Code Review
2018 Changes to International Codes

FLORIDA BUILDING COMMISSION
"Stronger Codes Through Science and Consensus"

Florida dbpr
Building Codes and Standards

International Fire Code(IFC) / International Mechanical Code – Fire Prevention

Mechanical Technical Advisory Committee (TAC)

IMC- Code Change No.	IMC- Section	Change Summary b/t 2015 IMC and 2018 IMC – Mechanical TAC	Change Summary b/t 2017 FMC and 2018	Staff comments
F12-16	903.2.11.1.1 (IBC [F] 903.2.11.1.1), 903.2.11.2 (IBC [F] 903.2.11.2), 904.12.4 (IBC [F] 904.12.4), 905.5 (IBC [F] 905.5), 906..5 (IBC [F] 906.5), 907.2 (IBC [F] 907.2), 907.2.6 (IBC [F] 907.2.6), 907.2.6.3.3 (IBC [F] 907.2.6.3.3), 907.2.10.1 (IBC [F] 907.2.10.1), 907.2.20 (IBC [F] 907.2.20), 907.2.22.2 (IBC [F] 907.2.22.2), 907.4.2.6 (IBC [F] 907.4.2.6), 907.8.2 (IBC [F] 907.8.2), 909.12.4 (IBC [F] 909.12.4, IMC [F]	Revises section 303.2.11.1.1 “Opening dimensions and access,” revises section 903.2.11.2 “Rubbish and linen chutes,” revises section 904.12.4 “Special provisions for automatic sprinkler systems,” revises section 905.5 “Location of Class II standpipe hose connections,” revises section 906.5 “Conspicuous location,” revises section 907.2 “Where required—new buildings and structures,” revises section 907.2.6 “Group I,” revises section 907.2.6.3.3 “Automatic smoke detection system,” revises section 907.2.10.1 “Manual fire alarm system,” revises section 907.2.20 “Covered and open mall buildings,” revises section 907.2.22.2 “Other airport traffic control towers,” revises section 907.4.2.6 “Unobstructed and unobscured,” revises section 907.8.2 “Testing,” revises section 909.12.4 “Automatic control,” revises section 910.4.5 “Manual control location,” revises section 3313.1 “Where required,” revises section 513.12.4 IMC and revises section 403.1 “Restricted Access” to provide a change in terminology for clarity purposes. This amendment was approved as modified per public comment by Michael O’Brian to provide further clarity. **Cost Impact:** Will not increase the cost of construction. This is a change in terminology for **clarity** and will have not technical changes to the codes.	Same as change between 2015 IMC and 2018 IMC	

Rule 61G20-2.002 2. Technical amendments needed to accommodate the specific needs of this state include but are not limited to amendments to the Florida Building Code that provide for the following: a. Establish minimum life safety construction requirements to protect buildings and their occupants from fire, wind, flood, and storm surge using the latest technical research and engineering standards for buildings and materials products. b. Provide for flood protection provisions that are consistent with the latest flood protection requirements of the National Flood Insurance Program. c. Maintain eligibility for federal funding and discounts from the National Flood Insurance Program, the Federal Emergency Management Agency, and the United States Department of Housing and Urban Development. d. Provide for energy efficiency standards for buildings that meet or exceed the national energy standards as mandated by Title III of the Energy Conservation and Protection Act. e. Maintain coordination with the Florida Fire Prevention Code. f. Provide for the latest industry standards and design

	513.12.4), 910.4.5 (IBC [F] 910.4.5), 3313.1 (IBC [F] 3311.1, IEBC [F] 1506.1), 109.1.1, [F] 403.1			

TAC Action	Commission Action		TAC	Cmsn.
Accommodate Florida Specific Need: YES (Select Criteria) ☐ NO: ☐ a.☐ b.☐ c.☐ d.☐ e.☐ f.☐ Others (Explain):	Accommodate Florida Specific Need: YES (Select Criteria) ☐ NO: ☐ a. ☐ b. ☐ c. ☐ d. ☐ e. ☐ f. ☐ Others (Explain):	☐ No Action Needed	☐	☐
		☐ Overlapping provisions	☐	☐

F274-16	IMC [F]502.16, [F]502.16.1 (New), [F]502.16.2 (New), [F]502.16.1, [F]502.16.2, Chapter 15; IMC [FG] 304.5.1, [FG] 304.5.1.1, IMC [FG] 304.5.1.2, IMC [FG] 304.5.2, IMC [FG] 304.5.3	Modifies text of section [F] 502.16 "Repair garages for vehicles fueled by lighter-than-air fuels", [F] 502.16.2.1 "Design", [F] 502.16.2.2 "Operation", 703.1 "Hydrogen-generating and refueling operations". *Adds new Section [F] 502.16.1 "Repair garages used for the repair of hydrogen-fueled vehicles",* [F] 502.16.2 "Exhaust ventilation system". Adds new reference standard NFPA 2-2016 "Hydrogen Technologies Code". Deletes entirety of Section 703.1.1 "Natural ventilation", 703.1.2 "Mechanical ventilation", 703.1.3 "Specially engineered installations". The exception language in 2311.7.2 (new numbering) was modified to match existing verbiage found in the IMC. This proposal is a comprehensive fix of the exhaust ventilation requirements for repair garages for hydrogen fueled vehicles and for exhaust ventilation requirements for the installation hydrogen-generating and refueling operations. The primary goal was consistency and correlation between the requirements found within the IFC, the IMC and the IFGC along with tighter correlation with the requirements of NFPA 2. **Cost Impact**: Will not increase the cost of construction. This proposal **will reduce the cost** of installation by eliminating an internal conflict within the IMC, by **correlating** all of the ICC	Same as change between 2015 IMC and 2018 IMC	

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		codes dealing with this topic, and by providing for tighter correlation with NFPA 2 which the I-Codes already refer to for these types of installations.		

TAC Action	Commission Action		TAC	Cmsn.
Accommodate Florida Specific Need: **YES (Select Criteria)** ☐ **NO:** ☐ **a.** ☐ **b.** ☐ **c.** ☐ **d.** ☐ **e.** ☐ **f.** ☐ **Others (Explain):**	**Accommodate Florida Specific Need:** **YES (Select Criteria)** ☐ **NO:** ☐ **a.** ☐ **b.** ☐ **c.** ☐ **d.** ☐ **e.** ☐ **f.** ☐ **Others (Explain):**	☐ **No Action Needed**	☐	☐
		☐ **Overlapping provisions**	☐	☐

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Code Change No: F12-16

Original Proposal

Section(s): 105.6.16, [A] 106.3, 107.5, 202, 309.2, 311.2.1, 315.6, 316.2.1, 403.10.2.2.1, 504.1, 509.2, 603.1.5, 603.1.6.1, 605.12, 606.5, 608.4.1, 703.1, 903.2.11.1.1 (IBC [F] 903.2.11.1.1), 903.2.11.2 (IBC [F] 903.2.11.2), 904.12.4 (IBC [F] 904.12.4), 905.5 (IBC [F] 905.5), 906..5 (IBC [F] 906.5), 907.2 (IBC [F] 907.2), 907.2.6 (IBC [F] 907.2.6), 907.2.6.3.3 (IBC [F] 907.2.6.3.3), 907.2.10.1 (IBC [F] 907.2.10.1), 907.2.20 (IBC [F] 907.2.20), 907.2.22.2 (IBC [F] 907.2.22.2), 907.4.2.6 (IBC [F] 907.4.2.6), 907.8.2 (IBC [F] 907.8.2), 909.12.4 (IBC [F] 909.12.4, IMC [F] 513.12.4), 910.4.5 (IBC [F] 910.4.5), 914.2.3, 1105.9, 2005.4, 2005.7, 2005.7.1, 2006.6.1, 2301.1, 2303.2, 2306.2.5, 2308.6, 2310.6.3, 2404.3.2.5, 2405.3.2, 2404.8.1.2, 2404.7.8.2, 2703.10.1.1, 2703.10.4.4.5, 2903.3, 3201.4, 3206.2, 3206.6.1, 3206.9.1.1, 3309.1, 3313.1 (IBC [F] 3311.1, IEBC [F] 1506.1), 3503.6, 3504.2.6, 5003.2.2.1, 5004.2.3, 5303.5.3, 5305.4, 5503.4.3, 5606.5.2.1, 5606.5.2.3, 5703.6.2.1, 5703.6.6.1, 5704.2.9.6.2, 5704.2.9.7.5.1, 5704.3.5.4, 5704.3.6.2, 5706.4.7.6, 5706.4.10.4, 5706.5.3.1.1, 5706.5.4.5, 6004.2.2.10.3, 6109.9, 6109.10, 6109.15, D102.1, I101.3, L104.6, L104.14.1; IWUIC [A] 109.1.1, [F] 403.1

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

Revise as follows:

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

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

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

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

Add new definition as follows:

SECTION 202
DEFINITIONS

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Exceptions:

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

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

Exceptions:

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

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

Exceptions:

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

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

Exceptions:

1. A manual fire alarm system is not required in buildings not more than two stories in height where all individual *sleeping units* and contiguous attic and crawl spaces to those units are separated from each other and public or common areas by not less than 1-hour *fire partitions* and each individual *sleeping unit* has an *exit* directly to a *public way*, *egress court* or yard.
2. Manual fire alarm boxes are not required throughout the building where all of the following conditions are met:
   2.1. The building is equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.
   2.2. The notification appliances will activate upon sprinkler water flow.
   2.3. Not fewer than one manual fire alarm box is installed at an *approved* location.

2.4. Manual fire alarm boxes in resident or patient sleeping areas shall not be required at *exits* where located at all nurses' control stations or other constantly attended staff locations, provided such stations are visible and continuously ~~accessible~~ available for access and that the distances of travel required in Section 907.4.2.1 are not exceeded.

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

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

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

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

907.8.2 Testing. Testing shall be performed in accordance with the schedules in NFPA 72 or more frequently where required by the *fire code official*. Records of testing shall be maintained.

Exception: Devices or equipment that are ~~inaccessible~~ not available for access for safety considerations shall be tested during scheduled shutdowns where *approved* by the *fire code official*, but not less than every 18 months.

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

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

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

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

Exception: Manual fire alarm boxes in patient sleeping areas shall not be required at *exits* if located at all nurses' control stations or other constantly attended staff locations, provided such stations are

visible and continuously ~~accessible~~ open for access and that travel distances required in Section 907.4.2.1 are not exceeded.

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

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

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

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

2301.1 Scope. Automotive motor fuel-dispensing facilities, marine motor fuel-dispensing facilities, fleet vehicle motor fuel-dispensing facilities, aircraft motor-vehicle fuel-dispensing facilities and repair garages shall be in accordance with this chapter and the *International Building Code, International Fuel Gas Code* and *International Mechanical Code*. Such operations shall include both those that are ~~accessible~~ open to the public and private operations.

2303.2 Emergency disconnect switches. An *approved,* clearly identified ~~and readily accessible~~ emergency disconnect switch with ready access shall be provided at an *approved* location to stop the transfer of fuel to the fuel dispensers in the event of a fuel spill or other emergency. The emergency disconnect switch for exterior fuel dispensers shall be located within 100 feet (30 480 mm) of, but not less than 20 feet (6096 mm) from, the fuel dispensers. For interior fuel-dispensing operations, the emergency disconnect switch shall be installed at an *approved* location. Such devices shall be distinctly *labeled* as: EMERGENCY FUEL SHUTOFF. Signs shall be provided in *approved* locations.

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

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

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

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

Exceptions:

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

2. This requirement shall not prohibit locating a spray booth closer than 3 feet (914 mm) to an exterior wall or a roof assembly, provided the wall or roof is constructed of noncombustible material and the spray booth can be adequately maintained and cleaned.

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

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

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

2404.7.8.2 Attachment. Overspray collection filters shall be readily removable and ~~accessible~~ have access for cleaning or replacement.

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

Exceptions:

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

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

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

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

TABLE 3206.2
GENERAL FIRE PROTECTION AND LIFE SAFETY REQUIREMENTS

COMMODITY CLASS	SIZE OF HIGH-PILED STORAGE AREA[a] (square feet) (see Sections 3206.2 and 3206.4)	ALL STORAGE AREAS (See Sections 3206, 3207 and 3208)[b]				SOLID-PILED STORAGE, SHELF STORAGE AND PALLETIZED STORAGE (see Section 3207.3)		
		Automatic fire-extinguishing system (see Section 3206.4)	Fire detection system (see Section 3206.5)	Building access (see Section 3206.6)	Smoke and heat removal (see Section 3206.7)	Maximum pile dimension[c] (feet)	Maximum permissible storage height[d] (feet)	Maximum pile volume (cubic feet)
I-IV	0-500	Not Required[a]	Not Required	Not Required[e]	Not Required	Not Required	Not Required	Not Required
	501-2,500	Not Required[a]	Yes[i]	Not Required[e]	Not Required	100	40	100,000
	2,501-12,000 Open to the Public ~~accessible~~	Yes	Not Required	Not Required[e]	Not Required	100	40	400,000
	2,501-12,000 Not open to the public ~~Nonpublic accessible~~ (Option 1)	Yes	Not Required	Not Required[e]	Not Required	100	40	400,000
	2,501-12,000 Not open to the public ~~Nonpublic accessible~~ (Option 2)	Not Required[a]	Yes	Yes	Yes[j]	100	30[f]	200,000
	12,001-20,000	Yes	Not Required	Yes	Yes[j]	100	40	400,000
	20,001-500,000	Yes	Not Required	Yes	Yes[j]	100	40	400,000
	Greater than 500,000[g]	Yes	Not Required	Yes	Yes[j]	100	40	400,000
High hazard	0-500	Not Required[a]	Not Required	Not Required[e]	Not Required	50	Not Required	Not Required
	501-2,500 Open to the Public ~~accessible~~	Yes	Not Required	Not Required[e]	Not Required	50	30	75,000
	501-2,500 Not open to the public ~~Nonpublic accessible~~ (Option 1)	Yes	Not Required	Not Required[e]	Not Required	50	30	75,000
	501-2,500 Not open to the public ~~Nonpublic accessible~~ (Option 2)	Not Required[a]	Yes	Yes	Yes[j]	50	20	50,000
	2,501-300,000	Yes	Not Required	Yes	Yes[j]	50	30	75,000
	300,001-500,000[g, h]	Yes	Not Required	Yes	Yes[j]	50	30	75,000

For SI: 1 foot = 304.8 mm, 1 cubic foot = 0.02832 m^3 , 1 square foot = 0.0929 m^2 .

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

b. For aisles, see Section 3206.9.

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

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

e. Section 503 shall apply for fire apparatus access.
f. For storage exceeding 30 feet in height, Option 1 shall be used.
g. Special fire protection provisions including, but not limited to, fire protection of exposed steel columns; increased sprinkler density; additional in-rack sprinklers, without associated reductions in ceiling sprinkler density; or additional fire department hose connections shall be provided required by the fire code official.
h. High-piled storage areas shall not exceed 500,000 square feet. A 2-hour fire wall constructed in accordance with Section 706 the *International Building Code* shall be used to divide high-piled storage exceeding 500,000 square feet in area.
i. Not required where an automatic fire-extinguishing system is designed and installed to protect the high-piled storage area in accordance with Sections 3207 and 3208.
j. Not required where storage areas are protected by either early suppression fast response (ESFR) sprinkler systems or control mode special application sprinklers with a response time index of 50 $(m \cdot s)^{1/2}$ or less that are listed to control a fire in the stored commodities with 12 or fewer sprinklers, installed in accordance with NFPA 13.

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

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

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

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

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

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

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

CAUTION HOT WORK IN PROGRESS STAY CLEAR

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

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

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

   Health Class 3 or 4
   Flammability Class 4
   Instability Class 3 or 4

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

   Exceptions:

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

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

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

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

1. Securing containers, cylinders and tanks to a fixed object with one or more restraints.

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

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

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

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

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

1. Quantities exceeding 20 pounds (9 kg), but not exceeding 100 pounds (45 kg) shall be stored in portable wooden boxes having walls of not less than 1 inch (25 mm) nominal thickness.
2. Quantities exceeding 100 pounds (45 kg), but not exceeding 800 pounds (363 kg), shall be stored in nonportable storage cabinets having walls not less than 1 inch (25 mm) nominal thickness. Not more than 400 pounds (182 kg) shall be stored in any one cabinet, and cabinets shall be separated by a distance of not less than 25 feet (7620 mm) or by a *fire partition* having a *fire-resistance rating* of not less than 1 hour.
3. Storage of quantities exceeding 800 pounds (363 kg), but not exceeding 5,000 pounds (2270 kg) in a building shall comply with all of the following:
   3.1. The warehouse or storage room is ~~unaccessible~~ not open to unauthorized personnel.
   3.2. Smokeless propellant shall be stored in nonportable storage cabinets having wood walls not less than 1 inch (25 mm) nominal thickness and having shelves with not more than 3 feet (914 mm) of separation between shelves.
   3.3. Not more than 400 pounds (182 kg) is stored in any one cabinet.
   3.4. Cabinets shall be located against walls of the storage room or warehouse with not less than 40 feet (12 192 mm) between cabinets.
   3.5. The minimum required separation between cabinets shall be 20 feet (6096 mm) provided that *barricades* twice the height of the cabinets are attached to the wall, midway between each cabinet. The *barricades* must extend not less than 10 feet (3048 mm) outward, be firmly attached to the wall and be constructed of steel not less than $^1/_4$ inch thick (6.4 mm), 2-inch (51 mm) nominal thickness wood, brick or concrete block.
   3.6. Smokeless propellant shall be separated from materials classified as *combustible liquids*, flammable liquids, flammable solids or oxidizing materials by a distance of 25 feet (7620 mm) or by a *fire partition* having a *fire-resistance rating* of 1 hour.
   3.7. The building shall be equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1.
4. Smokeless propellants not stored in accordance with Item 1, 2, or 3 above shall be stored in a Type 2 or 4 magazine in accordance with Section 5604 and NFPA 495.

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

1. Quantities not to exceed 750,000 small arms primers stored in a building shall be arranged such that not more than 100,000 small arms primers are stored in any one pile and piles are not less than 15 feet (4572 mm) apart.
2. Quantities exceeding 750,000 small arms primers stored in a building shall comply with all of the following:
   2.1. The warehouse or storage building ~~shall~~is not ~~be accessible~~ open to unauthorized personnel.
   2.2. Small arms primers shall be stored in cabinets. Not more than 200,000 small arms primers shall be stored in any one cabinet.
   2.3. Shelves in cabinets shall have vertical separation of not less than 2 feet (610 mm).
   2.4. Cabinets shall be located against walls of the warehouse or storage room with not less than 40 feet (12 192 mm) between cabinets. The minimum required separation between cabinets shall be allowed to be reduced to 20 feet (6096 mm) provided that *barricades* twice the height of the cabinets are attached to the wall, midway between each cabinet. The *barricades* shall be firmly attached to the wall and shall be constructed of steel not less than $^{1}/_{4}$ inch thick (6.4 mm), 2-inch (51 mm) nominal thickness wood, brick or concrete block.
   2.5. Small arms primers shall be separated from materials classified as *combustible liquids*, flammable liquids, flammable solids or oxidizing materials by a distance of 25 feet (7620 mm) by a *fire partition* having a *fire-resistance rating* of 1 hour.
   2.6. The building shall be protected throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1.
3. Small arms primers not stored in accordance with Item 1 or 2 of this section shall be stored in a magazine meeting the requirements of Section 5604 and NFPA 495.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

5706.5.3.1.1 Shutoff valves. *Approved* automatically or manually activated shutoff valves shall be provided where the transfer hose connects to the process piping, and on both sides of any exterior fire-

resistance-rated wall through which the piping passes. Manual shutoff valves shall be arranged so that they ~~are accessible~~ have access from grade. Valves shall not be locked in the open position.

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

1. Dispensing shall occur only at sites that have been issued a permit to conduct mobile fueling.
2. The *owner* of a mobile fueling operation shall provide to the jurisdiction a written response plan which demonstrates readiness to respond to a fuel spill and carry out appropriate mitigation measures, and describes the process to dispose properly of contaminated materials.
3. A detailed site plan shall be submitted with each application for a permit. The site plan shall indicate: all buildings, structures and appurtenances on site and their use or function; all uses adjacent to the lot lines of the site; the locations of all storm drain openings, adjacent waterways or wetlands; information regarding slope, natural drainage, curbing, impounding and how a spill will be retained upon the site property; and the scale of the site plan.Provisions shall be made to prevent liquids spilled during dispensing operations from flowing into buildings or off-site. Acceptable methods include, but shall not be limited to, grading driveways, raising doorsills or other *approved* means.
4. The *fire code official* is allowed to impose limits on the times and days during which mobile fueling operations is allowed to take place, and specific locations on a site where fueling is permitted.
5. Mobile fueling operations shall be conducted in areas not ~~accessible~~ open to the public or shall be limited to times when the public is not present.
6. Mobile fueling shall not take place within 15 feet (4572 mm) of buildings, property lines, combustible storage or storm drains.

   Exceptions:

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

7. The tank vehicle shall comply with the requirements of NFPA 385 and local, state and federal requirements. The tank vehicle's specific functions shall include that of supplying fuel to motor vehicle fuel tanks. The vehicle and all its equipment shall be maintained in good repair.
8. Signs prohibiting smoking or open flames within 25 feet (7620 mm) of the tank vehicle or the point of fueling shall be prominently posted on three sides of the vehicle including the back and both sides.
9. A portable fire extinguisher with a minimum rating of 40:BC shall be provided on the vehicle with signage clearly indicating its location.
10. The dispensing nozzles and hoses shall be of an *approved* and *listed* type.
11. The dispensing hose shall not be extended from the reel more than 100 feet (30 480 mm) in length.
12. Absorbent materials, nonwater-absorbent pads, a 10-foot-long (3048 mm) containment boom, an *approved* container with lid and a nonmetallic shovel shall be provided to mitigate a minimum 5-gallon (19 L) fuel spill.
13. Tank vehicles shall be equipped with a "fuel limit" switch such as a count-back switch, to limit the amount of a single fueling operation to not more than 500 gallons (1893 L) before resetting the limit switch.

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

14. Persons responsible for dispensing operations shall be trained in the appropriate mitigating actions in the event of a fire, leak or spill. Training records shall be maintained by the dispensing company.
15. Operators of tank vehicles used for mobile fueling operations shall have in their possession at all times an emergency communications device to notify the proper authorities in the event of an emergency.
16. The tank vehicle dispensing equipment shall be constantly attended and operated only by designated personnel who are trained to handle and dispense motor fuels.
17. Fuel dispensing shall be prohibited within 25 feet (7620 mm) of any source of ignition.
18. The engines of vehicles being fueled shall be shut off during dispensing operations.
19. Nighttime fueling operations shall only take place in adequately lighted areas.
20. The tank vehicle shall be positioned with respect to vehicles being fueled to prevent traffic from driving over the delivery hose.
21. During fueling operations, tank vehicle brakes shall be set, chock blocks shall be in place and warning lights shall be in operation.
22. Motor vehicle fuel tanks shall not be topped off.
23. The dispensing hose shall be properly placed on an *approved* reel or in an *approved* compartment prior to moving the tank vehicle.
24. The *fire code official* and other appropriate authorities shall be notified when a reportable spill or unauthorized discharge occurs.
25. Operators shall place a drip pan or an absorbent pillow under each fuel fill opening prior to and during dispensing operations. Drip pans shall be liquid-tight. The pan or absorbent pillow shall have a capacity of not less than 3 gallons (11.36 L). Spills retained in the drip pan or absorbent pillow need not be reported. Operators, when fueling, shall have on their person an absorbent pad capable of capturing diesel fuel overfills. Except during fueling, the nozzle shall face upward and an absorbent pad shall be kept under the nozzle to catch drips. Contaminated absorbent pads or pillows shall be disposed of regularly in accordance with local, state and federal requirements.

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

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

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

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

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

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

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

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

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

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

6.1. Corroded or leaking batteries or terminals.
6.2. Smoke detectors having paint or other ornamentation that is not factory-applied.
6.3. Mechanical damage to heat or smoke detectors.
6.4. Tripped fuses.

7. Fire department connections having any of the following conditions:
   7.1. Fire department connections are not visible or ~~accessible~~ available for access from the fire apparatus access road.
   7.2. Couplings or swivels are damaged
   7.3. Plugs and caps are missing or damaged.
   7.4. Gaskets are deteriorated.
   7.5. Check valve is leaking.
   7.6. Identification signs are missing.
8. Fire pumps having any of the following conditions:
   8.1. Pump room temperature is less than 40°F (4.4°C).
   8.2. Ventilating louvers are not freely operable.
   8.3. Corroded or leaking system piping.
   8.4. Diesel fuel tank is less than two-thirds full.
   8.5. Battery readings, lubrication oil or cooling water levels are abnormal.

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

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

2015 International Wildland-Urban Interface Code

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

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

Approval as a result of an inspection shall not be construed to be an approval of a violation of the provisions of this code or of other ordinances of the jurisdiction. Inspections presuming to give authority to violate or cancel the provisions of this code or of other ordinances of the jurisdiction shall not be valid.

Where required by the code official, a survey of the lot shall be provided to verify that the mitigation features are provided and the building or structure is located in accordance with the *approved* plans.

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

ALTERNATIVE CONCEPTS

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

Exterior sprinkler systems. Currently, there is no nationally accepted standard for the design and installation of exterior fire sprinkler systems. Interior sprinkler systems are regulated by nationally recognized standards that have specific requirements. However, exterior sprinkler systems lack such

uniformity. What is generally proposed is a type of sprinkler system, placed on the roofs or eaves of a building, whose primary purpose is to wet down the roof. These types of systems can be activated either manually or automatically. However, the contemporary thought on exterior sprinkler systems is that if the roof classification is of sufficient fire resistance, exterior sprinklers are of little or no value.

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

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

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

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

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

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

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

A Fire Protection Plan describes ways to minimize the fire problems created by a specific project or development. The purpose for the Fire Protection Plan is to reduce the burden and impact of the project or development on the community's fire protection delivery system. The plan may utilize components of land use, building construction, vegetation management and other design techniques and technologies. It should include specific mitigation measures consistent with the unique problems resulting from the

location, topography, geology, flammable vegetation and climate of the proposed site. The plan shall be consistent with this code, and *approved* by the fire code official. The cost of preparation and review is to be borne by the project or development proponent.

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

2015 International Mechanical Code

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

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

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

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

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

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

Report of Committee Action Hearings

Committee Action: **Disapproved**

Committee Reason: This proposal was preferred over F1-16 however there were concerns with how certain sections were addressing the replacement of the term accessible. In particular Sections 106.3 and 605.12 were noted. This proposal needs a more careful review of each section for specific wording to meet the intent.

Assembly Action: **None**

Public Comments

Public Comment 1:

Michael O'Brian representing Fire Code Action Committee (fcac@iccsafe.org) requests Approve as Modified by this Public Comment.

Modify as follows:

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

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

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

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

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

315.6 Storage in plenums. Storage shall not be permitted in plenums. Abandoned material in plenums shall be deemed to be storage and shall be removed. Where located in plenums, the portion of abandoned cables that ~~is open for access and that are not~~ able to accessed without causing damage, or requiring demolition to the building, shall be identified for future use with a tag or shall be deemed storage and shall be removed.

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

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

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

603.1.5 Access. The installation shall ~~have ready access~~ be provided with *access to* equipment for cleaning hot surfaces; removing burners; replacing motors, controls, air filters, chimney connectors, draft regulators and other working parts; and for adjusting, cleaning and lubricating parts.

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

605.12 Abandoned wiring in plenums. ~~Portions of abandoned~~ Abandoned cables in ~~air-handling plenums that have access shall be removed. Cables~~ plenums that are ~~unused and have not been~~ able to be accessed without causing damage, or requiring demolition to the building, shall be tagged for future use or shall be ~~considered abandoned~~ removed.

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

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

703.1 Maintenance. The required *fire-resistance rating* of fire-resistance-rated construction, including, but not limited to, walls, firestops, shaft enclosures, partitions, *smoke barriers*, floors, fire-resistive coatings and sprayed fire-resistant materials applied to

structural members and fire-resistant joint systems, shall be maintained. Such elements shall be visually inspected by the *owner* annually and properly repaired, restored or replaced where damaged, altered, breached or penetrated. Records of inspections and repairs shall be maintained. Where concealed, such elements shall not be required to be visually inspected by the *owner* unless the concealed space is able to be accessed by the removal or movement of a panel, access door, ceiling tile or similar movable entry to the space. Openings made therein for the passage of pipes, electrical conduit, wires, ducts, air transfer openings and holes made for any reason shall be protected with *approved* methods capable of resisting the passage of smoke and fire. Openings through fire-resistance-rated assemblies shall be protected by self- or automatic-closing doors of *approved* construction meeting the fire protection requirements for the assembly.

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

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

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

905.5 Location of Class II standpipe hose connections. Class II standpipe hose connections ~~shall be have access and~~ shall be located so that all portions of the building are within 30 feet (9144 mm) of a nozzle attached to 100 feet (30 480 mm) of hose. Class II standpipe hose connections shall be located where they will have *ready access*.

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

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

Exceptions:

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

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

Exceptions:

1 A manual fire alarm system is not required in buildings not more than two stories in height where all individual *sleeping units* and contiguous attic and crawl spaces to those units are separated from each other and public or common areas by not less than 1-hour *fire partitions* and each individual *sleeping unit* has an *exit* directly to a *public way*, *egress court* or yard.

2. Manual fire alarm boxes are not required throughout the building where all of the following conditions are met:
   2.1. The building is equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2.
   2.2. The notification appliances will activate upon sprinkler water flow.
   2.3. Not fewer than one manual fire alarm box is installed at an *approved* location.
   2.4. Manual fire alarm boxes in resident or patient sleeping areas shall not be required at *exits* where located at all nurses' control stations or other constantly attended staff locations, provided such ~~stations~~ manual fire alarm boxes are visible, provided with *ready access* and ~~continuously available for access and that~~ the distances of travel required in Section 907.4.2.1 are not exceeded.

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

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

1. Airport traffic control cab.
2. Electrical and mechanical equipment rooms.
3. Airport terminal radar and electronics rooms.
4. Office spaces incidental to the tower operation.
5. Lounges for employees, including sanitary facilities.
6. *Means of egress*.
7. Utility shafts ~~with access~~ where *access to* smoke detectors can be provided.

907.4.2.6 Unobstructed and unobscured. Manual fire alarm boxes shall be ~~accessible~~ provided with *ready access*, unobstructed, unobscured and visible at all times.

907.8.2 Testing. Testing shall be performed in accordance with the schedules in NFPA 72 or more frequently where required by the *fire code official*. Records of testing shall be maintained.

> **Exception:** Devices or equipment that are ~~not available for access~~ inaccessible because of safety considerations shall be tested during scheduled shutdowns where *approved* by the *fire code official*, but not less than every 18 months.

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

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

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

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

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

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

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

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

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

2303.2 Emergency disconnect switches. An *approved* ~~clearly identified~~ emergency disconnect switch ~~with ready access~~ shall be provided at an *approved* location to stop the transfer of fuel to the fuel dispensers in the event of a fuel spill or other emergency. The emergency disconnect switch for exterior fuel dispensers shall be provided with *ready access* and shall be located within 100 feet (30 480 mm) of, but not less than 20 feet (6096 mm) from, the fuel dispensers. For interior fuel-dispensing operations, the emergency disconnect switch shall be provided with *ready access* and be installed at an *approved* location. Such devices shall be distinctly *labeled* as: EMERGENCY FUEL SHUTOFF. Signs shall be provided in *approved* locations.

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

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

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

Exceptions:

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

2404.7.8.2 Attachment. Overspray collection filters shall be readily removable and ~~have access~~ able to be accessed for cleaning or replacement.

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

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

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

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

Exceptions:

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

2703.10.4.4.5 Maintenance and inspection. ~~Sprinklers~~ *Access to* sprinklers in exhaust ducts shall ~~have access~~ be provided for periodic inspection and maintenance.

2903.3 Fire-fighting access. ~~Organic~~ The fire department shall be able to access the organic coating manufacturing operations ~~shall have access~~ from not less than one side for the purpose of fire control. *Approved aisles* shall be maintained for the unobstructed movement of personnel and fire suppression equipment.

3201.4 ~~Evacuation~~ Fire safety and evacuation plan. Where required by ~~the *fire code official*~~ Section 403, ~~an~~ a fire safety and evacuation plan ~~for areas open to the public and a separate set of plans indicating location and width of *aisles*, location of *exits*, *exit access* doors, *exit* signs, height of storage, and locations of hazardous materials~~ shall be submitted at the time of permit application for review and approval. Following approval of the ~~plans~~ plan, a copy of the *approved* ~~plans~~ plan shall be maintained on the premises in an *approved* location.

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

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 or where an equivalent means of communication has been *approved* the site address and fire department emergency telephone number shall be posted at the main entrance to the site, in guard shacks and in the construction site office.

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

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

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

   Health Class 3 or 4
   Flammability Class 4
   Instability Class 3 or 4

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

   Exceptions:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

1. Sprinkler and standpipe system piping and fittings having any of the following conditions:
   1.1. Signs of leakage.
   1.2. Evidence of corrosion.
   1.3. Misalignment.
   1.4. Mechanical damage.
2. Sprinkler piping support having any of the following conditions:
   2.1. Materials resting on or hung from sprinkler piping.
   2.2. Damaged or loose hangers or braces.
3. Class II and Class III standpipe systems having any of the following conditions:
   3.1. No hose or nozzle, where required.
   3.2. Hose threads incompatible with fire department hose threads.
   3.3. Hose connection cap missing.
   3.4. Mildew, cuts, abrasions and deterioration evident.
   3.5. Coupling damaged.
   3.6. Gaskets missing or deteriorated.
   3.7. Nozzle missing or obstructed.
4. Hose racks and cabinets having any of the following conditions:
   4.1. Difficult to operate or damaged.
   4.2. Hose improperly racked or rolled.
   4.3. Inability of rack to swing 90 degrees (1.57 rad) out of the cabinet.
   4.4. Cabinet locked, except as permitted by this code.
   4.5. Cabinet door will not fully open.

4.6. Door glazing cracked or broken.

5. Portable fire extinguishers having any of the following conditions:
   5.1. Broken seal or tamper indicator.
   5.2. Expired maintenance tag.
   5.3. Pressure gauge indicator in "red."
   5.4. Signs of leakage or corrosion.
   5.5. Mechanical damage, denting or abrasion of tank.
   5.6. Presence of repairs such as welding, soldering or brazing.
   5.7. Damaged threads.
   5.8. Damaged hose assembly, couplings or swivel joints.
6. Fire alarm and detection control equipment, initiating devices and notification appliances having any of the following conditions:
   6.1. Corroded or leaking batteries or terminals.
   6.2. Smoke detectors having paint or other ornamentation that is not factory-applied.
   6.3. Mechanical damage to heat or smoke detectors.
   6.4. Tripped fuses.
7. Fire department connections having any of the following conditions:
   7.1. Fire department connections are not visible or ~~available for access~~ able to accessed from the fire apparatus access road.
   7.2. Couplings or swivels are damaged
   7.3. Plugs and caps are missing or damaged.
   7.4. Gaskets are deteriorated.
   7.5. Check valve is leaking.
   7.6. Identification signs are missing.
8. Fire pumps having any of the following conditions:
   8.1. Pump room temperature is less than 40°F (4.4°C).
   8.2. Ventilating louvers are not freely operable.
   8.3. Corroded or leaking system piping.
   8.4. Diesel fuel tank is less than two-thirds full.
   8.5. Battery readings, lubrication oil or cooling water levels are abnormal.

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

L104.14.1 Location. The location of the external mobile air connection shall be ~~available for access by mobile air apparatus and~~ *approved* by the fire chief. Access to the external mobile air connection shall be provided for use by mobile air apparatus.

2015 International Wildland-Urban Interface Code

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

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

Approval as a result of an inspection shall not be construed to be an approval of a violation of the provisions of this code or of other ordinances of the jurisdiction. Inspections presuming to give authority to violate or cancel the provisions of this code or of other ordinances of the jurisdiction shall not be valid.

Where required by the code official, a survey of the lot shall be provided to verify that the mitigation features are provided and the building or structure is located in accordance with the *approved* plans.

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

ALTERNATIVE CONCEPTS

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

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

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

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

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

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

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

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

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

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

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

2015 International Mechanical Code

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

Commenter's Reason: This Public Comment responds to two issues raised and the CAH in Louisville.

First, when comparing the approach between F1 and F12, the approach taken by F12 was preferred at the CAH. So this Public Comment takes the approach of using the terms "access to" and ready access" when referring to the ability to use or access controls or components. The term 'accessible' is defined in the IBC and relates to elements and facilities that serve or have special accommodations for persons with mobility impairments. The terms "access to" and "ready access" are used in the IPC and IMC. Those definitions are proposed to be included here.

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

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

Second, issues were raised regarding the actual wording proposed for the various sections throughout the codes. This Public Comment has reviewed each occurrence and made revisions as needed. The items shown in the Public Comment are revisions to the original proposal. Revisions from the original proposal which were found to be satisfactory are listed at the end of this reason statement.

Additionally, other code change proposals were heard at the Committee Action Hearing in Louisville that affected some of the sections contained in this Public Comment. The following sections contain modifications based on the CAH actions so that it is clear how the revised wording herein will fit with the other proposals.

Section #	Code Change Item #	CAH Result
IFC 106.3	ADM82-16	Approved as Modified
IFC 3201.4	F313-16	Approved as Submitted
IFC 3206.6.1	F316-16	Approved as Submitted
IFC 3309.1	F327-16	Approved as Modified
IWUIC 109.1.1	ADM82-16	Approved as Modified

In addition to the definitions above, the following sections were revised in the original proposal and no modifications to these sections are included in this Public Comment. These sections will go forward with the modifications shown in the original proposal.

IFC 311.21
IFC 403.10.2.2.1
IFC 907.2
IFC 907.2.6.3.3
IFC 2301.1
IFC 2306.2.5
IFC 3206.9.1.1
IFC 3313.1
IFC 3503.6
IFC 5004.2.3
IFC 5303.5.3
IFC 5606.5.2.1
IFC 5606.5.2.3
IFC 5704.2.9.6.2
IFC 5704.3.5.4
IFC 5704.3.6.2
IFC 5706.5.4.5
IFC 6109.9
IFC 6109.10
IFC 6109.15

This public comment is submitted by the ICC Fire Code Action Committee (FCAC). The FCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance assigned International Codes with regard to fire safety and hazardous materials in new and existing buildings and facilities and the protection of life and property in wildland urban interface areas. In 2014, 2015 and 2016 the Fire-CAC has held 7 open meetings. In addition, there were numerous conference calls, Regional Work Group and Task Group meetings for the current code development cycle, which included members of the committees as well as any interested parties, to discuss and debate the proposed changes. Related documentation and reports are posted on the FCAC website at: FCAC

Final Action Results

F12-16 **AMPC1**

Code Change No: F274-16

Original Proposal

Section: 2311, 2311.7, 2311.7.1 (New), 2311.7.1, 2311.7.1.1, 2311.7.1.2, 2311.7.2, 2311.7.2.1, 2311.7.2.1.1, 2311.7.2.2, 2311.7.2.3; IMC: [F]502.16, [F]502.16.1 (New), [F]502.16.2 (New), [F]502.16.1, [F]502.16.2, Chapter 15; IFGC: 703.1, 703.1.1 (IMC: [FG] 304.5.1) 703.1.1.1 (IMC: [FG] 304.5.1.1),703.1.1.2 (IMC [FG] 304.5.1.2), 703.1.2 (IMC:[FG] 304.5.2), 703.1.3 (IMC:[FG] 304.5.3), Chapter 8

Proponent: Robert Davidson, Davidson Code Concepts, LLC, representing Quong & Associates, Inc./Toyota (rjd@davidsoncodeconcepts.com) ; Martin Gresho (marty@fp2fire.com)

Revise as follows:

CHAPTER 23
MOTOR FUEL-DISPENSING FACILITIES AND REPAIR GARAGES

SECTION 2311
REPAIR GARAGES

2311.7 Repair garages for vehicles fueled by lighter-than-air fuels. Repair garages for the conversion and repair of vehicles that use CNG, liquefied natural gas (LNG), hydrogen or other lighter-than-air motor fuels shall be in accordance with Sections 2311.7 through ~~2311.7.2.3~~ 2311.7.3.3 in addition to the other requirements of Section 2311.

Exceptions:

1. Repair garages where work is not performed on the fuel system and is limited to exchange of parts and maintenance not requiring open flame or welding on the CNG-, LNG-, hydrogen- or other lighter-than-air-fueled motor vehicle.
2. Repair garages for hydrogen-fueled vehicles where work is not performed on the hydrogen storage tank and is limited to the exchange of parts and maintenance not requiring open flame or welding on the hydrogen-fueled vehicle. During the work, the entire hydrogen fuel system shall contain ~~a quantity that is~~ less than 200 cubic feet (5.6 m^3) of hydrogen.

Add new text as follows:

2311.7.1 Repair garages used for the repair of hydrogen-fueled vehicles. Repair garages used for the repair of hydrogen-fueled vehicles shall be provided with an approved exhaust ventilation system in accordance with the International Mechanical Code and Chapter 6 of NFPA 2.

Revise as follows:

~~2311.7.1~~ **2311.7.2 Exhaust Ventilation System.** Repair garages used for the repair of CNG, liquefied natural gas~~-~~ (LNG), or ~~hydrogen-fueled vehicles~~ other lighter-than-air motor fuels other than hydrogen shall be provided with an *approved* mechanical exhaust ventilation system. The mechanical ventilation system shall be in accordance with the *International Mechanical Code* and Sections ~~2311.7.1.1~~ 2311.7.2.1 and ~~2311.7.1.2~~ 2311.7.2.2.

Exception: ~~Repair garages with natural ventilation when *approved*.~~ Where approved by the fire code official, natural ventilation shall be permitted in lieu of mechanical exhaust ventilation.

~~2311.7.1.1~~ **2311.7.2.1 Design.** Indoor locations shall be ~~ventilated~~ exhausted utilizing air supply inlets and exhaust outlets arranged to provide uniform air movement to the extent practical. Inlets shall be uniformly arranged on ~~exterior~~ walls near floor level. Outlets shall be located at the high point of the room in ~~exterior~~ walls or the roof.

~~Ventilation~~ Exhaust ventilation shall be by a continuous mechanical exhaust ventilation system or by a mechanical exhaust ventilation system activated by a continuously monitoring natural gas detection system ~~or, for hydrogen, a continuously monitoring flammable gas detection system, each~~ activating at a gas concentration of not more than 25 percent of the lower flammable limit (LFL). In all cases, the system shall shut down the fueling system in the event of failure of the ventilation system.

The exhaust ventilation rate shall be not less than 1 cubic foot per minute per 12 cubic feet [0.00139 $m^3 \times (s \cdot m^3)$] of room volume.

2311.7.2.2 Operation. ~~Activation of the gas detection~~ The mechanical exhaust ventilation system shall ~~result in all the following:~~ operate continuously.

~~1. Initiation of distinct audible and visual alarm signals in the repair garage.~~
~~2. Deactivation of all heating systems located in the repair garage.~~
~~3. Activation of the mechanical ventilation system, where the system is interlocked with gas detection.~~

Exceptions:

1. Mechanical exhaust ventilation systems that are interlocked with a gas detection system designed in accordance with Sections 2311.7.3 through 2311.7.3.3.
2. Mechanical exhaust ventilation systems in repair garages that are used only for repair of vehicles fueled by liquid fuels or odorized gases, such as CNG, where the exhaust ventilation system is electrically interlocked with the lighting circuit.

~~2311.7.2~~ **2311.7.3 Gas detection system.** *No change to text.*

~~2311.7.2.1~~ **2311.7.3.1 System design.** *No change to text.*

~~2311.7.2.1.1~~ **2311.7.3.1.1 Gas detection system components.** *No change to text.*

~~2311.7.2.2~~ **2311.7.3.2 Operation.** Activation of the gas detection system shall result in all the following:

1. Initiation of distinct audible and visual alarm signals in the repair garage.
2. Deactivation of all heating systems located in the repair garage.
3. Activation of the mechanical exhaust ventilation system, where the system is interlocked with gas detection.

~~2311.7.2.3~~ **2311.7.3.3 Failure of the gas detection system.** Failure of the gas detection system shall result in the deactivation of the heating system, activation of the mechanical exhaust ventilation system where the system is interlocked with the gas detection system and cause a trouble signal to sound in an *approved* location.

2015 International Mechanical Code

Revise as follows:

[F] 502.16 Repair garages for ~~natural gas and hydrogen fueled~~ vehicles fueled by lighter-than-air fuels. Repair garages used for the conversion and repair of vehicles which use CNG, liquefied natural

gas (LNG), hydrogen or ~~hydrogen-fueled vehicles~~ other lighter-than-air motor fuels shall be provided with an *approved* mechanical exhaust ventilation system. The mechanical exhaust ventilation system shall be in accordance with Sections 502.16.1 ~~and~~ or 502.16.2 as applicable.

~~Exception~~ Exceptions: ~~Where *approved* by the code official, *natural ventilation* shall be permitted in lieu of mechanical ventilation.~~

1. Repair garages where work is not performed on the fuel system and is limited to exchange of parts and maintenance not requiring open flame or welding on the CNG-, LNG-, hydrogen- or other lighter-than-air-fueled motor vehicle.
2. Repair garages for hydrogen-fueled vehicles where work is not performed on the hydrogen storage tank and is limited to the exchange of parts and maintenance not requiring open flame or welding on the hydrogen-fueled vehicle. During the work, the entire hydrogen fuel system shall contain a quantity that is less than 200 cubic feet (5.6 m3) of hydrogen.

Add new text as follows:

[F] 502.16.1 Repair garages used for the repair of hydrogen-fueled vehicles Repair garages used for the repair of hydrogen-fueled vehicles shall be provided with an approved exhaust ventilation system in accordance with this code and Chapter 6 of NFPA 2.

[F] 502.16.2 Exhaust ventilation system Repair garages used for the repair of CNG, liquefied natural gas (LNG), or other lighter-than-air motor fuels other than hydrogen shall be provided with an approved mechanical exhaust ventilation system. The mechanical exhaust ventilation system shall be in accordance with this code and Sections 502.16.2.1 and 502.16.2.2.

Exception: Where approved by the code official, natural ventilation shall be permitted in lieu of mechanical exhaust ventilation.

Revise as follows:

[F] ~~502.16.1~~502.16.2.1 Design. Indoor locations shall be ~~ventilated~~ exhausted utilizing air supply inlets and exhaust outlets arranged to provide uniform air movement to the extent practical. Inlets shall be uniformly arranged on ~~exterior~~ walls near floor level. Outlets shall be located at the high point of the room in ~~exterior~~ walls or the roof.

~~Ventilation~~ Exhaust ventilation shall be by a continuous mechanical exhaust ventilation system or by a mechanical exhaust ventilation system activated by a continuously monitoring natural gas detection system, ~~or for hydrogen, a continuously monitoring flammable gas detection system, each~~ activating at a gas concentration of 25 percent of the lower flammable limit (LFL). In all cases, the system shall shut down the fueling system in the event of failure of the exhaust ventilation system.

The exhaust ventilation rate shall be not less than 1 cubic foot per minute per 12 cubic feet [0.00138 $m^3/(s \cdot m^3)$] of room volume.

[F] ~~502.16.2~~ 502.16.2.2 Operation. The mechanical exhaust ventilation system shall operate continuously.

Exceptions:

1. Mechanical exhaust ventilation systems that are interlocked with a gas detection system designed in accordance with the *International Fire Code*.
2. Mechanical exhaust ventilation systems in garages that are used only for the repair of vehicles fueled by liquid fuels or odorized gases, such as CNG, where the exhaust ventilation system is electrically interlocked with the lighting circuit.

2015 International Fuel Gas Code

703.1 Hydrogen-generating and refueling operations. Hydrogen-generating and refueling appliances shall be installed and located in accordance with their listing and the manufacturer's instructions. ~~Ventilation~~ Exhaust ventilation shall be required in ~~accordance with Section 703.1.1, 703.1.2 or 703.1.3 in~~ public garages, private garages, repair garages, automotive motor fuel-dispensing facilities and parking garages that contain hydrogen-generating appliances or refueling systems in accordance with NFPA 2. For the purpose of this section, rooms or spaces that are not part of the living space of a dwelling unit and that communicate directly with a private garage through openings shall be considered to be part of the private garage.

Delete without substitution:

~~**703.1.1 Natural ventilation.** Indoor locations intended for hydrogen-generating or refueling operations shall be limited to a maximum floor area of 850 square feet (79 m^2) and shall communicate with the outdoors in accordance with Sections 703.1.1.1 and 703.1.1.2. The maximum rated output capacity of hydrogen generating appliances shall not exceed 4 standard cubic feet per minute (0.00189 m^3/s) of hydrogen for each 250 square feet (23.2 m^2) of floor area in such spaces. The minimum cross-sectional dimension of air openings shall be 3 inches (76 mm). Where ducts are used, they shall be of the same cross-sectional area as the free area of the openings to which they connect. In such locations, equipment and appliances having an ignition source shall be located such that the source of ignition is not within 12 inches (305 mm) of the ceiling.~~

~~**703.1.1.1 Two openings.** Two permanent openings shall be provided within the garage. The upper opening shall be located entirely within 12 inches (305 mm) of the ceiling of the garage. The lower opening shall be located entirely within 12 inches (305 mm) of the floor of the garage. Both openings shall be provided in the same exterior wall. The openings shall communicate directly with the outdoors and shall have a minimum free area of $^1/_2$ square foot per 1,000 cubic feet (1 m^2/ 610 m^3) of garage volume.~~

~~**703.1.1.2 Louvers and grilles.** In calculating the free area required by Section 703.1.1.1, the required size of openings shall be based on the net free area of each opening. If the free area through a design of louver or grille is known, it shall be used in calculating the size opening required to provide the free area specified. If the design and free area are not known, it shall be assumed that wood louvers will have 25-percent free area and metal louvers and grilles will have 75-percent free area. Louvers and grilles shall be fixed in the open position.~~

~~**703.1.2 Mechanical ventilation.** Indoor locations intended for hydrogen-generating or refueling operations shall be ventilated in accordance with Section 502.16 of the *International Mechanical Code*. In such locations, *equipment* and appliances having an *ignition source* shall be located such that the source of ignition is below the mechanical ventilation *outlet*(s).~~

~~**703.1.3 Specially engineered installations.** As an alternative to the provisions of Sections 703.1.1 and 703.1.2, the necessary supply of air for ventilation and dilution of flammable gases shall be provided by an *approved* engineered system.~~

Reference standards type: This is an update to reference standard(s) already in the ICC Code Books
Add new standard(s) as follows:

IMC and IFGC
NFPA 2-2016 *Hydrogen Technologies Code*

Reason: This proposal is a comprehensive fix of the exhaust ventilation requirements for repair garages for hydrogen fueled vehicles and for exhaust ventilation requirements for the installation hydrogen-generating and refueling operations. The primary goal was consistency and correlation between the requirements found within the IFC, the IMC and the IFGC along with tighter correlation with the requirements of NFPA 2. (A special note: Currently the hydrogen exhaust requirements are blended with the requirements for other lighter than air fuels; this proposal separates those technical requirements with no technical change other than for hydrogen.)

Section 2311.7 of the fire code has been modified to separate the requirements for hydrogen fueled vehicles from other lighter than air fueled vehicles. A new Section 2311.7.1 has been added to direct the code user to NFPA 2 for hydrogen fueled vehicle repair garages.

All of the requirements for exhaust of repair garages for hydrogen fuel vehicles is covered in NFPA 2 where the IFC already directs the user for the overwhelming majority of the hydrogen as a fuel construction and operation requirements regulated by the fire code. In addition, the air exhaust rate is different in NFPA 2 for hydrogen and this proposal would point the user to the correct exhaust rate.

The exception language in 2311.7.2 (new numbering) was modified to match existing verbiage found in the IMC.

The word exhaust was added to or replaced references to ventilation throughout 2311.7 to correlate with the type of system being required in accordance with Chapter 5 Exhaust in the IMC.

The IMC correlating language found in Section 502.16 has been modified to match the scoping language found within the IFC as to types of fuels covered. The technical language has been aligned to pick up earlier changes to the IFC over several cycles as well as the new modifications proposed to separate out hydrogen fueled vehicles and point to NFPA 2 for those facilities.

Section 304.5 of the IMC, the correlating Section 703.1 of the IFGC address exhaust ventilation for occupancies with Hydrogen-generating and refueling appliances. The language has been modified to delete the three subsections and point the user to NFPA 2 where the requirements are covered. Eliminating the language provides clarification and eliminates a conflict within the mechanical code, Option 1 was natural ventilation with very specific requirements; Option 2 was mechanical exhaust which points to Section 502.16 of the mechanical code which again provided for a natural ventilation exception with no specific requirements. Option 3 was for a specialty engineered system with no parameters, as a result a designer would default to NFPA 2 for guidance.

By deleting the three options and pointing the user to NFPA 2 the correct requirements are provided including a natural ventilation option along with the other comprehensive portions of NFPA 2 that apply to this specialized type of installation.

The provisions NFPA 2 - related to the issues addressed in this proposal are found in Section 6.17 of NFPA 2-2016. A link to the NFPA website where free access is provided to the standard is as follows: NFPA 2

Cost Impact: Will not increase the cost of construction

This proposal will reduce the cost of installation by eliminating an internal conflict within the IMC, by correlating all of the ICC codes dealing with this topic, and by providing for tighter correlation with NFPA 2 which the I-Codes already refer to for these types of installations.

Report of Committee Action Hearings

Committee Action: **Approved as Submitted**

Committee Reason: This proposal was approved based upon the proponent's reason statement.

Assembly Action: **None**

Final Action Results

F274-16 **AS**