

2018 International Fire Code

**Chapter 5 – Fire Service Features**



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Chapter 5 – Fire Service Features

- Chapter contains requirements that enable the fire service to manage and emergency at the building or premise
  - Fire Department access
  - Fire protection water supply
  - Premise identification
  - Key boxes
  - Access to equipment
  - Emergency responder radio coverage

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Chapter 5 – Fire Service Features 503.1

- Construction documents are required for review and approval for:
  - Fire apparatus access
  - Fire lanes
  - Security gates across fire apparatus access
  - Fire hydrant systems
  - Documents for all the above items must be reviewed and approved prior to construction

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### Definitions



- Fire apparatus access road - A road that provides fire apparatus access from a fire station to a facility, building or portion thereof.
  - This is a general term, inclusive of all other terms such as, Fire Lane, Public Street, Private Street, Parking Lot Lane and Access Roadway.
- Fire lane - A road or other passageway developed to allow the passage of fire apparatus.
  - A fire lane is not necessarily intended for vehicular traffic other than fire apparatus.

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### Chapter 5 – Fire Service Features

(503.1)

- Approved access shall be provided for every building
- Shall extend to within 150 feet of all portions of the first story exterior walls
  - Exceptions:
    - Approved sprinkler system installed
    - Cannot be provided and alternative fire protection is provided
    - Not more than two R-3 or U occupancies
    - Can be exempted for solar photovoltaic power generation facilities

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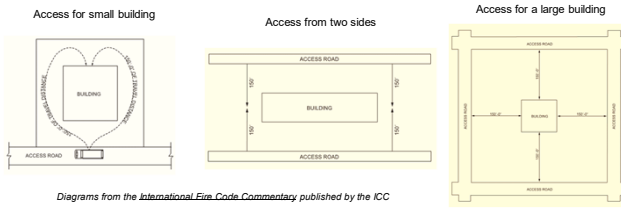
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### Chapter 5 – Fire Service Features

(503.1)



Diagrams from the *International Fire Code Commentary* published by the ICC

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### Chapter 5 – Fire Service Features

- Dimensions: (503.2.1)
  - Unobstructed width of at least 20 feet
  - Vertical clearance of at least 13 feet 6 inches
  - Security gates may be narrower when approved, & must comply with Section 503.6
- Authority
  - Fire code official has the authority to require or permit modifications to the access width



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### Chapter 5 – Fire Service Features

- Surface (503.2.3)
  - Shall be designed and maintained to support the load of fire apparatus
  - Shall have all weather capability
- Dead Ends
  - Dead ends that exceed 150 feet in length shall have an approved area for turning around fire apparatus



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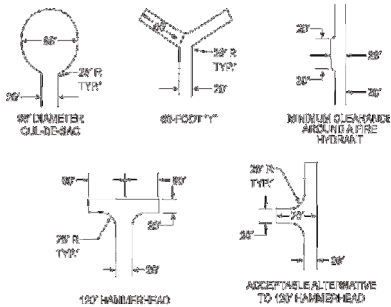
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### Chapter 5 – Fire Service Features

- Turnaround options
  - Appendix D



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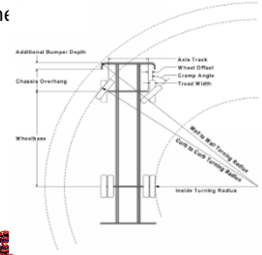
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Chapter 5 – Fire Service Features (503.2.4)

Turning Radius

- Determine



Parameters:	
Inside Cramp Angle:	40°
Axle Track:	82.50 in.
Wheel Offset:	5.25 in.
Traxel Width:	13.5 in.
Chassis Overhang:	65.59 in.
Additional Bumper Depth:	22 in.
Front Overhang:	127.8 in.
Wheelbase:	278 in.

Calculated Turning Radii:	
Inside Turn:	26 ft. 5 in.
Center to center:	42 ft. 4 in.
Wall to wall:	48 ft. 9 in.

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Chapter 5 – Fire Service Features

- Bridges and elevated surfaces
  - If used by fire apparatus must be constructed and maintained in accordance with AASHTO HB-17
    - American Association of State Highway and Transportation Officials
    - Highway Bridges, 17<sup>th</sup> Edition



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Chapter 5 – Fire Service Features (503.2.7)

- 503.2.7 Grade
  - Grade (slope) of the road must be within limits established by the fire code official based on the fire department's apparatus
- 503.2.8 Angles of Approach and Departure
  - Must be within limits established by the fire code official based on the fire department's apparatus



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Chapter 5 – Fire Service Features (503.3)

Marking

- Where required, by the Fire Code Official, approved signs or other approved notices or markings that include the words:
- NO PARKING - FIRE LANE
- Shall be provided for fire apparatus access roads



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Chapter 5 – Fire Service Features (504.1)

- Access to Building Openings and Roofs
  - Exteriors doors and openings required by the IFC and/or the International Building Code (IBC) shall be maintained and readily accessible for emergency access by the Fire Department.
- Maintenance of Exterior Doors and Openings
  - IF rendered non-functional must be signed on exterior side.



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Chapter 5 – Fire Service Features

505.1 Buildings shall have approved address numbers, building numbers, or building identification

- Legible and visible from street
- Contrasting background
- Where access to building is via a private road a monument, pole, or other approved means of identification shall be provided



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Chapter 5 – Fire Service Features

- Key Boxes
- Fire code official is authorized to require where:
  - Access to or within a structure is restricted by secured openings
  - Where immediate access is necessary for life-saving or firefighting purposes
- Key box location shall be approved
- Key Box type shall be approved
- Keys to gain necessary access shall be provided as required



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Chapter 5 – Fire Service Features

- Nonstandardized fire service elevators
  - Older elevators built prior to standardized keys
  - Mounted 5'6" on the right side of the elevator bank



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Chapter 5 – Fire Service Features (507.1)

- **Approved water supply capable of providing the required fire-flow shall be provided**
- Water supplies shall consist of:
  - Reservoirs
  - Pressure tanks
  - Elevated tanks
  - Water mains or fixed systems



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### Chapter 5 – Fire Service Features

- Fire Flow requirements shall be determined in an approved manner
  - Water supply test – must be witnessed or documentation submitted
  - Appendix B is also often used – you could use as a guide or adopt appendix B



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### Chapter 5 – Fire Service Features

- Fire Flow example – Appendix B

TABLE B105.1(2)  
REFERENCE TABLE FOR TABLES B105.1(1) AND B105.2

FIRE-FLOW CALCULATION AREA (square feet)					FIRE-FLOW (gallons per minute) <sup>F</sup>	FLOW DURATION (hours)	
Type IA and IB <sup>A</sup>	Type IIA and IIA <sup>A</sup>	Type IV and V-A <sup>A</sup>	Type III and III <sup>B</sup>	Type V-B <sup>A</sup>			
0-22,700	0-12,700	0-8,200	0-5,900	0-3,600	1,500	2	
22,701-30,200	12,701-17,000	8,201-10,900	5,901-7,900	3,601-4,800	1,750		
30,201-38,700	17,001-21,000	10,901-12,900	7,901-9,900	4,801-6,200	2,000		
38,701-48,300	21,001-24,200	12,901-17,400	9,901-12,600	6,201-7,700	2,250		
48,301-59,000	24,201-33,200	17,401-21,300	12,601-15,400	7,701-9,400	2,500		
59,001-70,900	33,201-39,700	21,301-25,000	15,401-18,400	9,401-11,300	2,750		
70,901-83,700	39,701-47,100	25,001-30,100	18,401-21,800	11,301-13,400	3,000		
83,701-97,700	47,101-54,900	30,101-35,200	21,801-25,900	13,401-15,600	3,250		
97,701-112,700	54,901-63,400	35,201-40,600	25,901-29,300	15,601-18,000	3,500		3
112,701-128,700	63,401-72,400	40,601-46,400	29,301-33,500	18,001-20,600	3,750		
128,701-145,900	72,401-82,100	46,401-52,500	33,501-37,900	20,601-23,300	4,000		

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### Chapter 5 – Fire Service Features

- Fire Hydrant System (507.5)
  - Provide where required by the Fire Code Official
  - Where a portion of a building is greater than **400 feet** away from a hydrant, as measured by an approved route around the building
  - Exceptions:
    - **R-3 and U Occupancies, the distance is 600 feet**
    - Buildings equipped with an approved fire sprinkler system, the distance is 600 feet

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## Chapter 5 – Fire Service Features

(507.5.1)

600'-0" FROM HYDRANT TO ALL PARTS OF THE GROUND FLOOR EXTERIOR.

For SI: 1 foot = 304.8

Commentary Figure 507.5.1(2)  
HYDRANT LOCATION—GROUPS R-3 AND U

HYDRANT LOCATED AT INTERSECTION OF ACCESS ROAD OF BUILDING TO PUBLIC STREET OR OTHER END OF THE HYDRANT

ACCESS ROAD

BUILDING

PUBLIC STREET

For SI: 1 foot = 304.8

Commentary Figure 507.5.1(1)  
HYDRANT LAYOUT TO MINIMIZE HOSE RUN

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## Chapter 5 – Fire Service Features

- Fire hydrant to a standpipe FDC
  - Building with a standpipe system must have a fire hydrant within 100 feet of the FDC.

This does not pertain to fire sprinkler systems

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## Chapter 5 – Fire Service Features

- Private fire service mains and water tanks shall be periodically inspected, tested, and maintained in accordance with NFPA 25
  - Private fire hydrants: Inspection annually and after each operation (flow test and maintenance annually)
  - Fire service main piping: Inspection of exposed piping annually; flow test every 5 years
  - Fire service main piping strainers: Inspection and maintenance after each use

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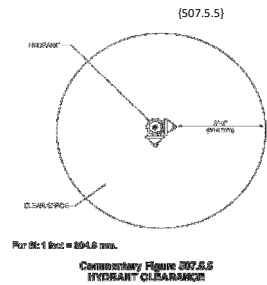
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### Chapter 5 – Fire Service Features

- Unobstructed access to hydrants shall be maintained at all times
  - Fire Department shall not be deterred from gaining immediate access to fire protection equipment or hydrants
- 3-foot clear space shall be maintained around the circumference of fire hydrants
  - Measured from the center of the hydrant




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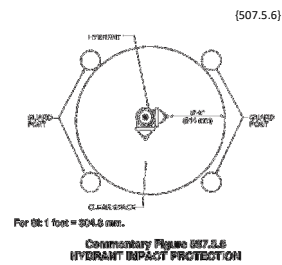
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### Chapter 5 – Fire Service Features

- Where fire hydrants are subject to impact by a motor vehicle, guard posts (i.e., bollards) or other approved means shall be provided
  - Posts or other methods shall comply with IFC Section 312




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### Chapter 5 – Fire Service Features

- Fire Command Center – “where required”
  - Must be separated by a 1-hour fire barrier
  - Must not be less than .015% of the total building area or 200 sq. ft. in area whichever is greater
  - With a minimum width of .7 times the square root of room area or 10 feet which ever is greater
  - There are 18 features the room must contain.

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Chapter 5 – Fire Service Features (509.1)

- Fire protection equipment shall be identified in an **approved** manner
  - air-conditioning systems
  - sprinkler risers and valves, or other fire detection
  - suppression or control elements
- Shall be identified for the use of the fire dept.
- Approved signs shall be readily visible

**FIRE  
ALARM  
CONTROL PANEL  
LOCATED INSIDE**

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Chapter 5 – Fire Service Features (509.1.1)

Utility Identification

- “Where Required”
- Gas shutoff valves
- Electric meters
- Service switches
- Other utility equipment

**NOTICE  
EMERGENCY  
GAS SHUTOFF**

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Chapter 5 – Fire Service Features (510)

- Emergency Responder Radio Coverage
- All new buildings shall have approved radio coverage for emergency responders within the building based upon the existing coverage level of the public safety radio system at the exterior of the building
  - Exception:
    - If the existing public safety radio system cannot provide this coverage inside the building, then the building and fire code officials can allow a wired communication system to be provided
    - Where determined by the Fire Code Official that radio coverage system is not needed

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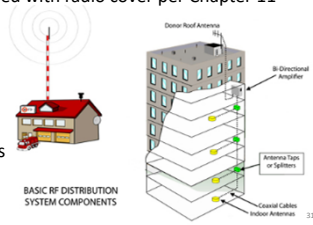
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# Chapter 5 – Fire Service Features

[510]

- Emergency Responder Radio Coverage
  - Existing building shall be provided with radio cover per Chapter 11 (1103.2)
- 510.4 – Technical Requirements
- 510.4.2 – System design
- 510.5 – Installation requirements
- 510.6 – Maintenance requirements



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# Chapter 6 Building Services and Systems

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# Information Removed

Photovoltaic

Battery

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CHAPTER 6 (601.1)

- 601.1 The provisions of this chapter apply to:
  - Fuel-fired appliances and heating systems
  - Electrical systems and equipment
  - Mechanical refrigeration systems
  - Elevator recall
  - Commercial kitchen equipment
  - Hyperbaric Facilities

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CHAPTER 6

- Permits Required
  - Refrigeration Systems



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FUEL-FIRED APPLIANCES (603.1)

- International Fuel Code
  - Non-Portable Gas Fired Appliances
- International Mechanical Code
  - Non-Portable Liquid Fired Appliances
- Allow for specific fuel fired devices like generators and fire pumps
- Installation should be in accordance with the manufacturer's instructions.

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### FUEL-FIRED APPLIANCES

{603.1}

- 603.1.4 Fuel Oil
  - The grade of fuel oil shall be compatible with the burner
  - Oil containing gasoline is prohibited
  - Waste oil can be used in F, M, and S occupancies if equipment is compatible

Table 6 Typical API Gravity, Density, and Higher Heating Value of Standard Grades of Fuel Oil

Grade No.	API Gravity	Density, lb/gal	Higher Heating Value, Btu/gal
1	28 to 45	6.950 to 6.675	137,000 to 132,000
2	30 to 38	7.296 to 6.960	141,800 to 137,000
4	20 to 28	7.787 to 7.396	148,100 to 143,100
5L	17 to 22	7.940 to 7.686	150,000 to 146,800
5H	14 to 18	8.080 to 7.890	152,000 to 149,400
6	8 to 15	8.448 to 8.053	155,000 to 151,300



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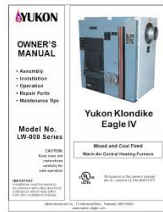
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### FUEL-FIRED APPLIANCES

{603.1}

- 603.1.5 Installed equipment shall have access so that maintenance and repairs can be performed
- 603.1.6 The equipment shall be tested to verify proper installation
- 603.1.6.2 Instructions and diagrams shall be furnished to the owner.



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### FUEL-FIRED APPLIANCES

{603.1}

- 603.1.7 Working clearances shall be provided
- 603.2 Chimneys
  - Masonry chimneys shall comply with the International Building Code (IBC)
  - Factory-built chimneys shall comply with the International Mechanical Code (IMC)
  - Metal chimneys shall comply with NFPA 211



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**FUEL-FIRED APPLIANCES**

### Fuel Oil Storage Systems (603.3)

Tank Design	Non-sprinklered Building	Fire Sprinklers Provided in Room	Fire Sprinklers Provided in the Building
UL 80	660 Gallons	660 Gallons	660 Gallons
UL 142	660 Gallons	660 Gallons	1320 Gallons
UL 2085	660 Gallons	3000 Gallons	3000 Gallons

Additional Requirements for the construction of the rooms and separations between rooms and the rest of the building.

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**FUEL-FIRED APPLIANCES**

- 603.4 Portable Unvented Heaters
  - Prohibited in A, E, I and R occupancies
    - Except if listed and approved for such use in one- and two-family dwellings
  - 603.4.1 Shall not be located in bedrooms, bathrooms, storage closets
  - 603.4.2 Portable outdoor gas-fired heating appliances shall meet the requirements of this section.



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**FUEL-FIRED APPLIANCES**

**603.4.2.2 Portable outdoor gas-fired heating appliances**

- 603.4.2.2.1 Shall be listed
- 603.4.2.2.3 Shall be equipped with a tilt or tip-over switch that shuts off flow of gas if the appliance is tilted more than 15 degrees from the vertical
- 603.4.2.2.4 Shall have a permanent guard to prevent accidental contact with persons/material

**603.5 Heating appliances**

- Shall be installed and maintained in accordance with manufacturer's instructions; and the IBC, IMC, IFGC, and NFPA 70

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**FUEL-FIRED APPLIANCES**



- 603.6 Chimneys and Appliances
  - Shall be maintained so as to not create a fire hazard
  - 603.6.1 Masonry shall have an intact flue liner
  - 603.6.2 Metal and factory built chimneys which are corroded or improperly supported shall be repaired or replaced
  - 603.6.5 Chimney/Vent Connectors shall be repaired if corroded, damaged, or improperly supported

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**FUEL-FIRED APPLIANCES**



- 603.7 Discontinuing operation of unsafe heating appliances
  - The fire code official is authorized to order that measures be taken to prevent the use of fuel fired appliances that are defective or in violation of the IFC (with or without notice, depending on the severity of the problem)
  - Use shall not occur until repairs are made and approval to resume use is granted

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**FUEL-FIRED APPLIANCES**



- 603.8 Incinerators
  - Shall be constructed in accordance with the IBC, IFGC, and IMC
  - Shall be equipped with a spark arrestor
  - Restrictions apply when incinerator is within 500 feet of mountainous, brush, or grass-covered terrain and creates a potential fire hazard
  - Burning shall take place during approved hours
  - Use shall be discontinued if smoke is offensive or determined to be a hazard.

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**FUEL-FIRED APPLIANCES**



- 603.9 Gas meters
  - Gas meters and piping subject to damage from vehicles shall be protected in accordance with IFC Section 312

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**Electrical Equipment, Wiring, and Hazards**

- 604.1 Abatement of electrical hazards
  - Identified hazards shall be abated
  - Shall be brought to the attention of the code official responsible for enforcement of the electrical code
  - Wiring, equipment, or devices that present a hazard shall not be used

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**Electrical Equipment, Wiring and Hazard**



**604.2 Illumination**


Illumination shall be provided for service equipment areas, motor control centers and electrical panelboards



**605.3 Working space clearance**

Clear space shall be provided in front of electrical service equipment and maintained clear of combustibles

- Minimum W: 30 inches; D: 36 inches; H: 78 inches
- Except where modified by NFPA 70

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Electrical Equipment, Wiring and Hazard (604)

Required working clearance

36 INCHES

30 INCHES

36 INCHES

Diagram from the International Fire Code Commentary published by the ICC

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Electrical Equipment, Wiring and Hazard

- 604.3.1 Labeling
  - Doors providing access to panel rooms shall be identified as "ELECTRICAL ROOM"

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Electrical Equipment, Wiring and Hazard

- 604.4 Multi-plug adapters
  - Cube adapters, unfused plug strips, or other devices not in compliance with NFPA 70 are prohibited

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**Electrical Equipment, Wiring and Hazard**

- 604.4.1 Relocatable power taps shall be polarized or grounded, equipped with over-current protection, and UL listed
  - Shall be plugged directly into a power outlet
  - Shall NOT:
    - Extend through walls, ceilings, floors
    - Extend under doors or floor coverings
    - Be subjected to environmental or physical damage

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**Electrical Equipment, Wiring and Hazard**

- 604.5 Extension cords and flexible cords
  - Shall NOT be substituted for permanent wiring
  - Shall NOT be affixed to structures
  - Shall NOT extend through:
    - Walls
    - Floors
    - Ceilings
    - Under doors or floor coverings
  - Shall NOT be subjected to:
    - Environmental or physical damage
  - Used for 90 days

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**Electrical Equipment, Wiring and Hazard**

- 605.5 Extension cords and flexible cords
  - SHALL
    - Be plugged directly into an approved receptacle, power tap, or multiplug adapter
    - Shall serve only one PORTABLE appliance
      - Except for approved multi plug extension cords
    - Have adequate ampacity for the portable appliance being supplied
    - Be maintained in good condition without splices, deterioration, or damage
    - Be grounded when serving grounded portable appliances



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### Electrical Equipment, Wiring and Hazard

- 604.6 Unapproved conditions
  - Open junction boxes and open-wiring splices are prohibited
  - Approved covers shall be provided for all switch and electrical outlet boxes
- 604.7 Appliances
  - Shall be tested and listed by an approved agency
  - Shall be installed and maintained in accordance with instructions and listings

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### Electrical Equipment, Wiring and Hazard



**604.8 Electrical motors**

Shall be maintained and kept free from accumulations of oil, dirt, waste, and debris



**604.9 Temporary wiring**

Is allowed for a period not to exceed 90 days  
Must comply with NFPA 70

- Except for construction, demolition, remodeling, or repairs

Where attached to structure: shall be in an approved manner

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### Electrical Equipment, Wiring and Hazard

- 604.10 Portable electric space heaters
  - Allowed where not prohibited by other sections of the IFC
  - Prohibited in I-2 occupancies (hospitals, etc.)
    - Exception: Non-sleeping employee staff areas, when the heating element temp. cannot exceed 212 degrees F
  - Shall be listed and labeled
  - Shall be plugged directly into an approved receptacle
  - Shall not be plugged into an extension cord
  - Shall not be operated within three feet of combustibles
  - Shall be operated only in areas for which they are listed

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### Electrical Equipment, Wiring and Hazard



- 604.11 Abandoned cables in plenums that are able to be accessed without causing damage, or requiring demolition to the building, shall be tagged for future use or shall be removed.

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### Mechanical Refrigeration

- Break out two different types of refrigerants
  1. Refrigerants other than ammonia – Installed in accordance with ASHRAE 15
  2. Ammonia Refrigeration – Comply with IAR

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### Mechanical Refrigeration

- Majority of requirements for mechanical refrigeration systems are in the International Mechanical Code (IMC)
- 605.5 Access
  - Systems having a refrigerant circuit containing more than 220 pounds of Group A1 or 30 pounds of any other group refrigerant shall be accessible to the fire department as required by the fire code official
- 605.6 Testing, including emergency devices/systems
  - Shall be conducted by qualified personnel and as required by the equipment manufacturer and fire code official.
- 605.7 Emergency signs

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## Mechanical Refrigeration

- 605.8 Refrigerant detector
  - Machinery rooms containing refrigerant systems shall have a refrigerant detector that provides visual and audible alarms at levels specified by the IMC

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## Mechanical Refrigeration

- 605.9 Remote controls
  - Where flammable refrigerants are used and compliance with IMC Section 1106 is required, remote control of the mechanical equipment & appliances in the machinery room shall be provided near the machinery room in an approved location
  - Emergency shut-off shall be provided
  - A switch for on-only control of the ventilation system shall be provided

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## Mechanical Refrigeration



**605.10** Systems containing more than 6.6 lbs of flammable, toxic or highly toxic refrigerant or ammonia shall be equipped with an emergency pressure control system



**605.10.2** Automatic emergency stop

A means shall be provided to automatically cause emergency stop of operation when:

- \*The system pressure reaches 90% of the set point for emergency pressure relief devices
- \*An automatic crossover valve has operated

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Mechanical Refrigeration

- 605.11 Storage, use, and Handling
  - Flammable and combustible materials shall not be stored in machinery rooms for refrigeration systems having a refrigerant circuit containing more than 220 pounds of Group A1 or 30 pounds of any other group refrigerant.
  - Exception: Does not apply to spare parts, tools and incidental materials necessary for the safe and proper operation/maintenance of the system

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Mechanical Refrigeration

- 605.12 Termination of relief devices
  - Shall meet IFC requirements specified for flammable, toxic/highly toxic, and ammonia refrigerants
  - Systems containing more than 6.6 lbs of flammable refrigerant with density equal to/greater than air shall discharge vapor to the atmosphere through an approved treatment system

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Mechanical Refrigeration

- 605.12.6 Treatment Systems
  - Shall be designed to reduce the allowable discharge concentration of the refrigerant gas to not more than 50% of the IDLH at the point of exhaust.
- 605.12.7 Flaring Systems
  - Flaring systems for incineration of flammable refrigerants shall be designed to incinerate the entire discharge.

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# Mechanical Refrigeration




**605.15 Records**

A written record of refrigerant quantities brought into and removed from the premises shall be maintained.



**605.16 Electrical equipment**

Based upon the type of refrigerant used, electrical equipment shall conform to Class 1 Division 2 hazardous location classification requirements of NFPA 70.

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# Mechanical Refrigeration

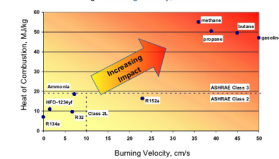
(605.17)

- Special requirements for A2L refrigerants that have lower flammability ratings


**Honeywell** Honeywell

**HFO-1234yf Flammability Properties**

Flammability is evaluated by 'Chance of Flame occurring' and 'Effect of Flame occurring'  
\*Effect of Flame occurring -> Burning Velocity, Heat of Combustion



**HFO-1234yf will be classified in Class 2L (Low Burning Velocity)**

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# Mechanical Refrigeration



- New refrigerants have a toxicity rating of Group A - non-toxic
- New requirements for electrical and mechanical ventilation

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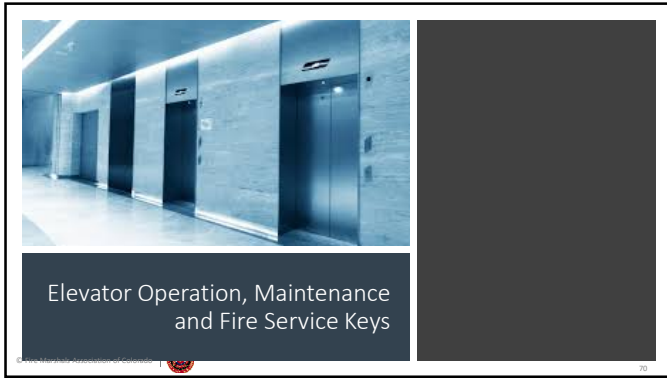
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### Elevator Operation, Maintenance and Fire Service Keys



- 606.1 Emergency operation
  - Existing elevators with a travel distance of 25 feet or more shall comply with IFC Chapter 11
  - New elevators shall have Phase I recall and Phase II emergency in-car operations in accordance with ASME A17.1
- 606.2 Standby power requirements
- 606.3 Emergency signs
  - An approved pictorial sign shall be posted adjacent to elevators that directs occupants to use stairwells in case of fire.

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### Elevator Operation, Maintenance and Fire Service Keys



- 606.4 Fire service access elevator lobbies
  - Where fire service access elevators are required by the IBC, the elevator lobbies for these elevators shall be kept clear of storage and furniture
- 606.5 Occupant evacuation elevator lobbies
  - Shall be kept clear of storage and furniture
- 606.7 Elevator keys
  - Keys for elevator car doors and firefighter service keys shall be kept in an approved location for immediate use by the fire department

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Elevator Operation, Maintenance and Fire Service Keys

- 606.8 Standardized fire service elevator keys
  - Buildings with elevators with Phase I emergency recall, Phase II emergency in-car operation, or a fire service access elevator shall be equipped to operate with a standardized fire service elevator key approved by the fire code official
  - Standardized fire service elevator keys shall be:
    - Uniform and specific for the jurisdiction
    - Of a patent-protected design to prevent unauthorized duplication, and engraved with "DO NOT DUPLICATE"
    - Restricted by the manufacturer to prevent the unauthorized distribution of key blanks



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Elevator Operation, Maintenance and Fire Service Keys

- 606.4 Fire service access elevator lobbies
  - Where fire service access elevators are required by the IBC the elevator lobbies for these elevators shall be kept clear of storage and furniture
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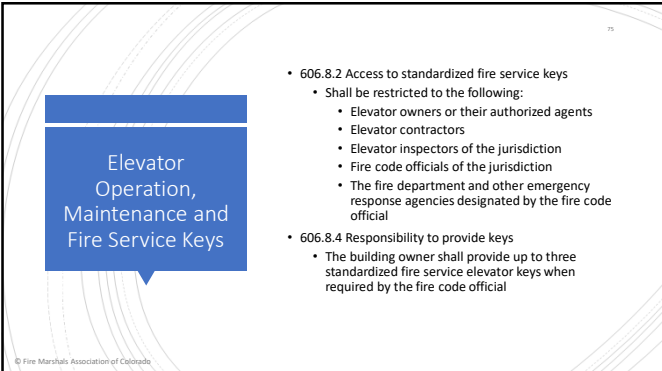
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Elevator Operation, Maintenance and Fire Service Keys

- 606.8.2 Access to standardized fire service keys
  - Shall be restricted to the following:
    - Elevator owners or their authorized agents
    - Elevator contractors
    - Elevator inspectors of the jurisdiction
    - Fire code officials of the jurisdiction
    - The fire department and other emergency response agencies designated by the fire code official
- 606.8.4 Responsibility to provide keys
  - The building owner shall provide up to three standardized fire service elevator keys when required by the fire code official



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## Commercial Kitchen Hoods

{607}

Cooking Type I  
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## Commercial Kitchen Hoods



- 607.1 General
  - Commercial kitchen exhaust hoods shall comply with the IMC
- 607.2 Where required
  - A Type I hood is required where commercial cooking produces grease-laden vapors
  - Exception for certain electrical cooking appliances
- 607.3 Operations and maintenance
  - Ventilation system shall be operated at the required rate of air movement
  - Grease filters shall be in place

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## Commercial Kitchen Hoods

- 607.3 Operations and maintenance (continued)
  - Where grease extractors are installed they shall be used
  - Cleaning
    - Shall occur at required intervals (Table 609.3.3.1)
    - Inspections shall occur at specified intervals by qualified individuals
    - If accumulation of grease is found, hood and associated components shall be cleaned
    - Records that document who performed the cleaning, the inspection, and when the inspection took place, shall be maintained



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**Commercial Kitchen Hoods**

- 607.3.4 Extinguishing system service
  - Automatic fire extinguishing systems protecting commercial cooking systems shall be serviced as required in Section 904.12.5
- 607.4 Appliance connection to building piping
  - Gas-fired appliances that are moved for cleaning shall be connected to the gas piping system by approved means
  - Restraining devices shall be installed to limit movement of appliances with casters

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**Commercial Kitchen Cooking Oil Storage**

- 608.1 Storage of cooking oil in commercial cooking operations shall comply w/NFPA 30
- 608.2 Metallic cooking oil storage tanks shall be listed in accordance with UL 142 or UL 80
- 608.3 Nonmetallic cooking oil storage tanks shall be listed and a maximum size of 200 gallons
- 608.5 Cooking oil storage tanks shall be provided with normal and emergency venting
- 608.6 Electrical equipment used for heating cooking oil shall be listed to UL 499 and shall comply with NFPA 70



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**Non-Metallic Cooking Oil Storage Tank Modification**

- Listed in accordance with UL 2152
- Tank capacity shall not exceed 200 gallons



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## Hyperbaric Facilities



609.1 Hyperbaric facilities shall be inspected, tested and maintained in accordance with NFPA 99

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## 2018 International Fire Code

### Chapter 7 – Fire and Smoke Protection Features

**IFC Chapter 7**  
(New & Existing Construction)

**IBC Chapter 7**  
(New Construction Only)



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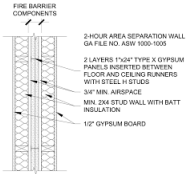
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## Chapter 7 - General

(701.1)

- This chapter shall govern the maintenance of the materials, systems and assemblies used for structural fire resistance and fire-resistance-rated construction separation of adjacent spaces to safeguard against the spread of fire and smoke within a building and the spread of fire to or from buildings
- New buildings shall comply with the IBC



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Chapter 7 (701.2)

- Know the terms ( Definitions Chapter 2)
  - Exterior Wall
  - Fire Wall
  - Fire Barriers
  - Fire Partition
  - Horizontal Assemblies

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Chapter 7 (701.2.1)



- Hanging Displays from acoustical ceiling systems part of a fire-resistance- rated horizontal assembly
- Maintenance language through the code
  - Smoke Partitions
  - Penetrations
  - Joints

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Chapter 7




sound duct with caulk only, no gles are required. Fire-rated retaining angle integral intumescent fire

- 703 - Penetrations
- 704 - Joints and Voids
- 705 - Door and Window Openings
- 706 - Duct and Air Transfer Openings
- 707 - Concealed Spaces

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Chapter 7

- Maintenance language through the code
  - Smoke Partitions
  - Penetrations
  - Joints



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Chapter 7 (705.2.2)

- Signage for Fire Doors
  - Normally open
    - FIRE DOOR – DO NOT BLOCK
  - Normally Closed
    - FIRE DOOR – KEEP CLOSED

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Chapter 7

- 705.2.4 Door Operation
  - Fire doors shall automatically close and latch
- 705.2.5 Smoke and Heat activated doors.
  - Maintained to self-close or automatically close upon detection of smoke
- 705.2.6 Horizontal and Vertical fire doors shall be tested annually and records maintained
  - Confirm proper operation and full closure



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Chapter 7

- Ducts and Air T...
- Maintained with NFPA 8...



NFPA 105 Standard for Smoke Door Assemblies and Other Opening Protectives 2019

NFPA 80 Standard for Fire Doors and Other Fire Door Assemblies

NFPA 105 Standard for Smoke Door Assemblies and Other Opening Protectives 2019

[706.1]

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2018 International Fire Code

Chapter 8 – Interior Finish, Decorative Materials and Furnishings



IFC Chapter 8 (New & Existing Construction)

IBC Chapter 8 (New Construction Only)

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803: Interior Wall & Ceiling Finish & Trim Existing Buildings

- Predominately a maintenance chapter in the IFC
- 803: Interior Wall and Ceiling Finish and Trim in Existing Buildings
  - 803.1.1 Classification per ASTM E 84
    - Class A, B and C material classes
    - Flame spread index
    - Smoke developed index

Typical Class Ratings		
Class	Flame Spread	Smoke Developed
Class A	0 - 25	0 - 450
Class B	26 - 75	0 - 450
Class C	76 - 200	0 - 450

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### 803: Interior Wall & Ceiling Finish & Trim Existing Buildings

- Predominately a maintenance chapter in the IFC
- 803: Interior Wall and Ceiling Finish and Trim in Existing Buildings
  - 803.1.1 Classification per ASTM E 84
    - Class A, B and C material classes.
    - Flame spread index
    - Smoke-developed index



Typical Class Ratings	
Flame Spread	Smoke Developed
0 - 25	0 - 450
26 - 75	0 - 450
76 - 200	0 - 450

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### 803: Interior Wall & Ceiling Finish & Trim Existing Buildings

- 803.3 NFPA 286
  - Used to test and classify interior wall and ceiling finishes and materials in a laboratory setting
  - "Room corner" test, in a room 8' X 12', with a ceiling 8' above floor
  - The test material is exposed to a 40 kW flame burner for 5 minutes
  - Materials which pass the test can be classified as Class A materials



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### 803: Interior Wall & Ceiling Finish & Trim Existing Buildings

- 803.5 Textile Wall Coverings
- Acceptance criteria for NFPA 265 Testing Protocol
  - During the 40 kW exposure, flames shall not spread to the ceiling
  - The flame shall not spread to the outer extremity of the sample on any wall or ceiling
  - Flashover shall not occur
  - Peak heat release rate shall not exceed 900 kW
  - Total smoke released shall not exceed 1,000 m<sup>3</sup> (Note: Smoke measured in m<sup>3</sup> because it is measured by the quantity of particulate released, not gas volume)
  - Materials which pass the test can be classified as Class A materials



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**805: Upholstered Furniture and Mattresses in New and Existing Buildings**

- Occupancy-specific requirements
  - I-1, I-2, I-3, R-2 College & University Dormitories (specifically college/university dormitories, not other types of R-2s)
- Requirements (Furniture vs. Mattresses)
  - Example: 805.1.1 vs. 805.1.2
  - Maximum allowed heat release rate
  - Ignition resistance (by cigarettes)
- Sprinkler exceptions (section by section)



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**806: Natural Decorative Vegetation in New and Existing Buildings**

- 806.1 Natural trees not allowed in most occupancies
  - Support devices
  - Dryness (test for dryness)
  - Exceptions for sprinklers
- Natural shall meet requirements for:
  - Egress
  - Open flame
  - Electrical Wiring



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**807: Decorative Materials and Artificial Decorative Vegetation in New and Existing Buildings**

- 807.2 Combustible Decorative Materials
  - Curtains, Draperies, fabric hangings suspended from walls and ceilings shall not exceed 10% of the specific wall area. Occupancy Driven
  - Exceptions
- 807.4 Artificial Decorative Vegetation
  - Wreaths and decorative items on doors



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**807: Decorative Materials and Artificial Decorative Vegetation in New and Existing Buildings**

- 807.5 Occupancy Based Requirements
  - Group A
    - Foam Plastics, Motion picture screens, wood in Religious, Pyroxylin plastics
  - Group E
    - Storage in Lockers, Artwork in classrooms and corridors
  - Group I requirements



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**808: Furnishings other than Upholstered Furniture and Mattresses or Decorative Materials in New and Existing Buildings**

- 808.1 Wastebaskets and linen containers
  - Only applies to I-1, I-2, I-3
  - Noncombustible, or peak HRR  $\leq 300\text{kW/m}^2$
- 808.2 Waste containers with capacity > 20 gals in Group R-2 dormitories
- 808.3 Foam plastic signs
- 808.4 Combustible lockers




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**2018 International Fire Code Chapter 33 – Fire Safety During Construction and Demolition**




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**Section 3301  
General**

- **3301.1 Scope**
  - Applies to structures in the course of construction, alteration or demolition
  - Compliance with NFPA 241 is required but not specifically addressed in this section
- **3301.2 Purpose**
  - This chapter is intended to regulate access by the responding fire department, fire protection systems, operations and maintenance of structures for precautions against fire and spread during construction and demolition.

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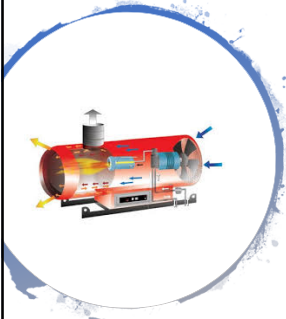
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**Section 3303 Temporary Heating Equipment**



- **3303.1 Listed.** All temporary heating devices shall be listed and labeled and installation must be in accordance with the manufacturers instructions.
- **3303.2 Oil-fired heaters.** Shall comply with Section 603

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**3303.3 LP-gas heaters.** Fuel supplies for LPG fired heaters shall comply with Chapter 61 (Liquified Petroleum Gas) and the International Fuel Gas Code

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- **3303.4 Refueling.** Shall be conducted in accordance with Section 5705
- The equipment shall be allowed to cool prior to refueling



- **3303.5 Installation.** Clearance to combustibles from temporary heating devices shall be maintained in accordance with the labeled equipment.
- It shall be fixed in place and protected from damage
- **3303.6 Supervision.** The use of temporary heating devices shall be supervised and maintained only by competent personnel.

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### Section 3304 Precautions Against Fire

- **3304.1 Smoking.** Shall be prohibited except in approved areas. Signs shall be posted in accordance with Section 310 and ashtrays shall be provided.

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### Combustible debris, rubbish and waste

- **3304.2** Shall comply with the requirements of Sections 3304.2.1 through 3304.2.4
- **3304.2.1 Combustible waste material accumulation.** Shall not be accumulated within buildings.
- **3304.2.2 Removal.** Shall be removed from buildings at the end of each shift of work
- **3304.2.3 Rubbish containers.** If containers exceed 5.33 cubic feet (40 gallons) are used for temporary storage of trash, a tight-fitting or self-closing lid is required. They must also be made of noncombustible materials.

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• **3304.2.4 Spontaneous ignition.** Materials susceptible to spontaneous ignition, like oil rags, shall be stored in a listed disposal container.



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• **3304.3 Burning of combustible debris, rubbish and waste.** This shall not be disposed of by burning on site unless approved.

• **3304.4 Open burning.** Open burning shall comply with Section 307.



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**Section 3304.5 through 3304.5.3 Fire Watch**

• A fire watch shall be provided for building demolition and for building construction that is hazardous in nature, such as temporary heating or hot work when required by the fire code official in accordance with Section 3308.3

• **3304.5.1 Fire watch during construction.** When required by the AHJ, a fire watch shall be provided during nonworking hours for new construction that exceeds 40 ft in height above the lowest adjacent grade.

• **3304.5.3 Fire watch location and records.** The fire watch folks must keep a record of all periods of duty. These must be made available for review by the AHJ.



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- **3304.6 Cutting and Welding.** Welding, cutting, open torches and other hot work operations and equipment shall comply with Chapter 35 ( Welding and Other Hot Work)
- **3304.7 Electrical.** Temporary wiring for electrical power and lighting installations used in connection with the construction, alteration or demolition of buildings, structures, equipment or similar activities shall comply with NFPA 70.



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### 3304.8 Cooking

- Cooking shall be prohibited except in approved designated cooking areas. Signs with a minimum letter height of 3 inches and a minimum brush stroke of 1/8 inch shall be posted in conspicuous locations in designated cooking areas and state:  
  
DESIGNATED COOKING AREA  
COOKING OUTSIDE OF A DESIGNATED COOKING AREA IS PROHIBITED.

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### Section 3305 Flammable and Combustible Liquids

- **3305.1 Storage of flammable and combustible liquids.** Storage of these liquids shall be in accordance with Section 5704.
- **3305.2 Class I and Class II liquids.** Storage of these at construction sites shall be in accordance with 5706.2. Ventilation is required.
- **3305.3 Housekeeping.** Flammable and combustible liquid storage areas shall be maintained clear of combustible vegetation and waste materials.



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### Section 3305 Flammable and Combustible Liquids

- **3305.4 Precautions against fire.** Sources of ignition and smoking shall be prohibited in flammable and combustible liquid storage areas. Signs shall be posted in accordance with Section 310.
- **3305.5 Handling at point of final use.** Class I and II liquids shall be kept in approved safety containers.
- **3305.6 Leakage and spills.** Leaking vessels shall be immediately repaired or taken out of service and spills shall be cleaned up and disposed of properly.



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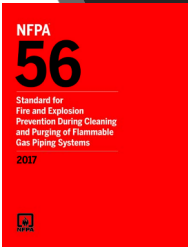
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### Section 3306 Flammable Gas



- **3306.1 Storage and handling.** The storage, use and handling of flammable gases shall comply with Chapter 58 (Flammable Gases and Flammable Cryogenic Fluids)
- **3306.2 Cleaning with flammable gas.** Flammable gases shall not be used to clean or remove debris from piping open to the atmosphere.
- **3306.2.1 Pipe cleaning and purging.** The cleaning and purging of flammable gas piping systems, including cleaning new or existing piping systems, purging piping systems into service and purging piping systems out of service, shall comply with NFPA 56.

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### Section 3307 Explosive Materials

- **3307.1 Storage and handling.** Explosive materials shall be stored, used and handled in accordance with Chapter 56.
- **3307.2 Supervision.** Blasting operations shall be conducted in accordance with Chapter 56.
- **3307.3 Demolition using explosives.** Approved fire hoses for use by demolition personnel shall be maintained at the demolition site wherever explosives are used for demolition. Such fire hoses shall be connected to an approved water supply and shall be capable of being brought to bear on post-detonation fires anywhere on the site of the demolition operation.



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### Section 3308 Owner's Responsibility for Fire Protection

- **3308.1 Program development and maintenance.** The owner or owners agent shall be responsible for the development, implementation and maintenance of a written plan establishing a fire prevention program at the project site throughout all phases of the construction, repair, alteration or demolition work.
- **3308.2 Program superintendent.** The owner shall designate a person to be the fire prevention program superintendent who shall be responsible for the fire prevention program and ensure that it is carried out through completion of the project.

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- **3308.3 Prefire plans.** The fire prevention program superintendent shall develop and maintain an approved prefire plan in cooperation with the fire chief.
- **3308.4 Training.** Training of responsible personnel in the use of fire protection equipment shall be the responsibility of the fire prevention program superintendent. Records of these trainings shall be kept and made part of the written plan for the fire prevention program.



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- **3308.5 Fire protection devices.** The fire prevention program superintendent shall determine that all fire protection equipment is maintained and services in accordance with this code. The quantity and type of fire protection equipment shall be approved.



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- **3308.6 Hot work operations.** The fire prevention program superintendent shall be responsible for supervising the permit system for hot work operations in accordance with Chapter 35.
- **3308.7 Impairment of fire protection systems.** Impairments to any fire protection system shall be in accordance with Section 901.
- **3308.7.1 Smoke detectors and smoke alarms.** Smoke detectors and smoke alarms located in an area where airborne construction dust is expected shall be covered to prevent exposure to dust or shall be temporarily removed.
- **3308.8 Temporary covering of fire protection devices.** Coverings placed on or over fire protection devices to protect them from damage shall be immediately removed upon completion of the construction project.



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### Section 3309 Fire Reporting

- **3309.1 Emergency telephone.** Emergency telephone facilities with ready access shall be provided in an approved location at the construction site, or an approved equivalent means of communication shall be provided. The street address of the construction site and the emergency telephone number of the fire department shall be posted adjacent to the telephone.



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### Section 3310 Access for Firefighting

- **3310.1 Required access.** Approved vehicle access for firefighting shall be provided to all construction or demolition sites. Vehicle access shall be provided to within 100 ft of temporary or permanent fire department connections.
- **3310.2 Key Boxes.** Key boxes shall be provided as required by Chapter 5.



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Section 3311 Means of Egress



- **3311.1 Stairways required.** Where building construction exceeds 40 ft in height above the lowest level of fire department vehicle access, a temporary or permanent stairway shall be provided. As construction progresses, such stairway shall be extended to within one floor of the highest point of construction having secured decking or flooring.

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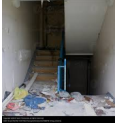
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- **3311.2 Maintenance.** Required means of egress and required accessible means of egress shall be maintained during construction and demolition, remodeling or alteration and additions to any building.
  - **Exception:** Approved temporary means of egress and accessible means of egress systems and facilities.
- **3311.3 Storage.** Combustible materials associated with construction, demolition, remodeling or alterations to an occupied structure shall not be stored in exits, enclosures for stairways and ramps, or exit access corridors serving an occupant load of 30 or more.
  - **Exceptions:** Where the only occupants are construction workers or combustible materials that are temporary accumulated to support work being performed when workers are present.



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Section 3312  
Water Supply for Fire Protection



- **When required.** An approved water supply for fire protection, either temporary or permanent, shall be made available as soon as combustible material arrives on site.

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### Section 3313 Standpipes

• **3313.1 Where required.** In buildings required to have standpipes by Section 905.3.1, not less than one standpipe shall be provided for use during construction. Such standpipes shall be installed prior to construction exceeding 40 ft in height above the lowest level of fire department vehicle access.

• **3313.2 Buildings being demolished.** Where a building is being demolished and a standpipe is existing within such a building, such standpipe shall be maintained in an operable condition so as to be available for use by the FD.

• **3313.3 Detailed requirements.** Standpipes shall be installed in accordance with the provisions of Section 905.



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### Section 3314 Automatic Sprinkler System

• **3314.1 Completion before occupancy.** In buildings where an automatic sprinkler system is required by this code or the IBC, it shall be unlawful to occupy any portion of a building structure until the automatic sprinkler system installation has been tested and approved.

• **3314.2 Operation of valves.** Operations of sprinkler control valves shall be allowed only by properly authorized personnel and shall be accompanied by notification of duly designated parties.



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### Section 3315 Portable Fire Extinguishers

• **3315.1 Where required.** Structures under construction, alteration, or demolition shall be provided with not less than one approved portable fire extinguisher in accordance with Section 906 and sized for not less than ordinary hazard as follows:

1. At each stairway on all floor levels where combustible materials have accumulated.
2. In every storage and construction shed
3. Additional shall be provided where special hazards exist including, but not limited to, the storage and use of flammable and combustible liquids.

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**Section 3316 Motorized Construction Equipment**

- **3316.1 Conditions of use.** Internal-combustion-powered construction equipment shall be used in accordance with all of the following conditions:
  1. Equipment shall be located so that exhausts do not discharge against combustible material.
  2. Exhausts shall be piped to the outside of the building.
  3. Equipment shall not be refueled while in operation.
  4. Fuel for equipment shall be stored in an approved area outside of the building.

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**Section 3317 Safeguarding Roofing Operations**

- **3317.1 General.** Roofing operations utilizing heat-producing systems or other ignition sources shall be conducted in accordance with Sections 3317.2 and 3317.3 and Chapter 35.
- **3317.2 Asphalt and kettles.** Asphalt and tar kettles shall be operated in accordance with Section 303.
- **3317.3 Fire extinguishers for roofing operations.** Fire extinguishers shall comply with Section 906. There shall be not less than one multi-purpose portable fire extinguisher with a minimum 3-A 40B:C rating on the roof being covered or repaired.

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**2018 International Fire Code**  
**Appendix B – Fire-Flow Requirements for Buildings**

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## Appendix B

- Modifications are allowed
  - Increases
  - Decreases
  - Areas without water supply systems
- Calculation Area
  - Total floor area of all floors within the exterior walls
  - Fire walls without openings: separate area calculations
  - Type IA & IB: Three largest successive floors

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## Appendix B

**TABLE B105.1(1)**  
FIRE FLOW TABLE FOR TYPE IA AND IB BUILDINGS

Area (sq. ft.)	Fire Flow (gpm)	Duration (hours)
0-22,700	1,500	2
22,701-38,200	1,750	2
38,201-48,300	2,250	2
48,301-59,000	2,500	2
59,001-70,900	2,750	2
70,901-83,700	3,000	2
83,701-97,700	3,250	2
97,701-112,700	3,500	2
112,701-128,700	3,750	2
128,701-145,900	4,000	2

**TABLE B105.1(2)**  
FIRE FLOW TABLE FOR TYPE III AND IV BUILDINGS

Area (sq. ft.)	Fire Flow (gpm)	Duration (hours)
0-5,900	1,500	2
5,901-7,900	1,750	2
7,901-9,900	2,000	2
9,901-12,000	2,250	2
12,001-15,400	2,500	2
15,401-18,400	2,750	2
18,401-21,800	3,000	2
21,801-25,900	3,250	2
25,901-29,300	3,500	2
29,301-33,500	3,750	2
33,501-37,900	4,000	2

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## Fire-Flow Table

TABLE B105.1(2)  
REFERENCE TABLE FOR TABLES B105.1(1) AND B105.2

Type IA and IB*	FIRE FLOW CALCULATION AREA (square feet)			Type V-B†	FIRE FLOW (gallons per minute)‡	FLOW DURATION (hours)
	Type IA and IIIA*	Type IV and V-A*	Type III and IIIA*			
0-22,700	0-12,700	0-8,200	0-5,900	0-3,600	1,500	2
22,701-38,200	12,701-17,000	8,201-10,900	5,901-7,900	3,601-4,800	1,750	
38,201-48,300	17,001-21,000	10,901-12,000	7,901-9,900	4,801-6,200	2,000	
48,301-59,000	21,001-24,200	12,001-17,400	9,901-12,000	6,201-7,700	2,250	
59,001-70,900	24,201-33,200	17,401-21,300	12,001-15,400	7,701-9,400	2,500	3
70,901-83,700	33,201-39,700	21,301-25,500	15,401-18,400	9,401-11,300	2,750	
83,701-97,700	39,701-47,100	25,501-30,100	18,401-21,800	11,301-13,400	3,000	
97,701-112,700	47,101-54,900	30,101-35,200	21,801-25,900	13,401-15,600	3,250	
112,701-128,700	54,901-63,400	35,201-40,600	25,901-29,300	15,601-18,000	3,500	3
128,701-145,900	63,401-72,400	40,601-46,400	29,301-33,500	18,001-20,600	3,750	
	72,401-82,100	46,401-52,500	33,501-37,900	20,601-23,300	4,000	

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### Appendix D

- Required access – *approved* asphalt, concrete able to support 75,000lbs.
- Access roads – shall be 26 feet wide exclusive of shoulders.
- Maximum grade 10%
- Turning radius – per the AHJ
- Maximum dead-end length

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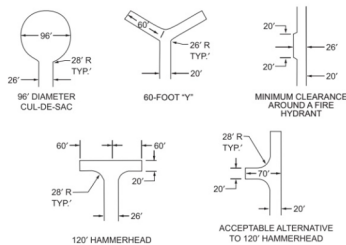
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### Appendix D - Turnarounds



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### Appendix D - Gates

- Not less than 20 feet in width
- Swinging or sliding
- Must be able to be manually operated by one person
- Operational at all times
- Electric gates shall have a manual means of opening
- Locking as approved by the AHJ
- Electric operators shall be UL 325 listed and designed & constructed in accordance with ASTM F2200

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### Appendix D - Signs

- Shall state "No Parking – Fire Lane"
- Minimum 12" wide and 18" high
- Posted on:
  - Both sides of roads 20 – 26 feet in width
  - One side of roads 26 – 32 feet wide



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### Appendix D – Commercial & Industrial Developments

- >62,000sf shall have two separate *approved* fire apparatus access roads.
  - Exception: Buildings <124,000sf that are sprinklered only require one fire apparatus access road.
- Remoteness: Separated by at least 1/4 of the overall diagonal dimension of the lot.

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### Appendix D – Aerial Fire Apparatus Access Roads

- Where building heights exceed 30 feet, the fire apparatus access road shall be 26 feet wide.
- Shall be parallel to one entire side of the building and be:
  - Minimum 15 feet from the structure
  - Maximum 30 feet from the structure
- There shall be no overhead obstructions along these routes

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**Appendix D – Multi-Family Residential Developments**

- Shall have two separate fire apparatus access roads when:
  - >100 non-sprinklered dwelling units
  - >200 sprinklered dwelling units
- Remoteness: Separated by at least ½ of the overall diagonal dimension of the lot.

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**Appendix D – One- or Two-Family Residential Developments**

- Shall have two separate fire apparatus access roads when:
  - >30 dwelling units
- Remoteness: Separated by at least ½ of the overall diagonal dimension of the lot.

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