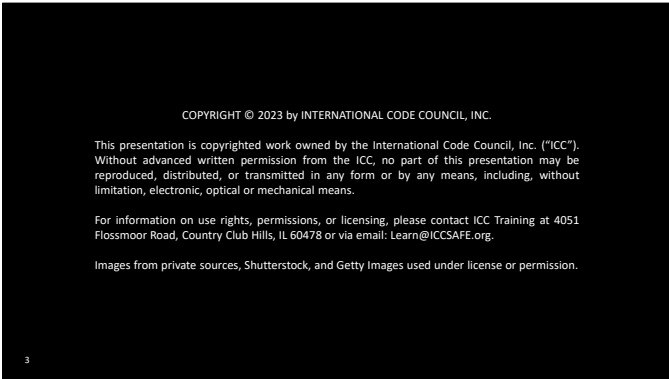




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3



4

INSTRUCTOR

Name

▪ Title

▪ International Code Council, Inc.

▪ Credentials

▪ name@iccsafe.org

5



6

GOAL & OBJECTIVES


This course...

1) Participants should be able to identify significant changes from the 2018 IFC to the 2024 IFC.

2) Participants should be able to identify new chapters in the 2024 IFC.

3) Participants should be able to understand the intent of the changes.

4) Participants should be able to explain the application of the changes.




7

REALITY CHECK

Why Does This Matter?

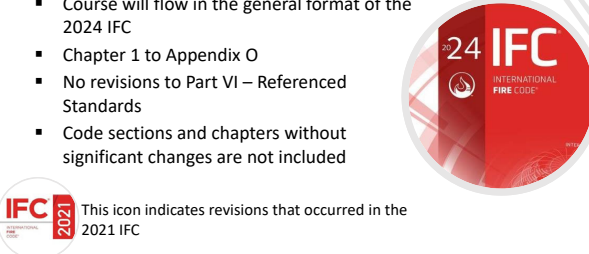
- Does 3D printing present a hazard?
- Is valet trash collection allowed by the IFC?
- What are the new/revised fire sprinkler requirements?
- What are the current requirements for lithium-ion and lithium metal batteries?
- How can a puzzle room (escape room) comply with the egress requirements?



8

COURSE OUTLINE


- Course will flow in the general format of the 2024 IFC
- Chapter 1 to Appendix O
- No revisions to Part VI – Referenced Standards
- Code sections and chapters without significant changes are not included



9

Part I

Administrative
Chapters 1 – 2



10

11

104 Duties & Powers of the Fire Code Official

- Section completely rewritten
- Same text in all I-Codes, so the codes are consistent when dealing with an alternate method that affects multiple codes
- Includes technical assistance and peer review
- Alternative methods clarified and guidance added for review and approval

11

12

104.2 Determination of Compliance

- Three paths to demonstrate compliance with the code:
 1. Comply with the specific requirements
 2. Submit a Request for use of an Alternative Method or Materials.
 3. Where specific code requirements cannot be met, the Fire Code Official (FCO) has the authority to modify code requirements.

12

13

104.2.3.4 Equivalency criteria

An alternative material, design or method of construction shall, for the purpose intended, be not less than the equivalent of that prescribed in this code with respect to all of the following, as applicable:

1. Quality
2. Strength
3. Effectiveness
4. Durability
5. Safety, other than fire safety
6. Fire safety

- Request for approval of an alternative method can be submitted for any code requirement
- Alternative must show equivalency in 6 characteristics
- Safety is listed separately from Fire Safety

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104.2.4 Modifications

Where there are practical difficulties involved in carrying out the provisions of this code, the fire code official shall have the authority to grant modifications in accordance with Section 104.2.4.1 or 104.2.4.2.


- Modifications are different than alternative methods
- The FCO is authorized to modify the code requirements where there are practical difficulties in complying with the code
- §104.2.4.2 addresses modifications that are necessary during, or in preparation for, a natural disaster
 - Temporary; end date established
 - Pandemic: dining tables in the street

14

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104.7 Official Records

- Whether approved or disapproved, written response is required for:
 - Plans
 - Request to use an alternative method
 - Request for modification
- Records retained for 5 years or for as long as the structure or activity remains in existence



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202 Change of Occupancy

Either of the following shall be considered as a change of occupancy where this code requires a greater degree of safety, accessibility, structural strength, fire protection, means of egress, ventilation or sanitation than is existing in the current building or structure:

1. Any change in the occupancy classification of a building or structure.
2. Any change in the purpose of, or a change in the level of activity within, a building or structure.

- A change of occupancy occurs when a new use or activity requires a greater degree of safety features
- Either the occupancy classification is changed, **OR**
- The occupancy classification remains the same, but the new activity requires additional safety provisions

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202 Flammable Gas Definition

A material which is a gas at 68°F or less at 14.7 psia subdivided as follows:

- Category 1A. A gas that meets either of the following:
 - 1.1. A gas which is ignitable at 14.7 psia when in a mixture of 13% or less by volume with air; or
 - 1.2. A gas with a flammable range at 14.7 psia with air of not less than 12%, regardless of the lower limit, unless data shows compliance with Category 1B.
- Category 1B. A gas which meets the flammability criteria for Category 1A, is not pyrophoric or chemically unstable, and meets one of more of the following:
 - 2.1. A lower flammability limit of more than 6% by volume of air; or
 - 2.2. A fundamental burning velocity of less than 3.9 inches/second.

The limits specified shall be determined at 14.7 psi and a temperature of 68°F in accordance with ASTM E681.

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

- Flammable gas split into 2 categories
 - Traditional flammable gas (CNG, hydrogen)
 - Slow flame spread (difluoromethane, A2L refrigerants)
- Correlates with Global Harmonization System (GHS)

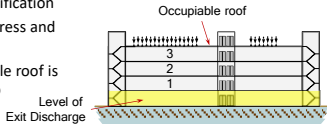
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202 Occupiable Roof

An exterior space on a roof that is designed for human occupancy, other than maintenance or repair, and which is equipped with a means of egress system meeting the requirements of this code.

- Occupiable roof is **not** considered a floor
- Occupiable roof does **not** change the building height
- Occupiable roof must meet egress requirements applicable to the occupancy classification
- Occupiable roof must meet all egress and accessibility requirements
- Elevator required **IF** the occupiable roof is above the 3rd floor above the LED




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203 Occupancy Classification

- Occupancy classifications moved from definitions to §203
- Text duplicated out of IBC Ch 3




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203.10 Storage of Alcoholic Beverages

- Storage of beverages with an alcohol content >20% is Group S-1
- Storage of beverages with an alcohol content ≤20% is Group S-2

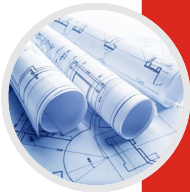


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21

Part II

General Safety Provisions
Chapters 3 – 4



21

22

304.1.1 Valet Trash


- Valet trash collection is an intermediary service that removes trash or recycling materials placed outside of dwelling units or sleeping units for final collection
 - Includes collection of recyclable materials
- Valet trash collection is only allowed where specifically approved
 - No permit
 - Only guidance/requirements are in Appendix O

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304.3 Trash Containers

- Requirements for containers for combustible rubbish are revised
- Containers >40 gallons must be of non-combustible materials or low heat release materials
 - Peak heat release $\leq 300 \text{ kW/m}^2$
- Exceptions
 - Dumpsters in sprinklered areas
 - Containers in dedicated storage buildings of Type I or IIA construction




23

24

304.3.6 Waste/Linen Containers – Group I

- Waste and linen containers in Groups I-1, I-2 and I-3 and ambulatory care facilities must be of noncombustible materials or low heat release materials
- Containers >32 gallons must be in waste or linen collection rooms
 - Incidental use
 - Waste or linen collection rooms >100 ft² must be of 1-HR construction or sprinklered




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304.3.7 Waste Containers – Group R-2

- Waste containers ≥ 20 gallons in Group R-2 college and university dormitories must be of noncombustible materials or low heat release materials
- Portable waste containers >32 gallons must be in waste collection rooms
 - Incidental use
 - Waste or linen collection rooms >100 ft² must be of 1-HR construction or sprinklered




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314.4 Indoor Vehicle Display

- Ignition batteries must be disconnected **IF** required by FCO
- Fuel tanks cannot exceed:
 - 5 gallons for Class I, II or III liquid fuel
 - ¼ tank or 6.6 gallons for LPG
 - ¼ tank or 630 ft³ for CNG
 - ¼ tank or 2,000 ft³ for hydrogen




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317.2 Vegetative and Landscaped Roofs


- IBC covers design and construction
 - New standard – ANSI/SPRI VF-1 External Fire Design for Vegetative Roofs
 - Separations and maximum areas did not change, but are now in standard
- IFC covers maintenance
 - Maintenance plan
 - Removal of dead material



Landscaped roof is an area over a roof assembly incorporating planters, vegetation, hardscaping or other similar decorative appurtenances that are not part of the roof assembly

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

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319 Additive Manufacturing

| Industrial additive manufacturing | Non-industrial additive manufacturing |
|--|--|
| <ul style="list-style-type: none">▪ Utilize combustible powders or metals, an inert gas supply, a combustible dust collection system, or creates a hazardous (classified) location area or zone outside of the equipment | <ul style="list-style-type: none">▪ 3D printing operations that do not create a hazardous (classified) location area outside of the equipment, and do not utilize an inert gas supply or a combustible dust collection system |

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319.2 Nonindustrial Additive Manufacturing

- No permit required
- Must be listed
- Self-contained unit
- ≤30 L of production material



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319.3 Industrial Additive Manufacturing

- Operational permit required
- Listed to UL 2011
- Use of gases must comply with Ch 53
- FCO can require technical assistance and require an evaluation report
- Only allowed in manufacturing facilities (Group F)
- If the quantities of hazardous materials exceed the maximum allowable quantity per control area, the room or building will become Group H

30

320 Storage of Lithium Batteries

- Storage of lithium-ion and lithium metal batteries regulated
- Exceptions:
 1. New or refurbished batteries *installed in* equipment, devices or vehicles they are designed to power
 2. New or refurbished batteries *packed for use with* equipment, devices or vehicles they are designed to power
 3. Batteries in original retail packaging with a rating ≤300 watt-hours for lithium-ion or contain ≤25 grams of lithium metal for lithium metal batteries



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320 Storage of Lithium Batteries

- Storage of lithium-ion and lithium metal batteries regulated
- Exceptions:
 - 4. Temporary storage of batteries or battery components during the battery manufacturing process prior to completion of final quality control checks
 - 5. Temporary storage of batteries during the vehicle manufacturing or repair process

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320 Storage of Lithium Batteries

- Permit required for lithium battery storage $\geq 15 \text{ ft}^3$
- Fire safety and evacuation plan required
- 3 storage configuration options
 - A single facility may use more than one storage configuration
 1. Containers
 2. Indoor storage room
 3. Outdoor storage room

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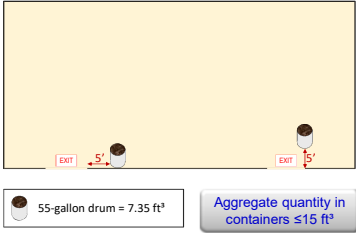
322.4.1 Battery Storage in Containers

- Maximum of 15 ft^3 of lithium-ion or lithium metal batteries can be stored in containers
- Containers shall be:
 - Open-top with a capacity of $\leq 7.5 \text{ ft}^3$
 - Containers of noncombustible materials or approved for battery collection
 - Groups of containers $\leq 7.5 \text{ ft}^3$
 - Groups of containers separated by $\geq 3'$ of open space, **OR** $\geq 10'$ of space that contains combustible materials
 - Containers shall be located $\geq 5'$ from exits or exit access doors

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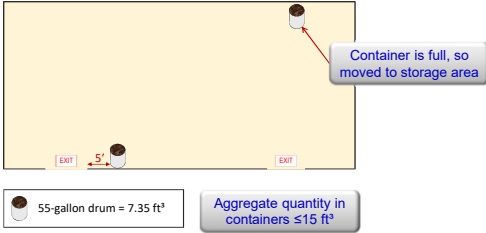
Collection Containers: 55-gallon drums



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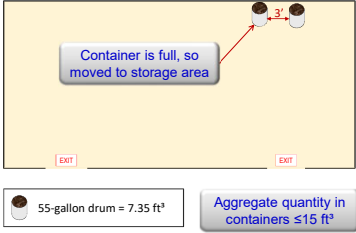
Collection Containers: 55-gallon drums



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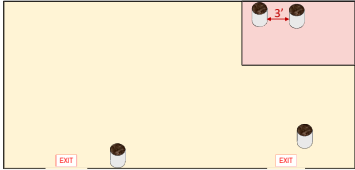
Collection Containers: 55-gallon drums



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Indoor Battery Storage Room

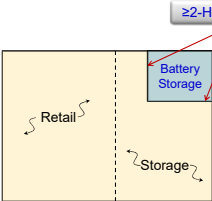


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320.4.2.2 Indoor Battery Storage Areas

▪ In mixed-use buildings, the battery storage area shall be separated from the remainder by 2-HR fire barriers



2-HR separation **NOT** required **IF**:

1. Batteries are stored in approved prefabricated portable structure
2. Only new batteries and they are in packaging designed to contain a fire in the package

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320.4.2.1 Technical Opinion and Report

▪ Technical opinion and report to evaluate the fire and explosion risks associated with the indoor storage of lithium-ion and lithium metal batteries and evaluate:

- The potential for deflagration of flammable gases released during a thermal runaway event
- The basis of design for sprinkler system or other approved fire suppression system
- Sprinkler design shall be based on full-scale fire testing or another approved method of demonstrating sufficiency of the recommended design

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320.4.2 Indoor Battery Storage Areas

- Indoor battery storage areas for lithium-ion or lithium metal batteries must be protected with:
 - Sprinklers or fire-extinguishing system
 - Design based on the technical opinion and report
 - Fire detection and alarm system
 - Detection shall be air-aspirating smoke detection or radiant energy-sensing fire detection
 - Explosion control when required in the technical opinion and report

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320.4.2.6 Reduced Requirements for Indoor Storage

- Where the state of charge is demonstrated to be $\leq 30\%$ for lithium-ion or lithium metal batteries, the following protection features are not required:
 - Technical opinion and report
 - Separation with 2-HR construction
 - Explosion control

Fire-extinguishing system and fire alarm system still required

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320.4.3.1 Outdoor Battery Storage Areas

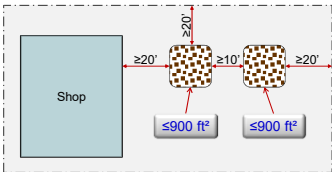
- Outdoor storage of lithium-ion or lithium metal batteries shall be:
 - $\geq 20'$ from any building, lot line, public street, public alley, public way or means of egress
 - Separation can be reduced to 3' if separated by a 2-HR fire-resistance rated assembly without openings or penetrations and extending $\geq 5'$ above and to the sides of the battery storage area
 - Separation can be reduced to 3' if batteries are contained in approved prefabricated portable structures providing a complete 2-HR fire-resistance rated enclosure

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320.4.3.2 Outdoor Battery Storage Areas

- Outdoor storage shall be in piles ≤ 900 ft²
- Piles shall not exceed 10' in height
- Piles shall be separated by $\geq 10'$ of open space



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320.4.3.2 Outdoor Battery Storage Areas


- The size, separation or protection requirements for outdoor storage areas for lithium-ion and lithium metal batteries are not affected by a roof covering or weather protection as provided in IBC §414.6.1
- Outdoor storage areas shall be protected with a fire detection and alarm system with radiant energy-sensing detection
- Prefabricated portable structures for storage of batteries shall be treated as outdoor storage areas

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321 Artificial Combustible Vegetation

- Regulates artificial combustible vegetation >6' in height and permanently installed outdoors $\leq 5'$ of a building or on the roof of a building
 - Exception: Artificial decorative vegetation >30' from the exterior wall of a building
- Flame retardant and tested to NFPA 701 or NFPA 289



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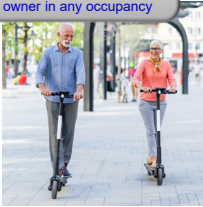
322 Powered Micromobility Devices

- Micromobility devices powered by lithium-ion or lithium metal batteries are regulated
- Battery charging areas
 - Chargers must be listed and from original equipment manufacturer
 - Extension cords and power taps prohibited
 - Removed batteries shall not be stacked
 - Removed batteries separated $\geq 18"$ while charging
 - Fire alarm system required

Exceptions:

1. Devices for personal use in residential occupancies

2. Charging performed by the owner in any occupancy



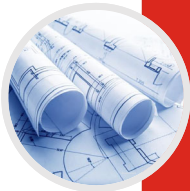
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Part III


Building and Equipment Design Features

Chapters 5 – 12



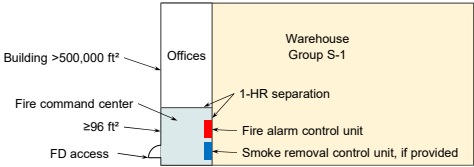
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508.1 Fire Command Center

- Fire command center now required in Group F-1 and S-1 where the building footprint $>500,000$ ft²
- Fire command center must be a ≥ 96 ft² with the smallest dimension $>8'$



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202 Definitions

Emergency Responder Communications Enhancement System (ERCES). An infrastructure solution installed within a building to enhance the communications capabilities for first responders that utilizes solutions such as a signal booster, voting receiver, base station or other technology capable of enhancing the radio frequency (RF) to ensure effective public safety communications.

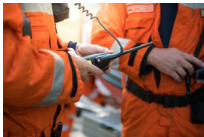
- New definition
- Revised to include all methods of communications
- Same concept and system

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510.4.1 Signal Strength

- ERCES provisions are expanded to include usable communications for all technologies available
- Required downlink signal strength for narrowband analog, digital or wideband LTE signals is a minimum Delivered Audio Quality (DAQ) of 3.0
 - Downlink signal is no longer required to meet - 95 dBm
- Bit Error Rate (BER) or Signal-to-Interference-Plus-Noise Ratio (SINR) measurements can be used for analog or digital signals



DAQ 3.0 = speech is understandable with slight effort, with occasional repetition due to noise or distortion


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510.4.2 Interference

- Equipment for ERCES must be listed to UL 2524
- Must be provided with oscillation detection
- Signal boosters and RF-emitting devices must have built-in oscillation detection and control capability



Bidirectional Amplifier
Photo courtesy of Radio Solutions, Inc.

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604.7 Storage in Elevator Spaces

▪ Storage is specifically prohibited in:

▪ Elevator lobbies where hoistway opening protection is required

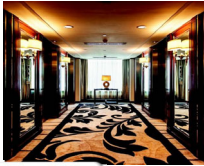
▪ Elevator machine rooms

▪ Elevator cars

Exceptions for:

1. Blankets for protection of elevator cab during construction

2. Materials necessary of operation and maintenance of elevator equipment



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604.5.1 Fire Service Access Elevators

▪ Storage **and furniture** are prohibited in elevator lobbies for:

▪ Fire service access elevators

▪ Occupant evacuation elevators



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605.4.2.2 Fuel Oil Storage Tanks

▪ Fuel oil storage tanks containing Class II or III combustible liquids are permitted, provided:

≤660 gallons

Tank listed to UL 80

≤1,320 gallons

Tank listed to UL 142
WITH 2nd containment
AND building is sprinklered with NFPA 13

≤3,000 gallons

Tank listed to UL 2085
AND building is sprinklered with NFPA 13


▪ Quantity is **not** counted in the MAQ

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608.1.1 CO₂ Mechanical Refrigeration

- Mechanical refrigeration systems regulated in the 2024 IFC are those with a refrigerant that is toxic, highly toxic, flammable or ammonia
- Mechanical refrigeration system with CO₂ refrigerant are now included in the IFC
- CO₂ systems must comply with IIAR CO₂ *Safety Standard for Closed-Circuit Carbon Dioxide Refrigeration Systems*




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608.9 Ammonia Mechanical Refrigeration

- Provisions for ammonia mechanical refrigeration systems are removed from the IFC
- Now found in the referenced standards IIAR 2, IIAR 6, IIAR 7, IIAR 8 and IIAR 9
- Issues of refrigerant detection, labeling, ventilation, discharge, and treatment, if any, are contained in the standards




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608.12 Storage of Refrigerants

- Many new refrigerants are classified as flammable gas
- Temporary storage of refrigerants during maintenance and repair of refrigeration systems is exempted from the general storage requirements
- Temporary storage is allowed where the refrigerant is removed from the system and will be reinstalled once the work is complete



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701.6 Fire-resistance-rated Construction

▪ IFC includes requirements to maintain the fire-resistance rating of Type IVA and IVB construction




Photo courtesy of the American Wood Council

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701.6 Fire-resistance-rated Construction

▪ **IBC** now includes

▪ Type IVA construction

- Exterior walls protected with 40-min fire resistance
- Interior walls protected with 80-min fire resistance


▪ Type IVB construction

- Exterior walls protected with 40-min fire resistance
- Interior walls protected with 80-min fire resistance
- ≤40% of walls and ≤40% of ceilings can be exposed

▪ Type IVC construction

- No added fire-resistance

1 layer of 5/8" Type X gypsum wallboard = 40 minutes



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705.2.7 Rolling Steel Fire Door Testing


▪ Rolling steel fire doors have unique requirements necessitating inspection and maintenance to be performed by trained personnel

▪ Annual testing is required

▪ Critical to reset the tension properly for rolling fire doors

- Drop speed between 6"/second and 24"/second

▪ Records must be maintained



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IFC

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708.1 Sprayed Fire-Resistant Materials


- Intumescent fire-resistant materials and spray applied fire-resistant materials must be visually inspected and maintained
- §701.6 requires annual inspection



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903.2 Sprinklers: Telecommunication Batteries


- Batteries for telecommunications equipment are no longer exempt from fire sprinkler requirements
- *IF* §1207 requires fire sprinklers for the ESS system, then fire sprinklers must be installed, and the exception does not apply
- See §1207.5.5
 - Depends on type of battery and storage capacity



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903.2.2, 903.2.7.3 Sprinklers: Lithium Batteries

- Fire sprinkler system required throughout **fire areas** of Group B for research and development or testing of lithium-ion or lithium metal batteries
- Fire sprinkler system required in the **room or space** of Group M *IF* required by
 - §320 for collection, storage or display
 - Ch 32 for high-piled storage




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903.2.4 Sprinklers: Lithium Batteries

- Fire sprinkler system required throughout the **building**:
 - Group F-1 for manufacturing of lithium-ion or lithium metal batteries
 - Group F-1 for manufacturing of vehicles powered by lithium-ion or lithium metal batteries
 - Group S-1:
 - Storage of vehicles powered by lithium-ion or lithium metal batteries with fire area >500 ft²
 - Repair of vehicles powered by lithium-ion or lithium metal batteries with fire area >500 ft²

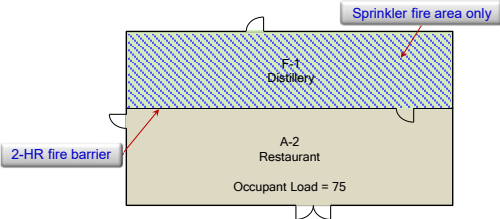


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903.2.4.2 Distilled Spirits

- Sprinkler system is required throughout the fire area of Group F-1 used for manufacture of distilled spirits



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903.2.9.3 Distilled Spirits

- Sprinkler system is required throughout the fire area of Group S-1 used for bulk storage of distilled spirits or wine

Distilled spirits and wine with an alcohol content of ≤20% would be classified as Group S-2

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IFC

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903.2 Upholstered Furniture & Mattresses

- Manufacturing, storage and retail display of upholstered furniture and mattresses requires a sprinkler system IF:
 - Group F-1: fire area used for manufacturing >2,500 ft²
 - Group M: fire area used for display and sale >5,000 ft²
 - Group S-1: fire area used for storage >2,500 ft²

Self-service storage facilities are listed as Group S-1 occupancies



Exception for 1-story self-service storage facilities with direct access to each unit from the exterior

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903.2.8.3 Sprinklers: Group R-4

- Fire sprinklers are required in all Group R
- Fire sprinklers are required in Group R-4 Condition 1 and Condition 2
- NFPA 13D allowed in Group R-3 and R-4 Condition 1
- NFPA 13D not allowed in Group R-3 and R-4 Condition 2
 - NFPA 13
 - NFPA 13R **IF** ≤4 stories above grade plane **AND** the roof assembly <45' above the LLFDVA



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903.2.10 Group S-2 Parking Garage

- Enclosed and open parking garages now have thresholds for the installation of a sprinkler system
 - Enclosed parking garage with a fire area >12,000 ft²
 - Enclosed parking garages located beneath other occupancies except Group R-3
 - Open parking garage with a fire area >48,000 ft²



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903.2.10.2 Mechanical-access Parking Garage

- Sprinkler system is required throughout buildings used as a mechanical-access parking garage
- Engineered design is required for the sprinkler system


Mechanical-access enclosed parking garage is an enclosed parking garage which employs parking machines, lifts, elevators or other mechanical devices for vehicle moving from and to street level and in which public occupancy in the garage is prohibited in all areas except the vehicle access bay



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903.3.1.1.1 Exempt Sprinkler Locations

- Exceptions 1 & 2 have been combined because there is little differentiation between them
- Item 1 allows sprinklers to be omitted where the application of sprinkler water can create a serious life or fire hazard
- NOTE: where sprinklers are omitted in accordance with §903.3.1.1.1, the building is still considered fully sprinklered



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903.3.1.1.3 Sprinklers: Lithium Batteries

- Fire sprinkler design criteria is not readily available to protect lithium-ion or lithium metal batteries
- Densities change based on individual components, encasement and manufacturer
- Sprinkler densities to be based on fire tests

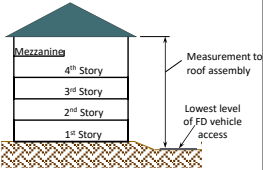


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903.3.1.2 NFPA 13R Sprinkler Installations

- Maximum of 4 stories
 - Counted from grade plane
- Maximum height is:
 - Top floor ≤30' above LLFDVA for other than Group R-2
 - For Group R-2, roof assembly ≤45' above LLFDVA
 - Measured to top of parapet at exterior wall, or eave of highest pitched roof




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903.4 Sprinkler Alarms

- Local exterior alarm is required for sprinkler systems
 - Audible **and** visual
 - Not required for 1- and 2-family dwellings
- Electrical supervision required for valves, pumps, tanks, waterflow switches
 - Not required for 1- and 2-family dwellings
 - Not required for limited area sprinkler systems unless the building has a required fire alarm system
- Monitoring is required for sprinkler systems
 - Supervising station or constantly attended location



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904.12 Hybrid Fire-extinguishing System

- Hybrid fire-extinguishing systems recognized by the code
 - Do not replace sprinkler system
 - As noted in §904.2.1, are not considered an alternative sprinklers with regard to code modifications
- Installed in accordance with NFPA 770
- Consist of water spray and inert gas

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904.14.1 Manual Activation Device

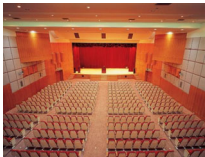
- Manual activation device is required for fire-extinguishing systems protecting cooking appliances
- Located 42" to 48" above the floor
- Located 10' to 20' from cooking appliances
- New exception allows the FCO to accept other distances where 10' to 20' is not feasible
 - Must be in path of egress
 - Must be visible



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905.5.1 Standpipes: Stages

- Standpipe connection no longer required on stages
- Standpipe connection no longer required on each tier of dressing rooms
- Standpipe connections still required:
 - On each side of the rear of the auditorium
 - On each side of the balcony



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907.2.1 Fire Alarm: Group A-5

- Manual fire alarm system is required for all Group A with ≥300 occupants or ≥100 occupants above or below the LED
- System is not required for Group A-5 if:
 - >15,000 occupants
 - PA system with standby power is provided
 - Enclosed spaces ≤10% of the area and ≤1,000 ft²
 - All means of egress are open to the outside




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80

907.2 Fire Alarm: Lithium Batteries

- Automatic fire alarm system with air-sampling detection or radiant-energy-sensing detection required throughout the **fire area** in:
 - Group B with research and development or testing of lithium-ion or lithium metal batteries
 - Group F with manufacturing of lithium-ion or lithium metal batteries
 - Group F with manufacturing of vehicles, ESS or equipment powered by lithium-ion or lithium metal batteries
 - Group S with storage of lithium-ion or lithium metal batteries where required by §320




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907.2 Fire Alarm: Lithium Batteries

- Automatic fire alarm system with air-sampling detection or radiant-energy-sensing detection required throughout the **room or area** in:
 - Group M with storage of lithium-ion or lithium metal batteries where required by §320



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907.2.10 Public-storage & Self-storage

- Manual fire alarm system required in Group S public- and self-storage facilities ≥3 stories
- Cover interior corridors and interior common areas



Only 1 manual fire alarm boxes required *IF* building is sprinklered

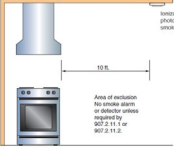
Visible notification *not* required in storage units

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907.2.11.3 Near Cooking Appliances

- Smoke alarms must be installed $\geq 10'$ from cooking appliances
 - Regardless of type smoke alarm
- Exception allows for reduction down to 6' where necessary to comply with other sections specifying smoke alarm locations




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907.5.2.1.3 Audible Alarm Signals

- IF** Group R-1, R-2 and I-1 is required to install a fire alarm system, the audible alarm signal in sleeping rooms must provide 520 Hz low-frequency signal
 - 6 times more effective in waking young, hearing-impaired and alcohol impaired individuals
 - Not available in smoke alarms




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907.5.2.3.3.1 Expansion Capability in R-2

- Fire alarm systems in Group R-2 shall be designed for future visible notification by 1 of the following:
 - Replacement of audible appliances with audible/visible appliances
 - Extension of existing wiring from the unit smoke alarm locations to visible appliances
 - Fire alarm power supply and circuits shall provide $\geq 5\%$ excess capacity with a single access point to such circuits shall be available on every story



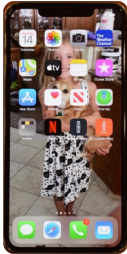
85

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907.6.6.1, 907.6.6.2 Monitoring

- Do It Yourself (DIY) fire alarm devices and Monitor It Yourself (MIY) capabilities are available
- Monitoring of fire alarm systems must be in accordance with NFPA 72
- Monitoring via MIY technology is only allowed where approved by the FCO




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907.10 Smoke Alarm Maintenance

- Smoke alarms are required to be tested in accordance with manufacturer’s instructions
- Any smoke alarm shall be replaced when:
 - It fails the operability test
 - It exceeds 10 years after date of manufacture
 - It sounds the end-of-life signal
 - The manufacturing date cannot be determined




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908.3 Emergency Alarm & Fire Alarm Interface

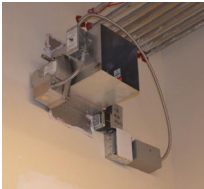
- Emergency alarm signal must be different from the fire alarm signal
- Emergency alarm signal is a local alarm with notification at the emergency control station
- Where interconnected to the FACU, it will produce supervisory notification



88

909.17 Smoke Control System Response

- Transition from normal ventilation to smoke control mode is not instantaneous
- A maximum time period of 90 seconds is stipulated for full transition to operating conditions and notification at the smoke control panel



89

Table 911.1 Explosion Control

Table 911.1 Explosion Control Requirements ¹ (excerpts)

| MATERIAL | CLASS | EXPLOSION CONTROL METHODS | |
|---------------|---------------------------|---------------------------|---|
| | | Barricade construction | Explosion (deflagration) venting or explosion (deflagration) prevention systems |
| | | Hazard Category | |
| Explosives | Division 1.1 | Required | Not required |
| | Division 1.2 | Required | Not required |
| | Division 1.3 | Not required | Required |
| | Division 1.4 ¹ | Not required | Required |
| | Division 1.5 | Required | Not required |
| | Division 1.6 | Required | Not required |
| Flammable gas | Gaseous | Not required | Required ² |
| | Liquefied | Not required | Required ² |

h. Not required for Category 1B Flammable Gases having a burning velocity not exceeding 3.9 inches per second.

i. Does not apply to consumer fireworks, 1.4G.

90

912.5 FDC Signs

- Signs on FDCs are clarified
- Lettering ≥1" in height
- Type of systems supplied
- Identify buildings served, if more than 1
- Portion of building served, if not the entire building
- Pressure required if >150 PSI



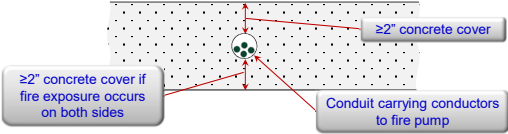
91

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913.2.2 Electric Circuits for Fire Pumps

- Protection of electric conductors serving fire pumps is already specified in the code
- Option of protection with $\geq 2"$ of concrete is added
 - NFPA 20 also provides this option
- Protection not required inside separated pump room



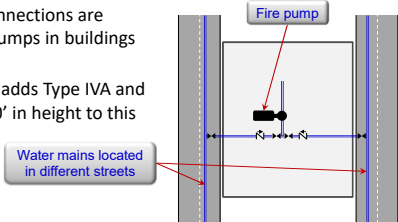
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914.3.1.2 Water Supply for Fire Pumps

- 2 water supply connections are required for fire pumps in buildings $>420'$ in height
- New requirement adds Type IVA and IVB buildings $>120'$ in height to this requirement



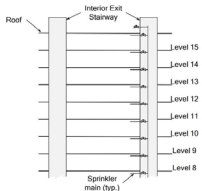
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914.3.1.1 Standpipe/Sprinkler Riser in High-rise

- In buildings $\leq 420'$ in height, standpipe and sprinkler systems can be supplied by a single riser or express riser within each vertical water supply zone
- Standpipe and sprinkler risers shall be located in interior exit stairways



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914.7.2 Fire Alarm: Special Amusement Area

- Activation of 1 smoke detector shall activate an audible and visual alarm in the constantly attended location
- Activation of 2 smoke detectors, 1 smoke detector with alarm verification, sprinkler waterflow, or the manual device in the constantly attended location shall:
 - Activate prerecorded message
 - Stop conflicting sounds or visual distractions
 - Illuminate the means of egress

Additionally, in Puzzle Rooms the egress doors shall unlock and open




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915.1 Carbon Monoxide Detection

- CO detection is required in all occupancies other than Groups F, S and U that are not normally occupied
- Detection required if a CO source exists
 - Buildings supplied by a CO-producing forced-air furnace
 - Buildings with attached private garages
 - Buildings that have a CO-producing vehicle used within the building
 - Buildings with a CO source

CO source is a piece of equipment or permanently installed appliance, fireplace or process that produces or emits carbon monoxide gas




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915.2 CO Detection Locations

- Locations for CO detection are specified
 - Sleeping units and dwelling units – outside of each sleeping area unless CO source in sleeping room
 - Group E requires a CO detection system
 - Rooms with fuel-burning forced air furnace require CO detection in the room
 - Occupiable rooms contiguous to attached private garages with opening to garage

CO detection provided in air ducts and plenums shall not substitute for installation in required locations




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915.3 CO Detection and Fire Alarms

- CO alarms only allowed in sleeping units and dwelling units
- In new buildings with a required fire alarm system and required CO detection shall have CO detectors connected to the FACU
- In new buildings without a fire alarm system, install a CO detection system
 - Where approved by the FCO, CO alarms can be utilized




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917.2 Mass Notification: Group E

- Mass notification risk analysis is required for:
 - New building at a multi-building college or university campus
 - New building containing a Group E with an occupant load of ≥500
- Analysis conducted in accordance with NFPA 72
- Mass notification provided is risk analysis determines it is needed



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1004.5 Information Technology Equipment

- Information technology equipment (ITE) added to code
- ITE is server room, or server farm
 - Different than data entry centers




Table 1004.5 (excerpts)
Maximum Floor Area Allowances per Occupant

| FUNCTION OF SPACE | OCCUPANT LOAD FACTOR* |
|---|-----------------------|
| Information technology equipment facilities | 300 gross |

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Table 1006.3.4(1) Occupiable Roofs

Table 1006.3.4(1)
Stories and Occupiable Roofs with One Exit or Access to One exit for R-2 Occupancies

| Story and Occupiable Roof | Occupancy | Maximum Number of Dwelling Units | Maximum Exit Access Travel Distance |
|--|--------------------|----------------------------------|-------------------------------------|
| Basement, first, second or third story above grade plane and occupiable roofs over the first or second story above grade plane | R-2 ^{a,b} | 4 dwelling units | 125 feet |
| Fourth story above grade plane and higher | NP | NA | NA |

a. Buildings classified as Group R-2 equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 and provided with emergency escape and rescue openings in accordance with Section 1031.
b. This table is used for R-2 occupancies consisting of dwelling units. For R-2 occupancies consisting of sleeping units, use Table 1006.3.4(2).
c. This table is for occupied roofs accessed through and serving individual dwelling units in Group R-2 occupancies. For Group R-2 occupancies with occupied roofs that are not access through and serving individual units, use Table 1006.3.4(2).

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Table 1006.3.4(2) Occupiable Roofs

Table 1006.3.4(2) (excerpts)
Stories and Occupiable Roofs with One Exit or Access to One exit for Other Occupancies

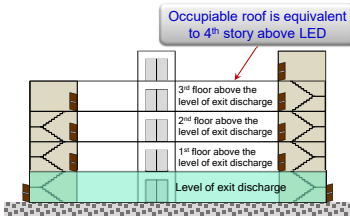
| Story and Occupiable Roof | Occupancy | Maximum Occupant Load per Story and Occupiable Roof | Maximum Exit Access Travel Distance (feet) |
|--|--|---|--|
| First story above or below grade plane and occupiable roofs over the first story above grade plane | A, B ^a , E, F ^b , M, U | 49 | 75 |
| | H-2, H-3 | 3 | 25 |
| | H-4, H-5, I, R-1, R-2 ^{a,c} | 10 | 75 |
| | S ^{b,d} | 29 | 75 |
| Second story above grade plane | B, F, M, S ^d | 29 | 75 |
| Third story above grade plane and higher | NP | NA | NA |

- Occupiable roof is **NOT** considered another story
- Occupiable roof does **NOT** change the building height
- The area of an occupiable roof is **NOT** included in the building area
- Occupiable roof is **NOT** considered another story
- Height of occupiable roof is included when determining high-rise

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1009.2.1 Elevator Serving Occupied Roof

- An elevator is required where:
 - Accessible floor is ≥4 stories above LED
 - Occupiable roof creates ≥4 levels above LED



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| Table 1010.2.4 Locks & Latches | | | | |
|--|---|--|-----------------------|-------------------------|
| Manual Bolts, Automatic Flush Bolts and Constant Latching Bolts on the Inactive Leaf of a Pair of Doors | | | | |
| Application with a Pair of Doors with an Active Leaf and Inactive Leaf | The Pair of Doors are Required to Comply with IBC Section 716 | Permitted Uses of Manual Bolt Locks, Automatic Flush Bolts and Constant Latching Bolts on the Inactive Leaf of a Pair of Doors | | |
| | | Surface or flush mounted manual bolts | Automatic flush bolts | Constant latching bolts |
| Group B, F, or S with occupant load less than 50 | No | P | P | P |
| | Yes | NP | NP ^b | P |
| Group B, F or S where the building is equipped with an automatic sprinkler system in accordance with §903.3.1.1 and the inactive leaf is not needed to meet egress capacity requirements | No | P | P | P |
| | Yes | NP | NP ^b | P |

continued on next slide

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| Table 1010.2.4 Locks & Latches | | | | |
|---|---|--|-----------------------|-------------------------|
| Manual Bolts, Automatic Flush Bolts and Constant Latching Bolts on the Inactive Leaf of a Pair of Doors | | | | |
| Application with a Pair of Doors with an Active Leaf and Inactive Leaf | The Pair of Doors are Required to Comply with IBC Section 716 | Permitted Uses of Manual Bolt Locks, Automatic Flush Bolts and Constant Latching Bolts on the Inactive Leaf of a Pair of Doors | | |
| | | Surface or flush mounted manual bolts | Automatic flush bolts | Constant latching bolts |
| Group I-2 patient care rooms and sleeping rooms where the inactive leaf is not needed to meet egress capacity requirements | No | NP | NP ^b | P |
| | Yes | NP | NP ^b | P |
| Any occupancy where panic hardware is not required, egress doors are used in pairs, and where both leaves are required to meet egress capacity requirements | No | NP | P | NP |
| | Yes | NP | NP ^b | NP |
| Storage or equipment rooms where the inactive leaf is not needed to meet egress capacity requirements | No | P ^a | P | P |
| | Yes | P ^a | P | P |

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1010.2.4 #8 Locks and Latches

- Except in egress courts, where the egress path travels back into the building, key-operated deadbolts are allowed to be used as the locking device

Exterior deck
Occupant load = 65

Group A-2 Restaurant
Occupant load = 205

Panic hardware

Key-operated deadbolt allowed

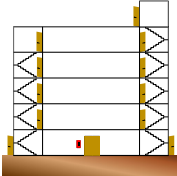
Panic hardware, or key-operated deadbolt at main entrance

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1010.2.6 Stairway Doors

- Stairway doors can be locked from the side opposite egress provided the doors are:
 - Capable of being unlocked individually or simultaneously by a signal from the fire command center or location inside the main entrance
 - Automatically unlocked upon activation of fire alarm
 - Automatically unlocked upon failure of the locking system or loss of power




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1010.2.9 Access Control Systems

- The code acknowledges access control systems
- Access control systems are allowed provided the egress side complies with one of the locking arrangements in Ch 10



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1010.2.14 Elevator Lobby Access Doors

- Doors from an elevator lobby to the tenant space can be electrically locked provided:
 - The floor has at least 2 exits that do not required travel through the elevator lobby
 - The building is equipped throughout with a sprinkler system
 - The building is equipped throughout with a fire alarm system
 - Smoke detectors are provided in the elevator lobbies
 - 2-way communication system is located in the elevator lobby and connected to an approved constantly attended station which has the capability of unlocking the electric locks
 - Emergency lighting is provided in the elevator lobby
 - The locking devices are listed

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1010.2.14 Elevator Lobby Access Doors

Smoke detector

Locked doors

2-way communication system

Elev.

Elev.

Elev.

Elev.

Elev.

Elev.

- Automatic sprinkler system throughout building
- Fire alarm system throughout building

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1013.2 Low-level Exit Signs

- Low level exit signs are required in areas serving guest rooms in Group R-1
- Bottom of the sign located between 10” and 18” above the floor
- No longer required in Group R-1 *IF* the building is sprinklered
 - NFPA 13 or 13R is acceptable

EXIT

EXIT

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1032.2.2 Fire Escape Maintenance

- Requirements to maintain fire escapes has been in the code since 2000
 - Located in Ch 11
- Relocated to maintenance of means of egress in §1032
- Examined every 5 years
- Evaluated for capability to carry live load of 100 lbs/ft²

Fire escape

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1103.5.4 Sprinklers in Existing High-rise


▪ Sprinklers required in existing high-rise *IF* any of the following exist:

1. Occupied floor >75' and ≤120' and building does not have ≥2 interior exit stairs complying with §1104.10 with 2-HR enclosure

§1104.10

- Tread rise ≤8¼"
- Tread run ≥9"

This section only applies *IF* Appendix M is *NOT* adopted



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1103.5.4 Sprinklers in Existing High-rise

▪ Sprinklers required in existing high-rise *IF* any of the following exist:

2. Occupied floor >75' and ≤120' and building does not have a fire alarm system with smoke detection in:
 - Electrical, mechanical, transformer, telephone rooms
 - Corridors
 - Elevator lobbies
 - Doors penetrating interior exit stairway enclosures

This section only applies *IF* Appendix M is *NOT* adopted



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1103.5.4 Sprinklers in Existing High-rise

▪ Sprinklers required in existing high-rise *IF* any of the following exist:

3. Occupied floor >120' above LLFDVA

This section only applies *IF* Appendix M is *NOT* adopted



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1103.7.5.1 Fire Alarm in R-1 Hotel/Motel

- Manual fire alarm system required in existing R-1 hotel or motel when >1 story or >20 sleeping rooms
 - Exceptions
 - Fire alarm system not required if only 1-story with >20 sleeping rooms **AND** each room has direct access to public way **AND** each sleeping room is separated by 1-HR
 - Fire alarm system not required if ≤3 stories with ≤20 sleeping rooms **AND** is sprinklered with NFPA 13 or 13R
 - Fire alarm system is required but only 1 manual fire alarm box **IF** sprinklered with NFPA 13 or 13R




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1103.9 CO Detection in Existing Buildings

- CO detection required in existing buildings with a CO source
 - All occupancies
- Detection can be CO alarms
- Not required to be connected to fire alarm system




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1107.1 Existing Energy Storage Systems

- Failure Modes and Effects Analysis (FMEA) shall be provided for existing ESS utilizing lithium-ion battery technology **IF**:
 - Capacity exceeds Table 1207.1.3, and
 - Installed prior to the local adoption of the 2018 IFC
 - Except for detached 1- and 2-family dwellings and townhouses
- FMEA shall evaluate thermal runaway and early detection




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1201.1, 1207.1 ESS Under Utility Control

- ESS systems must comply with Ch 12 and NFPA 855
- ESS managed by utility companies are specifically required to comply with Ch 12
 - Excludes capacitors and capacitor equipment for utilities and industrial facilities
 - Excludes mobile ESS at utility substations for ≤90 days during repair or maintenance




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1205.2.3 Building-Integrated PV Systems

- Building-integrated photovoltaic systems must be listed to UL 3741
- Components must be designed so when FF cut and remove components for ventilation, they are not exposed to significant electrical charge
- The eaves, or edge of building, must be marked to identify areas to avoid ground ladder placement



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Table 1207.1.3 ESS Threshold

- New ESS technologies added to §1207

| TABLE 1207.1.3 ENERGY STORAGE SYSTEM (ESS) THRESHOLD QUANTITIES | |
|--|------------------------------|
| TECHNOLOGY | ENERGY CAPACITY ^a |
| Capacitor ESS | 3 kWh |
| Flow batteries ^b | 20 kWh |
| Lead acid batteries, all types | 70 kWh ^c |
| Lithium-ion batteries | 20 kWh |
| Nickel-cadmium (Ni-Cd), Nickel metal hydride (Ni-MH) and Nickel zinc (Ni-Zn) batteries | 70 kWh |
| Non-electrochemical ESS ^d | 70 kWh |
| Other battery technologies | 10 kWh |
| Other electrochemical ESS technologies | 3 kWh |
| Sodium nickel chloride batteries | 70 kWh |
| Zinc manganese dioxide (Zn-MnO ₂) batteries | 70 kWh |

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Table 1207.5 Maximum Capacity for ESS

- Never becomes Group H
- MAQ per fire area

| TABLE 1207.5 MAXIMUM ALLOWABLE QUANTITIES OF ELECTROCHEMICAL ESS | |
|--|--------------------------------|
| TECHNOLOGY | MAXIMUM ALLOWABLE QUANTITIES * |
| STORAGE BATTERIES | |
| Flow batteries ^b | 600 kWh |
| Lead-acid, all types | Unlimited |
| Lithium-ion | 600 kWh |
| Sodium nickel chloride | 600 kWh |
| Nickel-cadmium (Ni-Cd), nickel metal hydride (Ni-MH) and nickel zinc (Ni-Zn) | Unlimited |
| Zinc manganese dioxide (Zn-MnO ₂) | Unlimited |
| Other battery technologies | 200 kWh |
| CAPACITORS | |
| All types | 20 kWh |
| OTHER ELECTROCHEMICAL ESS | |
| All types | 20 kWh |

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Table 1207.6 Specific Requirements for ESS

- New ESS technologies added to §1207

| TABLE 1207.6 (excerpts) | | | | | | | |
|---|----------|--------------------|--|---|------------------|------|------------------------|
| MAXIMUM ALLOWABLE QUANTITIES OF ELECTROCHEMICAL ESS | | | | | | | |
| COMPLIANCE REQUIRED * | | BATTERY TECHNOLOGY | | | | | |
| Feature | Section | Lead-acid | Nickel cadmium (Ni-Cd), nickel metal hydride (Ni-MH) and nickel zinc (Ni-Zn) | Zinc manganese dioxide (Zn-MnO ₂) | Lithium-ion | Flow | Sodium nickel chloride |
| Exhaust ventilation | 1207.6.1 | Yes | Yes | Yes | No | Yes | No |
| Explosion control | 1207.6.3 | Yes ^a | Yes ^a | Yes | Yes | No | Yes |
| Safety caps | 1207.6.4 | Yes | Yes | No | No | No | No |
| Spill control and neutralization | 1207.6.2 | Yes ^c | Yes ^c | Yes ^f | No | Yes | No |
| Thermal runaway | 1207.6.5 | Yes ^d | Yes ^d | Yes ^a | Yes ^a | No | Yes |

f. Not required for batteries with gelled electrolyte.

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1207.5.5 Fire-extinguishing System for ESS

- Fire-extinguishing system design for ESS is based on the following:
 - Sprinklers for ESS ≤50 kWh – minimum design of 0.3 GPM/ft² over the room or 2,500 ft², whichever is smaller
 - Sprinklers for ESS >50 kWh – minimum design based on large-scale fire testing
 - Alternative fire-extinguishing system for ESS – based on large-scale fire testing
- New exceptions:
 - Lead-acid and nickel-cadmium ESS under utility control
 - Lead-acid ESS used for UPS comprising ≤10% of floor area

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1207.11.1 ESS in Group R-3 or R-4

- ESS in Group R-3 or R-4 must comply with §1207.11, **OR**:
- Be listed and labeled “FOR USE IN RESIDENTIAL DWELLING UNITS” and comply with the listing and manufacturer’s instructions, **OR**
- Have a capacity <1 kWh

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1207.11.3 ESS in Group R-3 or R-4

- ESS may be installed in the following locations:
 - Detached garages
 - Detached accessory structures
 - Attached garages **IF** separated in accordance with IBC §406.3.2
 - Outdoors or on the exterior side of exterior walls **IF** ≥3’ from doors and windows directly entering the dwelling unit
 - Enclosed utility closets, basements and storage spaces within dwelling units and sleeping units provided with finished or noncombustible walls and ceilings
 - Unfinished wood-framed construction shall be provided ≥5/8” Type X gypsum wallboard

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1207.11.4 ESS in Group R-3 & R-4

- Individual ESS units ≤20 kWh

| ESS Location | Maximum Aggregate Rating | Conditions |
|--|--------------------------|---|
| Detached garages & detached accessory structures | 80 kWh | |
| Attached garages | 80 kWh | Separated from the dwelling unit and sleeping units per IBC |
| Utility closets, basements, storage or utility spaces within dwelling units and sleeping units | 40 kWh | |
| Outdoors on exterior walls | 80 kWh | ≥3’ from doors and windows |
| Outdoors on the ground | 80 kWh | ≥3’ from doors and windows |

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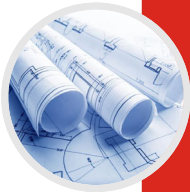
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Part IV

Special Occupancies and Operations

Chapters 20 – 41




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Ch 22 Combustible Dust

- Chapter is revised
- Explosion prevention
- Dust collection
- Control of ignition sources
- Housekeeping
- Emergency response plan
- Employee training
- Dust Hazard Analysis



US No. 40 Standard Sieve

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2203 Dust Explosion Prevention

- Identification of hazard – critical depth layer

| Type of Dust | Critical Depth Layer (inches) |
|-----------------|-------------------------------|
| Wood Flour | 1/8 |
| All Other Dusts | 1/32 |

- Other depths can be used **IF** evaluated under specific criteria in NFPA 654
- Housekeeping is critical




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2308.2 CNG Vehicle Fueling


- Vehicle Fueling Appliance (VFA)
 - Listed to CSA/ANSI NGV 5.2
 - Fueling rate ≥10 cfm/min
- Residential Fueling Appliance (RFA)
 - Listed to CSA/ANSI NGV 5.1
 - Fueling rate ≥5 cfm/min



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2404.2 Enclosures for Spray Operations

- Portable or inflatable enclosures shall not be used for spray operations
 - Spray operations at marinas, dry docks and construction areas are allowed if they comply with NFPA 33
- Membrane enclosures can be used if they comply with NFPA 33



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NFPA 33, Ch 18 Membrane Enclosures

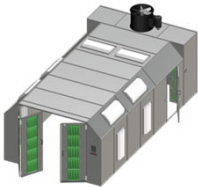
- Membrane enclosures are limited in use to 180 days
- Membrane must be noncombustible, or pass NFPA 701 Test Method 2, or meets specific criteria when tested to NFPA 286, or be classified as a welding curtain by FM 4950
- Membrane enclosures are permitted in buildings protected with sprinkler systems
- Control ignition sources inside enclosure – Class I Division 1

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2404.5.3.6 Size of Spray Booths

- Individual spray booths are no longer limited to 1,500 ft²
- Now limited to the smaller of:
 - 10% of the floor area of the building
 - Basic allowable area for Group H-2
- A single booth can be 500 ft²
 - Even when it exceeds 10%



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2404.5.3.6 Size of Spray Booths

IBC Table 506.2 Allowable Area (excerpts)

| Occupancy Classification | See Footnotes | TYPE I | | TYPE II | |
|--------------------------|----------------|--------|--------|---------|-------|
| | | A | B | A | B |
| H-2 | NS S1 SM | 21,000 | 16,500 | 11,000 | 7,000 |

Group F-1
Type IIB construction
1-story
Sprinklered
50,000 ft²

Spray Booth
5,000 ft²

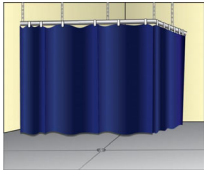
Basic allowable area

10% of floor area

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2404.5.4 Limited Finishing Workstation

- Limited finishing workstations added as an option for spray finishing operations
- Must comply with NFPA 33 and:
 - Protected by fire-extinguishing system
 - Provided with mechanical ventilation
 - Limited to use of 1 gallon in 8-hour period
 - Control ignition sources – Class I Div 1 inside enclosure
 - Enclosure noncombustible or meets NFPA 701, NFPA 286 or FM 4950



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2808.3 Basic Size of Piles or Stacks

- Storage piles associated with
 - Storage & processing of wood chips, hogged material, fines & compost
 - Solid biomass feedstock
 - Raw products at yard waste, agro-industrial facilities & recycling facilities
- Size of piles can be increased based on fire protection plan
 - Contact information for after-hours personnel
 - Storage yard areas and material-handling equipment selection, pile design and arrangement
 - Access roads around the piles or stacks and access roads to the top of piles
 - Evaluation and control of spontaneous heating
 - Routine yard inspections
 - Facilities and equipment needed
 - Water supply
 - Heavy equipment
 - De-inventory plan

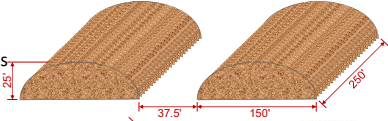
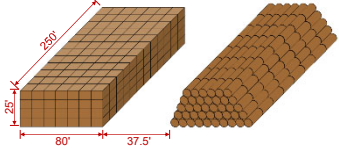
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2808.3 Basic Size of Piles or Stacks


- Size of piles
- Size of stacks

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3103.8.1 Water-filled vessels

- Temporary tents and membrane structures must be adequately anchored
- Stakes into the ground are the default method of choice
- Water-filled barrels have been used in cases where the structure sits on concrete
- Water-filled barrels are only permitted where the FCO approves their use and then only if in accordance with tent manufacturer's load specifications



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3106 Inflatable Amusement Devices

- Inflatable amusement devices are made of flexible fabric or other combustible materials that is inflated by ≥1 air blowers and typically designed for recreational activities that allow occupants to bounce, climb, slide, negotiate an obstacle course or participate in interactive play
- Anchored or secured
- Control of electrical wiring and equipment

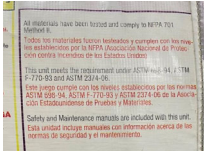


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3106 Inflatable Amusement Devices

- Provided with permanently affixed label:
 - Material must have limited flame propagation and meets NFPA 701 Test Method 2
 - Designed to ASTM F2374
 - Manufacturer's name




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Table 3203.8 Commodity Classification

- Correlates with NFPA 13
- Lithium-ion batteries added
 - Listed as high-hazard commodity
 - Can be classified as high-piled storage >6'



| Product Category | Product | Classification |
|------------------|---|----------------------------------|
| Batteries | Dry cells (nonlithium or similar exotic metals); in blister packing; cartoned | Class II |
| | Vehicle; any size (for example, automobile or truck); empty plastic casing | High-hazard (Group A unexpanded) |
| | Vehicle; large (in other words, truck or larger); dry or wet cells (excludes lithium-ion and other cells containing combustible electrolytes) | High-hazard (Group A unexpanded) |
| | Vehicle; small (for example, automobile); wet cells (excludes lithium-ion and other cells containing combustible electrolytes) | Class I |
| | Lithium-ion | High-hazard |

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3205.5 Maintenance of Aisle Width

▪ Retail displays are allowed to encroach into the required aisle width **IF**:

▪ Sprinklers have K-factor of 25.2 and comply with NFPA 13 §26.3.1

▪ Height ≤48"

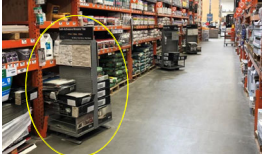
▪ Clear aisle ≥48"

2 hydraulic design points

1. 0.60 gpm/ft² over 2,000 ft²

2. 0.70 gpm/ft² from 4 sprinklers

Plus 500 gpm hose stream



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3208.3 Flue Spaces

▪ Flue spaces are critical in high-piled storage


▪ Flues allow heat to rise to activate sprinklers

▪ Flues allow sprinkler water to reach the fire below

▪ Minimum flue space dimensions are required

▪ The code is clarified that the rack uprights can be within the flue space and are not treated as an obstruction

▪ Flue space is measured from edge of commodity to edge of adjacent commodity



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3209.4 Automated Rack Storage Shutdown


▪ Automated rack storage systems are required to be provided with shutdown **IF** high-piled storage area >500 ft²

▪ Manual shutdown switch

▪ Automatic shutdown activated by either of the following:

▪ Sprinkler water flow

▪ Activation of fire detection system




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Ch 33

Fire Safety During Construction



3301 General

3302 Definitions

3303 Administrative Safety Controls

3304 Protection of Combustible Materials

3305 Ignition Source Controls

3306 Fire Protection Systems and Devices

3307 Fire Department Site Access and Water Supply

3308 Motorized Construction Equipment

3309 Hazardous Materials

3310 Additional Safeguards for Occupied Buildings

3311 Additional Safeguards for Type I & II Construction

3312 Additional Safeguards for Type IV Construction

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3303.3 Daily Fire Safety Inspection

- Daily inspection of building and site where construction is occurring
 - Contractors entering to perform hot work have been instructed in the hot work safety requirements
 - Temporary heating equipment is properly used
 - Combustible debris, rubbish and waste material is removed
 - Flammable liquids and other hazardous materials are stored in locations approved by the site safety director
- Vehicle access shall be provided by either temporary or permanent roads, capable of supporting vehicle loading under all weather conditions
 - Approved vehicle access for fire fighting shall be provided to all construction or demolition sites
 - Vehicle access shall be provided to within 100' of FDC

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3303.3.1 Daily Fire Safety Inspection

- Owner is responsible for daily fire safety inspection
- Failure to properly conduct, document and maintain daily inspection records and documentation
 - Is an unlawful act
 - Shall result in the issuance of a notice of violation
 - On the 3rd offense, FCO is authorized to issue a stop work order
 - Work cannot resume until assurances of future compliance have been presented and approved by the FCO

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3303.5.1 Fire Watch – New Construction

- Fire safety plan is required
- Fire watch provided for new construction IF:
 - >40' above lowest adjacent grade,
 - New multi-story construction >50,000 ft² per story,
 - Required by fire safety plan, or
 - Required by FCO


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3303.5.1 Fire Watch

- **IF** fire watch is required, it must be provided:
 - During nonworking hours
 - When construction >40' above lowest adjacent grade
- Fire watch personnel
 - Must be trained
 - Keep written log
- Fire watch for hot work is still required



Fire watch for construction is different than fire watch for hot work.


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3307 Water Supply During Construction

- Water supply required when combustible **building** materials arrive on site
 - Minimum 500 GPM
 - Fire hydrant ≤500' of the combustible materials
- Water supply required when standpipe is available
 - Minimum 500 GPM
 - Fire hydrant ≤100' of FDC



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3307 Water Supply During Construction

- Minimum fire flow of 500 GPM is increased for Type III, IV or V buildings before vertical construction commences
 - Full fire flow if building ≤30' of property line that can be built on
 - 50% of full fire flow if building >30' and ≤60' of property line that can be built on
 - Minimum of 500 GPM is acceptable during construction if building >60' of property line that can be built on

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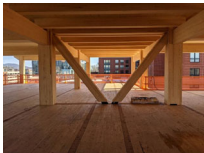
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3312.1 Mass Timber Construction

- When Type IVA or IVB construction reaches 6 stories, the 2021 IFC requires a single layer of noncombustible protection to be installed on all exposed wood surfaces up to 4 stories below the top floor under construction
 - In other words, never more than 4 stories of unprotected wood during the construction
- 2024 IFC exempts the floor from this requirement




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Chapter 39 Processing And Extraction Facilities




- 3901 Scope
- 3902 Definitions
- 3903 Processing and extraction
- 3904 Systems and equipment
- 3905 Safety systems

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3901 Plant Cultivation

- Ch 39 includes all facilities conducting plant processing and solvent-based extraction
 - Includes cultivation, pre-extraction and post-extraction operations
 - Greenhouses are excluded provided they do not utilize carbon dioxide enrichment




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3901.4 Lighting

- Lighting is used extensively in cultivation
- Lighting must be listed to UL 8800 *Standard for Horticultural Lighting Equipment and Systems*
- Lighting creates vast amounts of heat and electrical systems must be properly designed to safely handle the electrical loads




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3901.5 CO₂ Enrichment

- CO₂ operations are regulated in the 2021 IFC, but only if CO₂ is stored on-site
 - Stored as compressed gas or liquefied gas
 - Quantities >100 lbs require permit and must meet requirements
- CO₂ generation is now added to the code and a permit is required
 - CO₂ is created on-site, often using a propane burner
 - CO₂ is not stored




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3903.7 Means of Egress

- Exit doors and exit access doors from extraction rooms must swing in the direction of travel
- Panic hardware is not required, but door swing is required

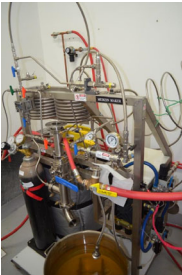


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3905.3.1 Ventilation: Flammable

- Continuous mechanical ventilation is required for extraction processes using flammable/combustible liquids or flammable gas as the extraction medium
 - ≥5 CFM per ft², **OR**
 - Based on engineered system to maintain the concentration ≤25% of the LEL
- Electrical equipment shall be interlocked so it is only operational while ventilation system is operational

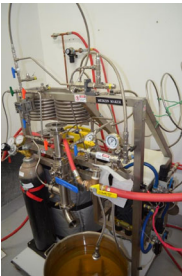


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3905.3.2 Ventilation: CO₂

- Continuous mechanical ventilation is required for extraction processes using asphyxiant or irritant gas as the extraction medium
 - ≥1 CFM per ft²
- Gas detection system can be provided in lieu of continuous ventilation
- Electrical equipment shall be interlocked so it is only operational while ventilation system is operational



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3905.3.3 Ventilation: Post-extraction


- Continuous mechanical ventilation is required for post-extraction processes using flammable liquids or combustible liquids heated above their flashpoint
 - ≥1 CFM per ft²
- Gas detection system can be provided in lieu of continuous ventilation
- Electrical equipment shall be interlocked so it is only operational while ventilation system is operational



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Ch 40
Storage of Distilled Spirits & Wines




4001 General
4002 Definitions
4003 Precautions against fire
4005 Fire protection
4006 Signage

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Ch 40 Distilled Spirits & Wines

- New chapter for storage of distilled spirits and wines
 - Not** classified as Group H
- Ch 50 & 57 do **not** apply to storage when in compliance with Ch 40
- §4003.1 Spill control
- §4003.2 Ventilation
- §4003.3 Control of ignition sources
- §4003.4 Lightning protection is suggested



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4005 Protection of Distilled Spirits

- Sprinkler systems to protect alcoholic beverages with alcohol content ≤20% are in accordance with NFPA 13
- Fire sprinkler criteria for >20% is in the IFC:
 - Palletized storage of distilled spirits in wooden barrels
 - Rack storage of distilled spirits in wooden barrels
- Storage in metal containers must comply with Ch 57



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4005 Protection of Distilled Spirits

- §4005.1 Palletized storage of distilled spirits in wooden barrels
 - Maximum 7 pallets high
- §4005.1.4.6 small facility requirements
- §4005.2 Rack storage of distilled spirits in wooden barrels
 - Barrels on side
 - Barrels on end




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Chapter 41

Temporary Heating & Cooking Operations



- 4101 General
- 4102 Portable electrical heating appliances
- 4103 Portable fuel-fired heating appliances
- 4104 Portable fuel-fired cooking appliances
- 4105 Portable electrical cooking appliances
- 4106 Mobile food preparation vehicles

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4104.4 Cooking operations

Cooking that produces sparks or grease-laden vapors shall not be performed within 10 feet of a tent or membrane structure except where the following conditions are met:

1. Cooking devices shall be isolated from the public.
2. Cooking devices shall be maintained and used according to the manufacturer's instructions.

Exception: Designated cooking tents with an automatic sprinkler system installed in accordance with Section 903.3.1.1.

- Cooking with liquid-fuels, gaseous-fuels and solid-fuels shall be separated $\geq 10'$ from tents and membrane structures
- Cooking in tents provided with a sprinkler system are allowed to have the public present

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4104.5.1 Groups of Cooking Tents

Cooking tents ≤ 700 ft²/group

Supply tent ≤ 100 ft²

No separation required

≥ 12 separation required

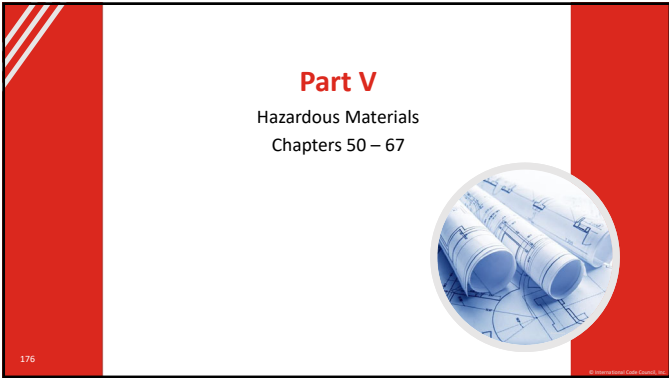
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4106 Mobile Food Preparation Vehicles

- Permit is required
- Must comply with code and NFPA 96
 - Many requirements in the 2021 IFC are now to be found in NFPA 96
- Exhaust hood is required over cooking
- Specific requirements for manual activation device for fire-extinguishing system override the general requirements in 904.12.

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| Table 5003.1.1(5) Haz Mat Exemptions | | |
|--|--------------------------------|---|
| Table 5003.1.1(5) Hazardous Materials Exemptions ^a (excerpts) | | |
| Material Classification | Occupancy or Application | Exemption |
| Combustible fiber | Baled Cotton | Densely packed baled cotton shall not be classified as combustible fiber, provided that the bales comply with the packing requirements of ISO 8115. |
| Explosives | Groups B, F, M and S | Storage of special industrial explosive devices is not limited. |
| | Groups M and R-3 | Storage of black powder, smokeless propellant, and small arms primers is not limited. |
| Flammable and combustible liquids and gases | | Quantity of alcoholic beverages in liquor stores and distributors without bulk storage is not limited. |
| | | The quantity of alcoholic beverages in distilling or brewing of beverages is not limited. |
| | Alcoholic beverages | The storage quantity of beer, distilled spirits and wines in barrels and casks is not limited. |
| | | The quantity of alcoholic beverages in retail and wholesale sales occupancies is not limited. To qualify for this allowance, beverages shall be packaged in individual containers ≤1.3 gallons. |
| | Flammable finishing operations | Buildings and structures occupied for the application of flammable finishes complying with Ch 24. |
| | Fuel | Quantity of liquid or gaseous fuel in fuel tanks on vehicles or motorized equipment is not limited. |
| | Fuel oil | Quantity of gaseous fuels in piping systems and fixed appliances regulated by IFGC is not limited. |
| | | The quantity of liquid fuels in piping systems and fixed appliances regulated by IMC is not limited. |
| | | The quantity of fuel oil storage complying with §605.4.2 is not limited. |
| | Hand sanitizer | The quantity of alcohol-based hand rubs (ABHR) classified as Class I or II liquids in dispensers installed in accordance with Sections 5705.5 and 5705.5.1 is not limited. The location of the ABHR dispensers shall be provided in the construction documents. |

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| Table 5003.8.2 Detached Building | | | |
|---|-----------------------------|--|-----------------------------------|
| Table 5003.8.2 Detached Building Required (excerpts) | | | |
| A DETACHED BUILDING IS REQUIRED WHERE THE QUANTITY OF MATERIAL EXCEEDS THAT LISTED HEREIN | | | |
| Material | Class | Solids and liquids (tons) ^{a,b} | Gases (cubic feet) ^{a,b} |
| Explosives | Division 1.1 | Maximum Allowable Quantity | Not Applicable |
| | Division 1.2 | Maximum Allowable Quantity | Not required |
| | Division 1.3 | Maximum Allowable Quantity | Not required |
| Explosives | Division 1.4 ^{c,d} | Maximum Allowable Quantity | Required |
| | Division 1.4 ^{c,d} | 1 | Required |
| | Division 1.5 | Maximum Allowable Quantity | Not required |
| | Division 1.6 | Maximum Allowable Quantity | Not required |

e. Does not apply to consumer fireworks, 1.4G.

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5003.8.3.3 Number of Control Areas

■ For the purposes of determining the number of control areas, each portion of a building separated by ≥ 1 fire walls shall be considered a separate building

The diagram illustrates two buildings, Building 1 and Building 2, separated by a 3-HR fire wall. Building 1 is divided into four control areas (Control Area 1, Control Area 2, Control Area 3, and Control Area 4) by 1-HR fire barriers. Building 2 is also divided into four control areas (Control Area 1, Control Area 2, Control Area 3, and Control Area 4) by 1-HR fire barriers. The 3-HR fire wall is shown as a thick vertical line between the two buildings.

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Table 5003.11.1 Haz Mat in Group M and S

Table 5003.11.1 (excerpts)
Maximum Allowable Quantity per Indoor and Outdoor Control Area in Group M and S Occupancies – Nonflammable Solids, Nonflammable and Noncombustible Liquids ^{d,e,f}

| Condition | | Maximum Allowable Quantity per Control Area | |
|---|-------|---|--------------------|
| Material | Class | Solids pounds | Liquids gallons |
| A. Physical Hazard Materials—Nonflammable and Noncombustible Solids and Liquids | | | |
| 1. Oxidizers ^{b,c} | 4 | Not Allowed | Not Allowed |
| | 3 | 4,350 ^g | 435 ^h |
| | 2 | 2,250 ^h | 225 |
| | 1 | 18,000 ^h | 1,800 ^h |

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Table 5003.11.2 Flammable Gas Category 1B

Table 5003.112
MAXIMUM ALLOWABLE QUANTITY OF LOW BURNING VELOCITY CATEGORY 1B FLAMMABLE GAS IN GROUP M AND S OCCUPANCIES PER CONTROL AREA ^a

| FLAMMABLE GAS CATEGORY 1B (Low BV) ^d | MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA | |
|---|---|-------------------------|
| | Sprinklered in accordance with Note b | Nonsprinklered |
| Gaseous | 390,000 ft ³ | 195,000 ft ³ |
| Liquefied | 40,000 lbs. ^c | 20,000 lbs. |

a. Control areas shall be separated from each other by not less than a 1-hour fire barrier.
b. The building shall be equipped throughout with an approved automatic sprinkler system with minimum sprinkler design density of Ordinary Hazard Group 2 in the area where flammable gases are stored or displayed.
c. Where storage areas exceed 50,000 square feet in area, the maximum allowable quantities area allowed to be increased by 2 percent for each 1,000 square feet of area in excess of 50,000 square feet, up to not more than 100 percent of the table amounts. Separation of control areas is not required. The aggregate amount shall not exceed 60,000 pounds.
d. "Low BV" Category 1B flammable gas has a burning velocity of 3.9 inches per second or less.

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5003.11.2.1 Flammable Gas 1B Storage

▪ Storage

▪ Separate ≥20' from flammable liquids

▪ Separate ≥10' from flammable liquids if secondary containment or diking is provided

▪ Edge of secondary containment or diking ≥10' from Category 1B flammable gas

▪ Shelf storage ≥6' in height

▪ Fire protection

▪ Rack storage, palletized storage or solid piles ≥6' in height shall be sprinklered

▪ Sprinklers designed for Extra Hazard Group 1

▪ Shelf storage shall be on metal shelves

▪ Combustible commodities shall not be stored above

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5003.11.2.1 Flammable Gas 1B Storage

Category 1B Flammable Gas
burning velocity ≤3.9 in./sec.

Maximum of
40,000 lbs.
liquefied gas

Shelf storage
max. height 6'

≥20'

Storage of
flammable liquids or
other flammable gases

Warehouse
Group S-1
50,000 sq. ft.

Sprinkler system of
Ordinary Hazard
Group 2

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5003.12 Outdoor Control Areas

▪ §5003.12 is specified as “general requirements”

▪ §5004.14, §5005.3.3 & §5005.4.3 are revised to state outdoor storage must comply with outdoor control area requirements, except where material specific requirements are found in the code or referenced standard

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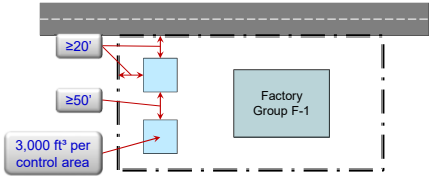
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5003.12 Outdoor Control Areas

Outdoor control area for flammable gas



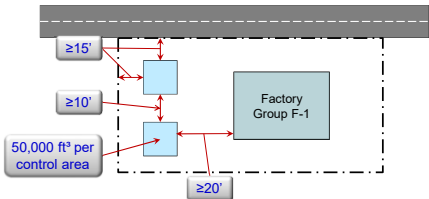
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5003.12 Outdoor Control Areas

Outdoor control area for gaseous H₂ – NFPA 2



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5003.13 Rooftop Storage of Haz Mat

Storage on roofs or on top of canopies is considered rooftop storage

Rooftop storage quantities shall **NOT** be included in the MAQ for the building

Rooftop storage does **NOT** create another story

Quantity in rooftop storage shall not exceed the MAQ for the story below

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5003.13 Rooftop Storage of Haz Mat

Hazardous materials

Equivalent level to 4th story

MAQ for the rooftop is the same as 3rd story

3rd Story

2nd Story

1st Story

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5003.13.5 Rooftop Storage of Haz Mat

Hazardous materials

Weather protection per IBC Section 414.6.1

The MAQ for the rooftop storage is the same MAQ allowed on the 3rd story

3rd Story

2nd Story

1st Story

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5104 Plastic Aerosol 3 Products

- Aerosol products in plastic containers:
 - Plastic aerosol 1
 - Propellant is ≤4% flammable liquefied gas emulsified with product, or is nonflammable, or has no fire point
 - Product contains ≤20% ethanol or IPA
 - Plastic aerosol 3
 - Propellant is ≤10% flammable propellant
 - Product contains ≤50% water-miscible alcohols
 - Plastic aerosol X
 - Exceeds criteria above
 - Plastic aerosol X products are prohibited

Photo of Plastic Aerosol 1 courtesy of P&G Packaging

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Table 5104.3.1 General Storage Warehouse

Plastic aerosol 3 treated included with Aerosol Level 3

TABLE 5104.3.1
NONSEGREGATED STORAGE OF LEVEL 2 AND 3 AEROSOL AND PLASTIC AEROSOL 3 PRODUCTS IN
GENERAL PURPOSE WAREHOUSES^b

| AEROSOL LEVEL | MAXIMUM NET WEIGHT PER FLOOR (pounds) ^b | | | |
|---------------------|--|------------------------|--------------|------------------------|
| | Palletized or solid-pile storage | | Rack storage | |
| | Unprotected | Protected ^a | Unprotected | Protected ^a |
| 2 | 2,500 | 12,000 | 2,500 | 24,000 |
| 3 | 1,000 | 12,000 | 1,000 | 24,000 |
| Combination 2 and 3 | 2,500 | 12,000 | 2,500 | 24,000 |

a. Approved automatic sprinkler system protection and storage arrangements shall comply with NFPA 30B. Sprinkler system protection shall extend 20 feet beyond the storage area containing the aerosol products.
b. Storage quantities indicated are the maximum permitted in any 50,000-square-foot area.

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Table 5106.2.1 Aerosols in Retail

TABLE 5106.2.1
MAXIMUM QUANTITIES OF LEVEL 2 AND 3 AEROSOL PRODUCTS, AEROSOL COOKING SPRAY
PRODUCTS AND PLASTIC AEROSOL 3 PRODUCTS IN RETAIL DISPLAY AREAS

| Floor | MAXIMUM NET WEIGHT PER FLOOR (pounds) ^b | | |
|----------|--|--|--|
| | Unprotected ^a | Protected in accordance with Section 5106.2 ^{a,c} | Protected in accordance with Section 5106.3 ^c |
| Basement | Not Allowed | 500 | 500 |
| Ground | 2,500 | 10,000 | 10,000 |
| Upper | 500 | 2,000 | Not Allowed |

a. The total quantity shall not exceed 1,000 pounds net weight in any one 100-square-foot retail display area.
b. Per 25,000-square-foot retail display area.
c. Minimum Ordinary Hazard Group 2 wet-pipe automatic sprinkler system throughout the retail sales occupancy.

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5601.1.3 Consumer Use Fireworks

Where allowed, the storage, use and handling of Division 1.4G fireworks shall comply with **2006** NFPA 1124

- Display height ≤6'
- Display height along wall ≤12'
- Vertical flame breaks provided every 16' horizontally
- ≥50% of floor area shall be aisles



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NFPA 1124 Consumer Use Fireworks

Diagram illustrating the layout of fireworks displays. The layout shows a series of rectangular displays arranged in a row. Key dimensions and requirements are labeled: displays are ≤12' high along a wall, individual displays are ≤6' high, aisles between displays are ≥48" wide, vertical flame breaks are required between displays, and 50% of the floor area must be aisle.

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NFPA 1124 Consumer Use Fireworks

- Dead-end aisles are prohibited
- Exit access travel distance ≤75'
- Sprinklers required if new building >6,000 ft²
- Sprinklers required if existing building >7,500 ft²
- Smoke/heat vents required in new permanent buildings with ceiling height <10' and exit access travel distance >25'
- Temporary stands >800 ft² must meet all requirements of a permanent structure

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5705.5 Alcohol-based Hand Rub Dispensers

- Quantities of alcohol-based hand rub dispensers in storage and use are not included when calculating the MAQ
 - Location and method of flammable liquid storage must still be approved
- The following restrictions in the 2021 IFC are removed
 - Corridor ≥6' in width for placement in the corridor
 - Sprinklers required for placement in a carpeted room


Image showing boxes of alcohol-based hand rub dispensers stacked on a shelf.

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5705.5 Alcohol-based Hand Rub Dispensers

- No longer required to be wall-mounted
- Must be separated $\geq 3'$ from heating devices, open flame and ignition sources
- Must be separated $\geq 3'$ from, and cannot obstruct, the means of egress



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Motor Vehicle Fueling Operations


- Fixed fueling facilities (Ch 23)
- Dispensing on Farms and Construction Sites (§5706.2)
- Mobile Fuel Dispensing (§5706.5.4)
- Fleet Fueling (§5706.5.4.5)
- On-demand Mobile Fueling (§5707)
- Hydrogen Mobile Fueling (§5809 – new)
- Marine Fueling (§2310.4)

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5706.5.4.5 Fleet Fueling

- Fleet fueling is allowed where approved by the FCO at the following facilities
 - Commercial
 - Industrial
 - Governmental
 - Manufacturing
- Class I flammable liquid fuel (gasoline) is now included in this operation




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5809 Hydrogen On-demand Mobile Fueling

- On-demand mobile fueling of gaseous hydrogen is added to the code
- FCO must approve the operation
- Permit is required
- Fueling from tank vehicle or trailer is allowed



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5809 Hydrogen On-demand Mobile Fueling

- Hydrogen fueling vehicle or fueling trailer must comply with NFPA 2
- Containers or tanks must be mounted on vehicles
- Fire safety and emergency response plan is required
- Operator must be trained
- Nighttime fueling only allowed if adequately illuminated and approved by FCO

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5809 Hydrogen On-demand Mobile Fueling

- FCO can approve the individual sites where H₂ mobile fueling is allowed, or geographical areas where H₂ mobile fueling is allowed
- Prohibited in buildings, covered parking structures, on public streets
- Separation ≥25' to sources of ignition
- Fuel hose ≥15'
- Fueling vehicle and vehicle being fueled must be bonded
 - Can be accomplished by the fuel hose

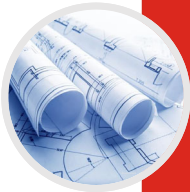
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Part VII

Appendices

Appendix A – O



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E102.1.7.2 Oxidizer Classifications

▪ The Globally Harmonized System (GHS) is an internationally agreed upon standard for classification of hazardous materials

▪ The IFC has not made a full transition to the GHS system

▪ Many Safety Data Sheets (SDS) have made the transition

▪ This revision provides a cross reference to assist the FCO when evaluating oxidizers



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E102.1.7.2 Oxidizer Classifications

Table E102.1.7.2

Oxidizer Comparison (IFC versus GHS)

| IFC Hazard Classification | GHS Hazard Classification |
|---------------------------|---------------------------|
| <u>Oxidizer, Class 4</u> | H271, Category 1 |
| <u>Oxidizer, Class 3</u> | H271, Category 1 |
| <u>Oxidizer, Class 2</u> | H272, Category 2 |
| <u>Oxidizer, Class 1</u> | H272, Category 3 |

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E104 GHS Definitions

- The definitions from GHS are added to further assist in the transition to the GHS nomenclature
- Many definitions are similar, but few have an exact match
- Table E104.2 provides a comparison and describes similarities and differences



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Table E104.2 IFC vs. GHS Definitions

| TABLE E104.2 (excerpts) | | | |
|-------------------------|----|--|---|
| | | IFC DEFINITION | GHS 2017 (REV 7) CLASSIFICATION (H-CODE AND CATEGORY); HAZARD STATEMENT, DEFINITION |
| Combustible liquid | — | A liquid having a closed cup flash point at or above 100°F (38°C). Combustible liquids shall be subdivided as follows: | A flammable liquid means a liquid having a flash point of not more than 93°C. |
| Combustible liquid | II | Liquids having a closed cup flash point at or above 100°F (38°C) and below 140°F (60°C). | H226, Category 3; Flammable liquid and vapor: Flash point ≥ 23°C and ≤ 60°C |
| Flammable liquid | IA | Liquids having a flash point below 73°F (23°C) and having a boiling point below 100°F (38°C). | H224, Category 1; Extremely flammable liquid and vapor. Flash point < 23°C and initial boiling point ≤ 35°C |
| Flammable liquid | IB | Liquids having a flash point below 73°F (23°C) and having a boiling point at or above 100°F (38°C). | H225, Category 2; Highly flammable liquid and vapor. Flash point < 23°C and initial boiling point > 35°C |
| Flammable liquid | IC | Liquids having a flash point at or above 73°F (23°C) and below 100°F (38°C). | H226, Category 3; Flammable liquid and vapor. Flash point ≥ 23°C and ≤ 60°C |

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Appendix O
Valet Trash Collection and Recycling
Collection in Group R-2 Occupancies



- O101 Scope
- O102 Containers
- O102.1 General
- O102.2 Integrity
- O102.3 Height
- O102.4 Capacity and limit
- O102.5 Construction materials
- O103.1 Container Location
- O103.2 Minimum means of egress width
- O103.3 Stairways
- O104.1 Time limits
- O104.2 Collection rules
- O104.3 Suspension of service

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Appendix O Valet Trash Collection

- §304.1.1 states that valet trash collection is only permitted where specifically approved by the FCO
- Where the FCO determines that valet trash collection is to occur, Appendix O provides criteria and requirements for that operation

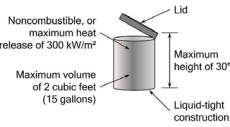
Valet trash collection is an intermediary service that removes trash or recycling materials placed outside of dwelling units or sleeping units for final collection

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O102 Containers

- Containers must be liquid-tight and have a lid
- Material must be noncombustible or have a peak heat release $\leq 300 \text{ kW/m}^2$
- Container size:
 - $\leq 30''$ in height
 - ≤ 2 cubic feet (15 gallons)

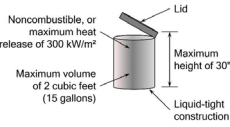


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O103 Container Location

- Only 1 container can be placed for collection at any time
- Lids shall be in the fully closed position when available for collection
- Container cannot obstruct the minimum required egress width
- Container cannot be placed on stairs or stair landings, or in an interior exit stairway



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O104 Additional Requirements

- **Filled** containers shall not be placed outside the dwelling unit for more than 6 hours in a 24-hour period
- **Empty** containers shall not remain outside the dwelling unit for more than 12 hours in a 24-hour period
- Written rules shall be established that the property manager will enforce regarding service rules, hours and penalties

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Discussion



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KEY POINTS

- 1) Over 200 individual code change proposals were approved for the 2021 IFC, and another 200+ for the 2024 IFC
- 2) This presentation covered those revisions with a larger, or more significant impact
- 3) Please refer to the code for complete code language
- 4) The code keeps pace with technology as best it can; however, you will likely be using this code for 3 or more years. During that time, new technologies will be developed. Alternative methods in Ch 1 allows the FCO to review and approve other methods of providing fire and life safety

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EVALUATION & SIGN OUT

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