working environments. The regulations herein are intended to prevent the flammable and combustible liquids from being spilled and provide marking requirements for when a fire does occur.

### SECTION 5701 GENERAL

5701.1 Scope and application. Prevention, control and mitigation of dangerous conditions related to storage, use, dispensing and handling of flammable and combustible liquids shall be in accordance with Chapter 50 and this chapter.

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 runways in Chapter 23.

2. Medicines, foodstuffs, cosmetics and commercial or institutional products containing not more than 50 percent by volume of water-miscible liquids and with the remainder of the solution not being flammable, provided that such materials are packaged in individual containers not exceeding 1.3 gallons (5 L).

3. Quantities of alcoholic beverages in retail or wholesale sales or storage occupancies, provided that the liquids are packaged in individual containers not exceeding 1.3 gallons (5 L).

4. Storage and use of fuel oil in tanks and containers connected to oil-burning equipment. Such storage and use shall be in accordance with Section 603. For storage of fuel oil tanks, this chapter applies.

5. Refrigerant liquids and oils in refrigeration systems (see Section 605).

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 99°F (35°C) in a water-miscible solution or dispersion with a water and inert (noncombustible) solids content of more than 80 percent by weight, which do not sustain combustion.

9. Liquids without flash points that can be flammable under some conditions, such as certain halogenated hydrocarbons and mixtures containing halogenated hydrocarbons.

10. The storage of distilled spirits and wines in wooden barrels and casks.

11. Commercial cooking oil storage tank systems located within a building and designed and installed in accordance with Section 608 and NFPA 30.

5701.3 Referenced documents. The applicable requirements of Chapter 50, other chapters of this code, the *International Building Code* and the *International Mechanical Code* pertaining to flammable liquids shall apply.

5701.4 Permit. Permits shall be required as set forth in Section 105.6 and 105.7.

5701.5 Material classification. Flammable and combustible liquids shall be classified in accordance with the definitions in Chapter 2.

When mixed with lower flash-point liquids, Class II or III liquids are capable of assuming the characteristics of the lower flash-point liquids. Under such conditions, the appropriate provisions of this chapter for the actual flash point of the mixed liquid shall apply.

When based above their flash points, Class II and III liquids assume the characteristics of Class I liquids. Under such conditions, the appropriate provisions of this chapter for flammable liquids shall apply.

### SECTION 5702 DEFINITIONS

5702.1 Definitions. The following terms are defined in Chapter 2:  
ALCOHOL-BASED HAND RUB.  
BULK PLANT OR TERMINAL.  
BULK TRANSFER.  
COMBUSTIBLE LIQUID.  
Class II.  
Class IIIA.  
Class IIIB.  
FIRE POINT.

# Chapter 53 – Compressed Gases

## 5307.3 Insulated liquid carbon dioxide systems used in beverage dispensing applications

- Insulated liquid carbon dioxide systems with more than 100 pounds of CO<sup>2</sup> shall be provided with either:
  - Mechanical ventilation per Section 5004.3
  - Gas detection system per Section 5307.3.2



# Chapter 53 – Compressed Gases

## 5307.3 Insulated liquid carbon dioxide systems used in beverage dispensing applications

### – Mechanical ventilation per Section 5004.3

- Installation per mechanical code
- Maintain negative pressure
- Designed to prevent accumulation of vapors
- Minimum rate of  $1 \text{ ft}^3/\text{min}/\text{ft}^2$
- Continuous operation unless an alternate design is approved
- Exhaust air cannot be recirculated
- Manual emergency shutoff

# Chapter 53 – Compressed Gases

## 5307.3 Insulated liquid carbon dioxide systems used in beverage dispensing applications

### – 5307.3.2 Gas detection system

- Required at indoor locations and below-grade outdoor locations
- CO2 sensors within 12 inches of the floor or where approved
- Activates audible and visible alarm supervisory alarm at a normally attended location at 5,000 ppm
- Activates audible and visible alarm within the room or immediate area at 30,000 ppm





# Chapter 53 – Compressed Gases

## 5307.4 Carbon dioxide enrichment systems

- Permit and documentation requirements
- Gas detection system
- Pressurization and ventilation provisions



# On-Demand Mobile Fueling

## Tank vehicles and vehicle operation

### 5706.6.4 Portable fire extinguisher\*

- **Model code language required:**

- A minimum rated 2-A:20-BC fire extinguisher
- During unloading the extinguisher shall be removed from its carrying device and placed 15 feet or more from the unloading vales

- **Conflicted with 49 CFR 393.95 and 177.834**

- **Amended to conform with federal regulations**

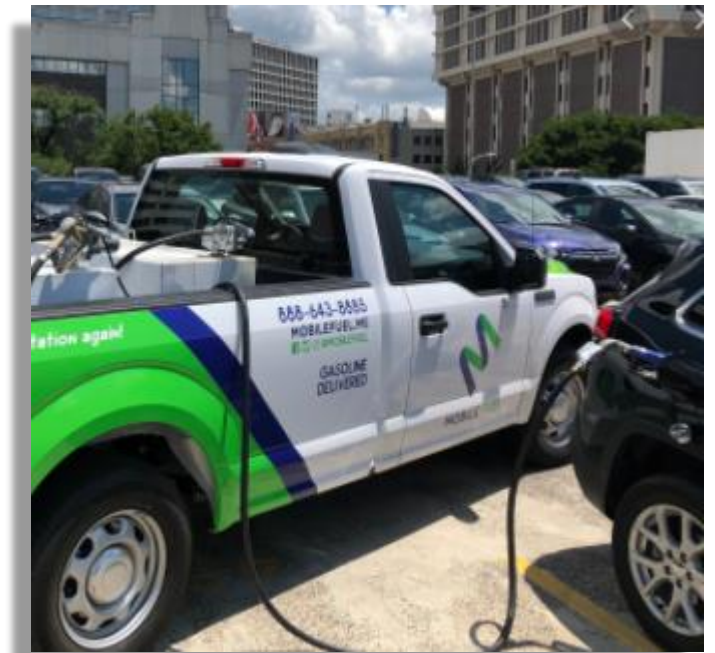
- Minimum rated 10-B:C extinguisher, and
- No requirement to remove extinguisher from its mount

# On-Demand Mobile Fueling

## SECTION 5707

### ON-DEMAND MOBILE FUELING OPERATIONS

**MOBILE FUELING.** 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.”



# On-Demand Mobile Fueling

## SECTION 5707

### ON-DEMAND MOBILE FUELING OPERATIONS

- Requires a permit and approval from the fire code
- Can occur only at approved locations
- Dispensing from a vehicle with chassis-mounted tanks or containers up to 1,200 gallon aggregate capacity
- Vehicles with a mounted tank > 110 gallons shall comply as a tank vehicle per 5706.6 and NFPA 385
  - NFPA 385 - *Standard for Tank Vehicles for Flammable and Combustible Liquids*

# On-Demand Mobile Fueling

## SECTION 5707

### ON-DEMAND MOBILE FUELING OPERATIONS

- **5707.2 Mobile fueling vehicle\***
  - Amended to remove the allowance to dispense from 5-gallon listed metal safety containers
- **Safety and Emergency response plan**
  - Policies and procedures for:
    - Fire safety
    - Spill prevention and control
    - Personnel training
    - Compliance with other applicable requirements of this code



# On-Demand Mobile Fueling

## SECTION 5707

### ON-DEMAND MOBILE FUELING OPERATIONS

#### – Training records

- Mobile fueling vehicles 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

# On-Demand Mobile Fueling

## SECTION 5707

### ON-DEMAND MOBILE FUELING OPERATIONS

- **Site plan for each fueling location** (where required by the code official), indicating:
  - Buildings, structures, lot lines, property lines
  - Appurtenances on site and their use or function
  - All uses adjacent to the lot lines of the site
  - Fueling locations, the locations of all storm drain openings and adjacent waterways or wetlands
  - Information regarding slope, natural drainage, curbing, impounding and how a spill will be kept on the site property
  - The scale of the site plan

# On-Demand Mobile Fueling

## SECTION 5707

### ON-DEMAND MOBILE FUELING OPERATIONS

#### – Mobile fueling prohibited:

- On public streets or public ways
- Inside buildings
- On the roof level of parking structures or other buildings
- Within 25 feet of buildings, property lines or combustible storage
- Within 15 feet of a storm drain unless an approved cover or an equivalent method is used to prevent any fuel from reaching the drain





# On-Demand Mobile Fueling

## SECTION 5707

### ON-DEMAND MOBILE FUELING OPERATIONS

#### – Sources of ignition

- Smoking, open flame or other ignition sources prohibited within 25 feet of fuel dispensing
- Signs prohibiting smoking or open flames within 25 feet of the vehicle or the point of fueling shall be prominently posted on the mobile fueling vehicle



# On-Demand Mobile Fueling

## SECTION 5707: ON-DEMAND MOBILE FUELING OPERATIONS

### – Equipment

- Dispensing hose and nozzle listed and approved
- Dispensing hose limited to 50 feet in length
- Fuel limiting switch that automatically shuts down after 30 gallons has been dispensed AND a nozzle or other approved device that, when activated, immediately stops the flow of fuel
- Minimum rated 40-B:C fire extinguisher mounted on vehicle with clearly visible signage indicating location
- An approved 5-gallon spill kit



# On-Demand Mobile Fueling

## SECTION 5707

### ON-DEMAND MOBILE FUELING OPERATIONS

#### – Operations

- Fueling is constantly attended with brakes set and warning lights in operation
- Fueling vehicles shall not obstruct emergency vehicle access roads
- **Dispensing hose must be:**
  - Positioned so as not to subject to vehicular damage
  - Properly recoiled in its reel or enclosed in its compartment before fueling vehicle can be moved

# On-Demand Mobile Fueling

## SECTION 5707

### ON-DEMAND MOBILE FUELING OPERATIONS

#### – Operations

- Drip pan or absorbent pad placed beneath nozzle and fill opening before and during dispensing
- Spills in reportable quantities shall be reported per Section 5003.3.1